VOLTAGE REGULATOR WITH ON/OFF SWITCH

FEATURES

- Low Dropout Voltage
- Pass Transistor Terminals Available
- Very Low Standby Current (ON, No Load)
- Very Low (<200 nA) Current in OFF Mode
- Low Output Noise
- Internal Thermal Shutdown
- Short Circuit Protection
- Available on Tape and Reel

APPLICATIONS

- Cordless Telephones
- Pagers
- Battery Powered Systems
- Personal Communications Equipment
- Portable Instrumentation
- Radio Control Systems
- Toys
- Low Voltage Systems
- Portable Consumer Equipment

DESCRIPTION

The TK115xx series devices are low power, linear regulators with electronic ON/OFF switches. Both active HIGH and active LOW control pins are provided.

An internal PNP pass-transistor is used in order to achieve low dropout voltage (typically 200 mV at 80 mA load current). A base drive is available at pin 7 for connection of an external pass transistor should higher current (up to 1 A) or lower dropout voltage is required.

An internal thermal shutdown circuit limits the junction temperature to below 150 °C. The load current is internally monitored, and the device will shut down in the presence of a short circuit at the output.

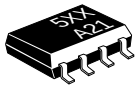
The TK115xx series is available in plastic surface mount SOP-8 packages.

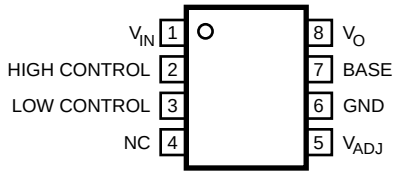
ABSOLUTE MAXIMUM RATINGS

Supply Voltage	16 V
Load Current	180 mA
Power Dissipation (Note 1)	600 mW
Storage Temperature Range	-55 to +150 °C
Operating Temperature Range	-30 to +80 °C
Lead Soldering Temp. (10 sec.)	260 °C
Junction Temperature	150 °C

Note 1: Derate output power by 4.8 mW/°C for operation above 25 °C.

TK115xxM





KT115xxM • PO

ORDERING INFORMATION

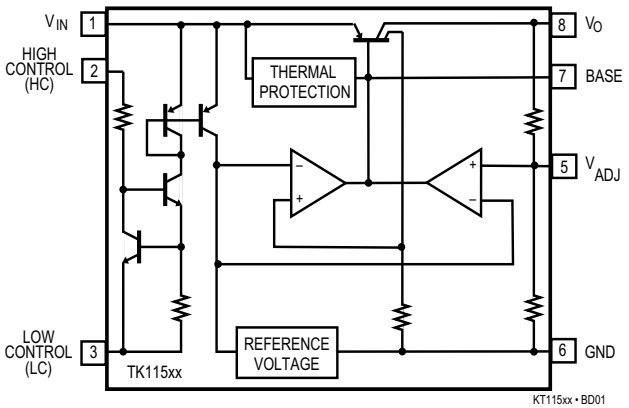
TK115 □□ M □□

Voltage Code

Tape/Reel Code

VOLTAGE CODE		TAPE/REEL CODE
30 = 3.0 V	45 = 4.5 V	BX : Bulk/Bag
32 = 3.25 V	47 = 4.75 V	TL : Tape Left
35 = 3.5 V	50 = 5.0 V	MG: Magazine
37 = 3.75 V	55 = 5.5 V	
40 = 4.0 V	80 = 8.0 V	

BLOCK DIAGRAM



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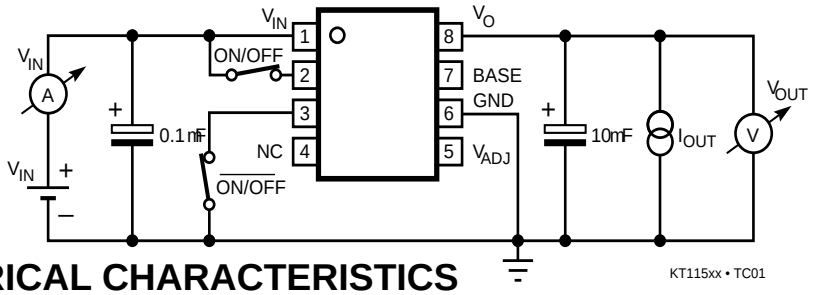
TEST CIRCUIT 1



TK11530 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 4.0 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 2.5 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 4.0 V, I_O = 30 mA	2.9	3.0	3.1	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 2.7 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 4V→9 V		5.0	30	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 4.0 V (Note 1)		18	50	mV
		I_O = 0 to 60 mA, V_{IN} = 4.0 V (Note 1)		36	80	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 4.5 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 4.5 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.3		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 4.0 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11532 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 4.2 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 2.5 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 4.2 V, I_O = 30 mA	3.15	3.25	3.35	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 2.95 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 4.2 V → 9.2 V		6.0	30	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 4.2 V (Note 1)		20	50	mV
		I_O = 0 to 60 mA, V_{IN} = 4.2 V (Note 1)		40	80	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 4.7 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 4.7 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.3		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 4.2 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11535 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 4.5 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 2.5 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 4.5 V, I_O = 30 mA	3.38	3.5	3.62	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 3.2 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 4.5 V → 9.5 V		6.0	30	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 4.5 V (Note 1)		20	55	mV
		I_O = 0 to 60 mA, V_{IN} = 4.5 V (Note 1)		40	95	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 5.0 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 5.0 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.3		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 4.5 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11537 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 4.75 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 3.3 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 4.75 V, I_O = 30 mA	3.625	3.75	3.88	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 3.45 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 4.75 V → 9.75 V		6.0	30	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 4.75 V (Note 1)		20	55	mV
		I_O = 0 to 60 mA, V_{IN} = 4.75 V (Note 1)		40	95	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 5.25 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 5.25 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.3		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 4.75 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11540 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 5.0 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 3.0 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 5.0 V, I_O = 30 mA	3.88	4.0	4.12	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 3.7 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 5.0 V → 10.0 V		8.0	40	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 5.0 V (Note 1)		24	60	mV
		I_O = 0 to 60 mA, V_{IN} = 5.0 V (Note 1)		48	100	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 5.5 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 5.5 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.4		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 5.0 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11545 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 5.5 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 3.5 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 5.5 V, I_O = 30 mA	4.36	4.5	4.64	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 4.2 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 5.5 V → 10.5 V		8.0	40	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 5.5 V (Note 1)		25	65	mV
		I_O = 0 to 60 mA, V_{IN} = 5.5 V (Note 1)		55	110	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 6.0 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 6.0 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.5		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 5.5 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11547 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 5.7 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 3.7 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 5.7 V, I_O = 30 mA	4.6	4.75	4.9	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 4.45 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 5.7 V → 10.7 V		8.0	40	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 5.7 V (Note 1)		25	70	mV
		I_O = 0 to 60 mA, V_{IN} = 5.7 V (Note 1)		50	120	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 6.2 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 6.2 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.6		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 5.7 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11550 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 6.0 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 4.0 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 6.0 V, I_O = 30 mA, T_A = 25 °C	4.85	5.0	5.15	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 4.7 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 6.0 V → 11 V		8.0	40	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 6.0 V (Note 1)		25	70	mV
		I_O = 0 to 60 mA, V_{IN} = 6.0 V (Note 1)		50	120	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 6.5 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 6.5 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.6		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 6.0 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11555 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 6.5 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 4.5 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 6.5 V, I_O = 30 mA	5.225	5.5	5.665	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 5.2 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 6.5 V → 11.5 V		8.0	40	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 6.5 V (Note 1)		25	70	mV
		I_O = 0 to 60 mA, V_{IN} = 6.5 V (Note 1)		50	120	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 7.0 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 7.0 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±0.6		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 6.5 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

TK11580 ELECTRICAL CHARACTERISTICS

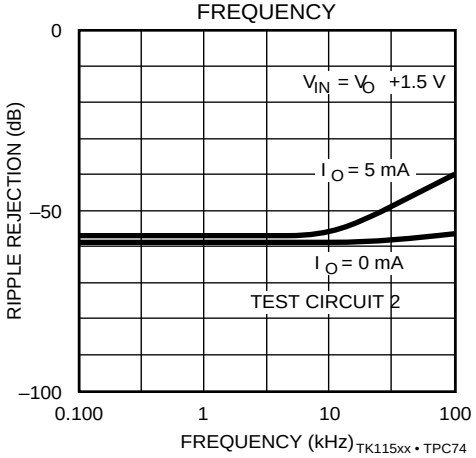
SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC1}	Supply Current 1	V_{IN} = 9.0 V, I_O = 0 mA		500	900	µA
I_{CC2}	Supply Current 2	V_{IN} = 7.0 V, I_O = 0 mA		1.4	2.5	mA
I_{CCS}	Standby Supply Current	V_{IN} = 14 V, Output Off		0.2	2.0	µA
V_O	Output Voltage	V_{IN} = 9.0 V, I_O = 30 mA	7.76	8.0	8.24	V
V_{DROP}	Voltage Dropout	I_O = 60 mA		0.13	0.35	V
I_O	Output Current	V_O = 7.7 V	100	130		mA
I_{OR}	Recommended Output Current				100	mA
LinReg	Line Regulation	V_{IN} = 9.0 V → 14.0 V		16.0	40	mV
LoaReg	Load Regulation	I_O = 0 to 30 mA, V_{IN} = 9.0 V (Note 1)		35	110	mV
		I_O = 0 to 60 mA, V_{IN} = 9.0 V (Note 1)		70	200	mV
RR	Ripple Regulation	100 mVrms, f = 400 Hz, V_{IN} = 9.5 V, I_O = 10 mA		55		dB
$\Delta V_O/\Delta T_A$	V_O Temperature Coefficient	V_{IN} = 9.5 V, I_O = 10 mA, -20 °C ≤ T_A ≤ 75 °C		±1.0		mV/°C
V_{NO}	Output Noise Voltage	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA		180		µVrms
I_B	Base Terminal Current	V_{IN} = 9.0 V	6	14	35	mA
Active High Control Terminal						
I_{HC}	HC Terminal Current	Output On, Connect LC & GND		2	40	µA
V_{HC1}	HC Terminal Voltage 1	Output On, Connect LC & GND	2.4		V_{IN}	V
V_{HC2}	HC Terminal Voltage 2	Output Off, Connect LC & GND	0		0.6	V
Active Low Control Terminal						
I_{LC}	LC Terminal Current	Output On, Connect HC & GND		35	120	µA
V_{LC1}	LC Terminal Voltage 1	Output On, Connect HC & GND	0		V_{IN}-2.5	V
V_{LC2}	LC Terminal Voltage 2	Output Off, Connect HC & GND	V_{IN}-0.2		V_{IN}	V

Note 1: This is a pulse measurement where T_J is constant. The output change due to temperature is not included.

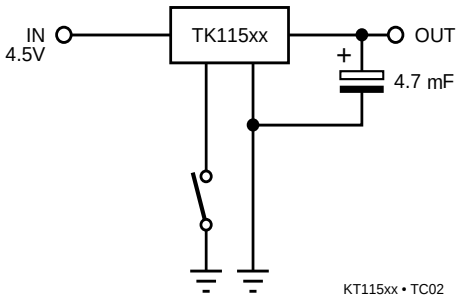
TYPICAL PERFORMANCE CHARACTERISTICS

COMMON CHARACTERISTICS T_A = 25 °C unless otherwise specified

RIPPLE REJECTION vs FREQUENCY

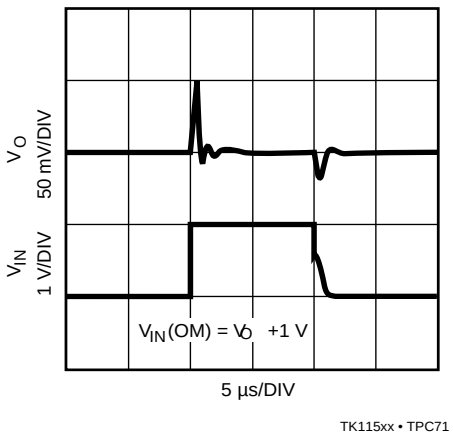


TEST CIRCUIT 2

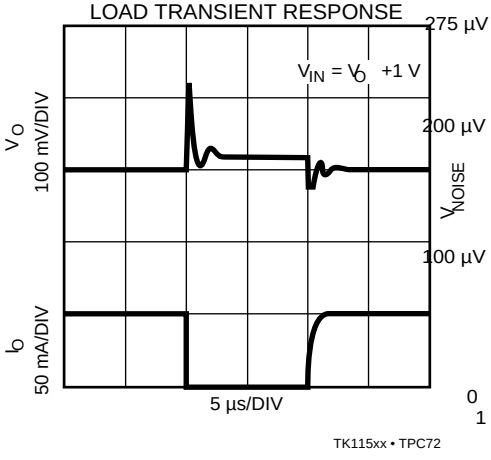


RIPPLE REJECTION TEST CIRCUIT

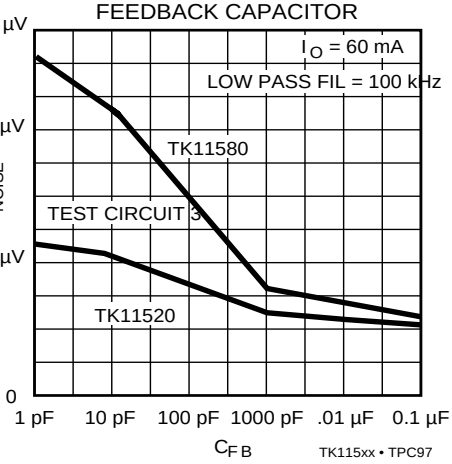
LINE TRANSIENT RESPONSE



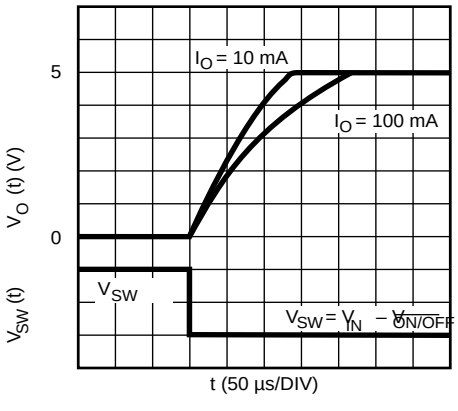
LOAD TRANSIENT RESPONSE



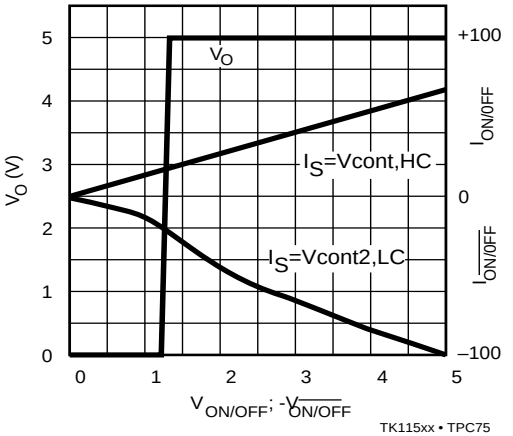
NOISE LEVEL vs FEEDBACK CAPACITOR



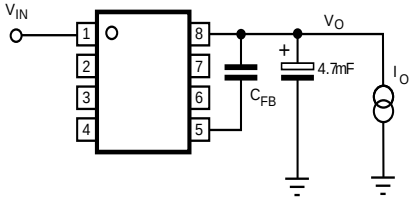
TURN ON TRANSIENT RESPONSE



CONTROL PIN CHARACTERISTICS



TEST CIRCUIT 3

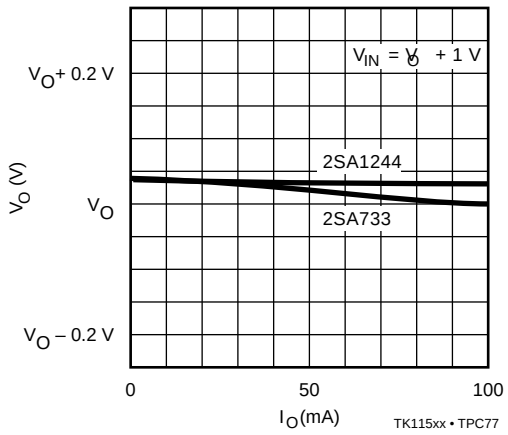


NOISE LEVEL TEST CIRCUIT

COMMON CHARACTERISTICS WITH EXTERNAL CURRENT BOOST TRANSISTOR (NEC 2SA733 OR TOSHIBA 2SA1244)

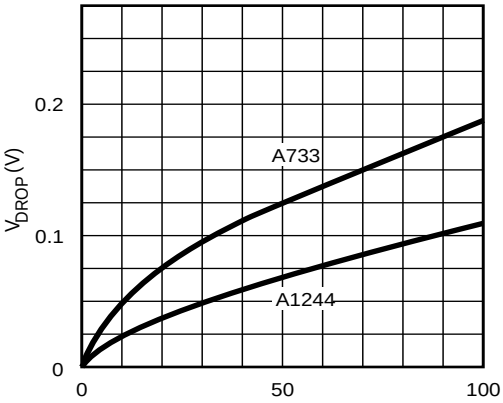
T_A = 25 °C unless otherwise specified

OUTPUT VOLTAGE vs OUTPUT CURRENT

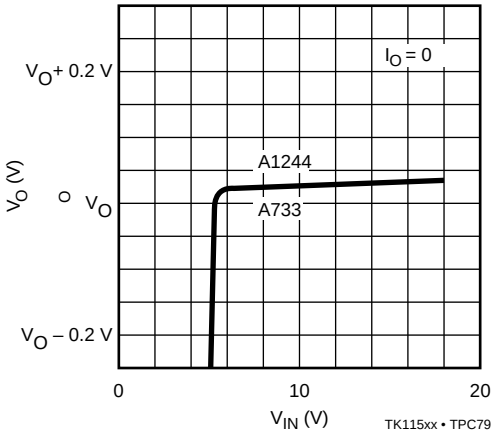


TK115xx • TPC77

DROPOUT VOLTAGE vs LOAD CURRENT

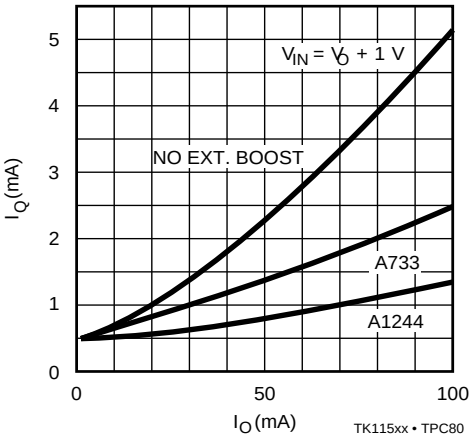


OUTPUT VOLTAGE vs INPUT VOLTAGE



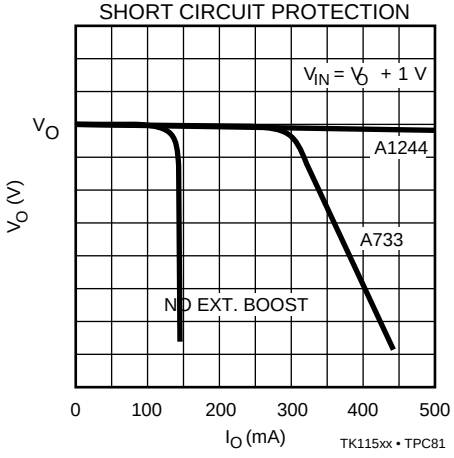
TK115xx • TPC79

QUIESCENT CURRENT vs LOAD CURRENT



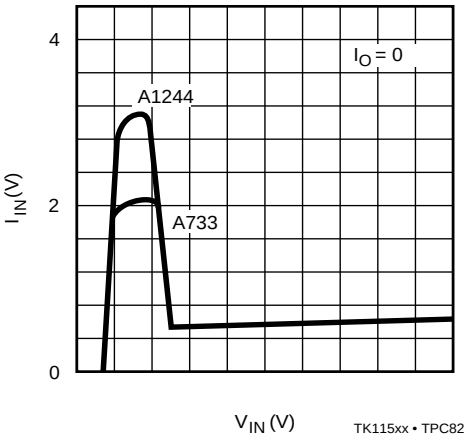
TK115xx • TPC80

SHORT CIRCUIT PROTECTION



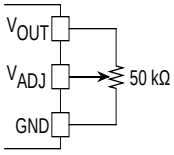
TK115xx • TPC81

INPUT CURRENT vs INPUT VOLTAGE



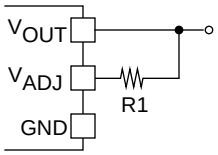
TK115xx • TPC82

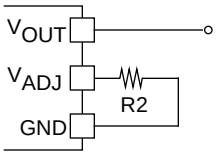
VOLTAGE ADJUSTMENT

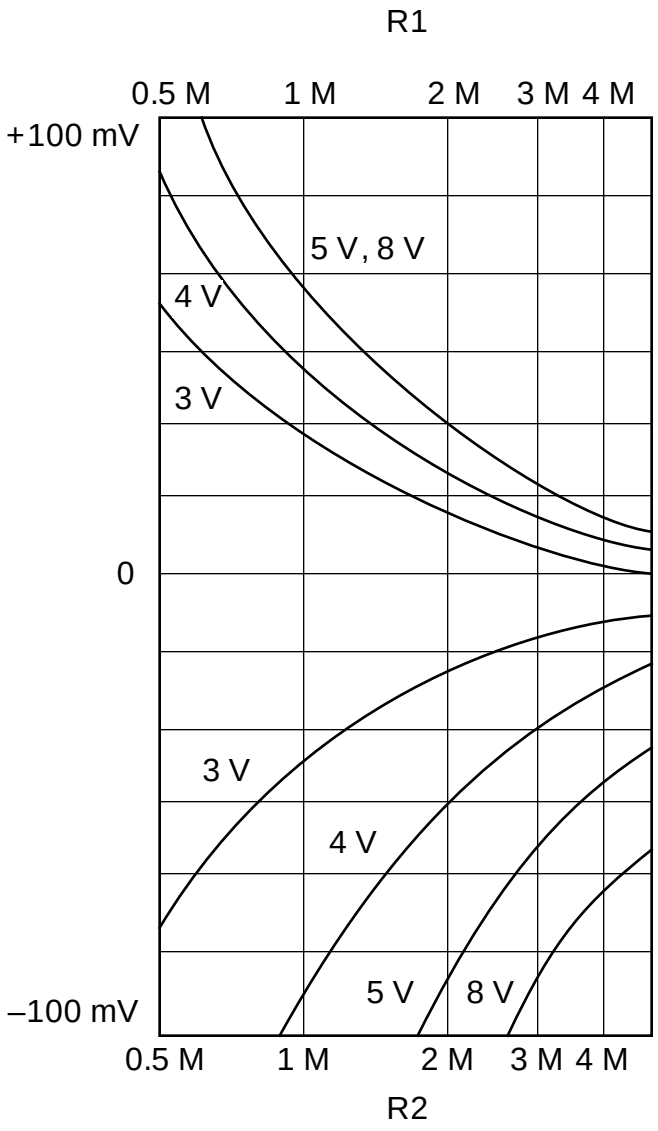


For large adjustment range use a 50 K potentiometer. This method gives good results when a voltage lower than the rated output is needed.

For small changes in output voltage use R1 to increase the output voltage or R2 to decrese the output voltage. The graph at right shows the approximate resistance values. The initial output voltage is indicated on the graph. (3 V = TK11530 etc.)

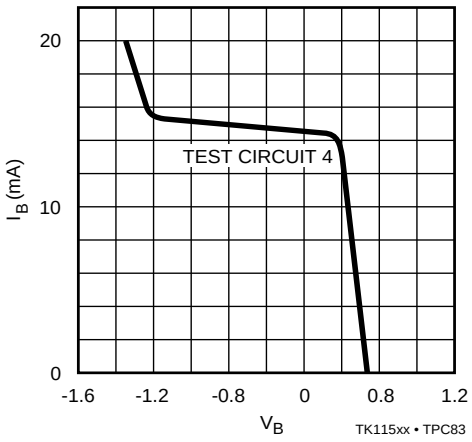




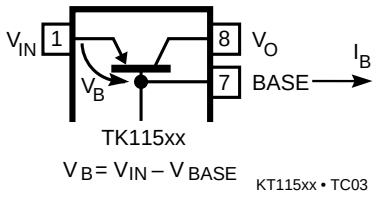


T_A = 25 °C unless otherwise specified

TK115xx INTERNAL
PASS TRANSISTOR



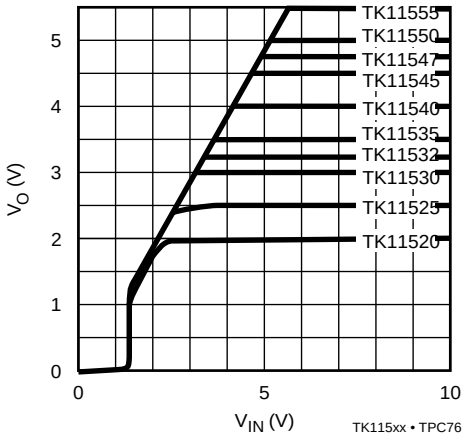
TEST CIRCUIT 4



$V_B = V_{IN} - V_{BASE}$

KT115xx • TC03

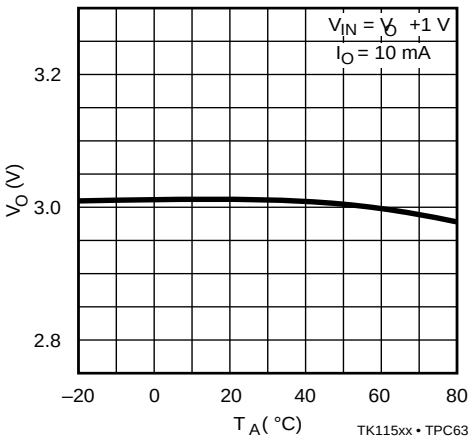
INPUT OUTPUT CHARACTERISTICS
(SWITCH ON)



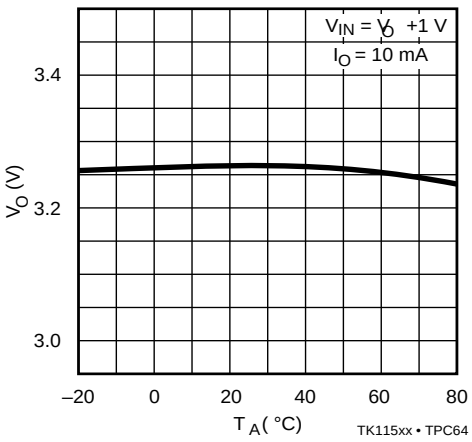
TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TEMPERATURE CHARACTERISTICS T_A = 25 °C unless otherwise specified

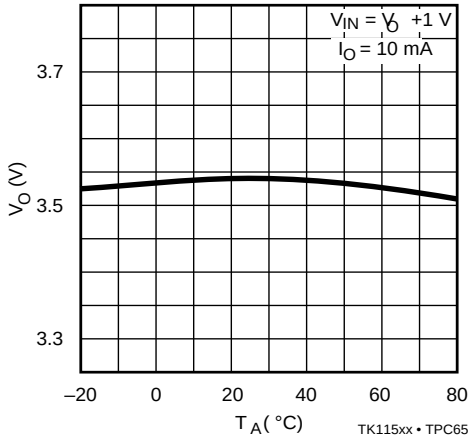
TK11530
OUTPUT VOLTAGE vs
TEMPERATURE



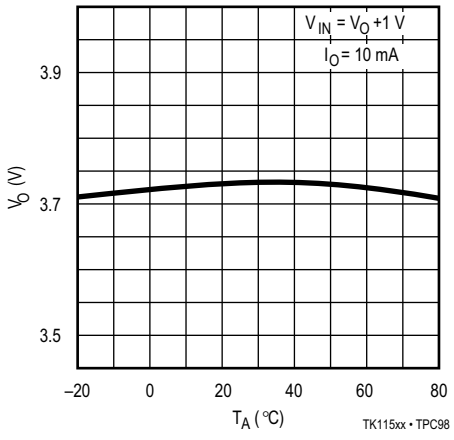
TK11532
OUTPUT VOLTAGE vs
TEMPERATURE



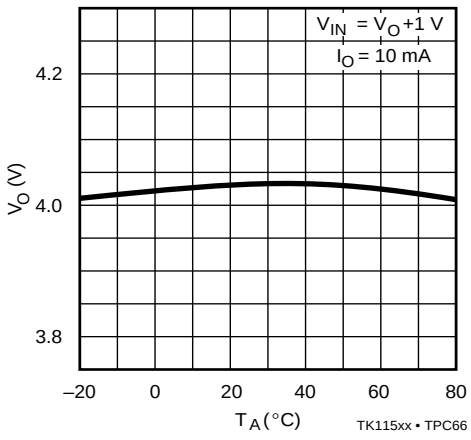
TK11535
OUTPUT VOLTAGE vs
TEMPERATURE



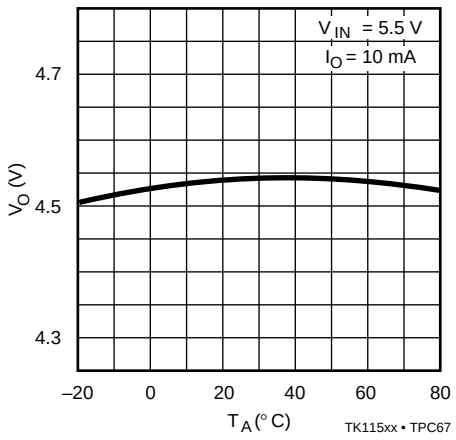
TK11537
OUTPUT VOLTAGE vs
TEMPERATURE



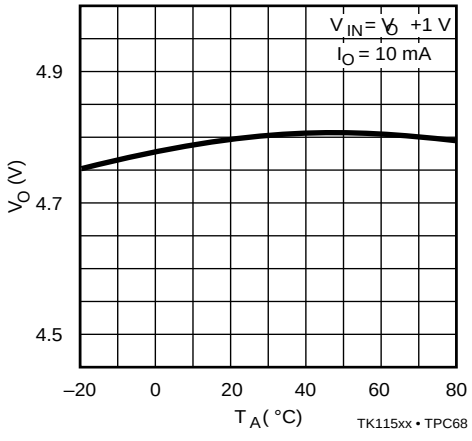
TK11540
OUTPUT VOLTAGE vs
TEMPERATURE



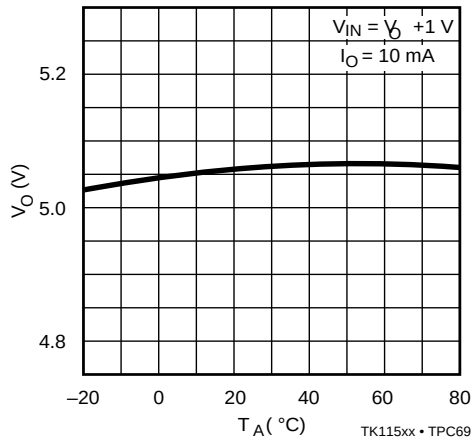
TK11545
OUTPUT VOLTAGE vs
TEMPERATURE



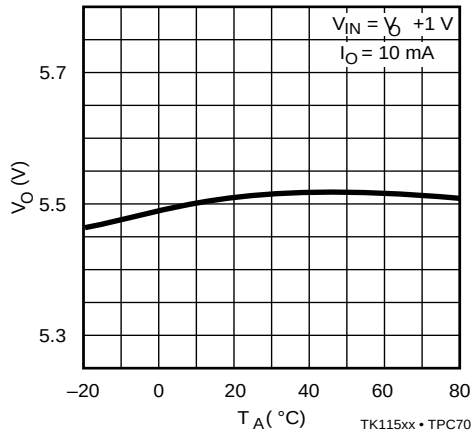
TK11547
OUTPUT VOLTAGE vs
TEMPERATURE



TK11550
OUTPUT VOLTAGE vs
TEMPERATURE



TK11555
OUTPUT VOLTAGE vs
TEMPERATURE

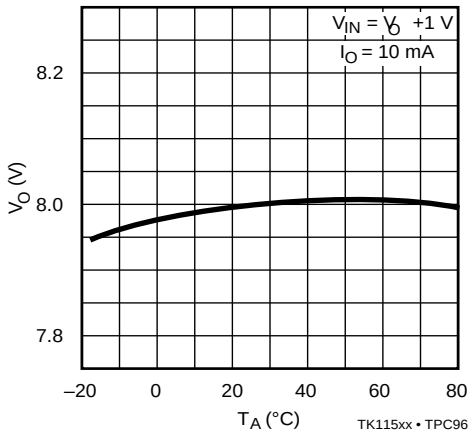


TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TEMPERATURE CHARACTERISTICS (CONT.)

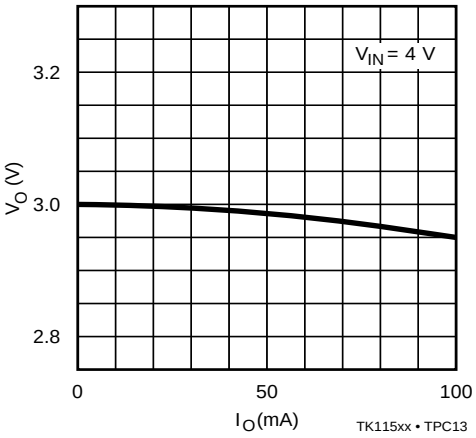
T_A = 25 °C unless otherwise specified

TK11580
OUTPUT VOLTAGE vs
TEMPERATURE

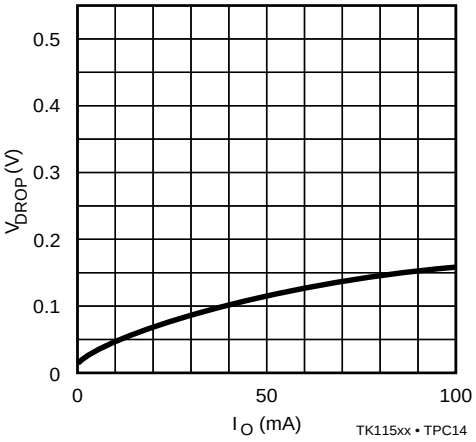


TK11530

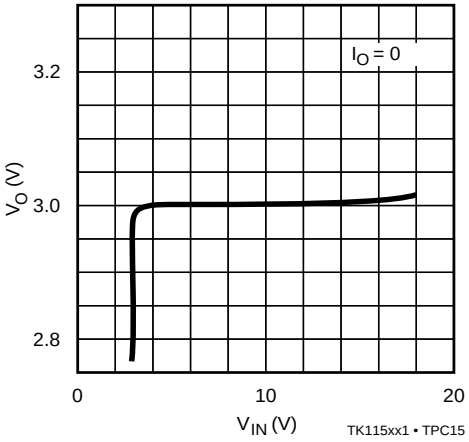
OUTPUT VOLTAGE vs
OUTPUT CURRENT



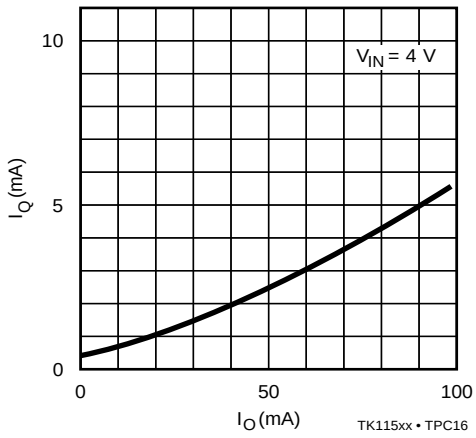
DROPOUT VOLTAGE vs
LOAD CURRENT



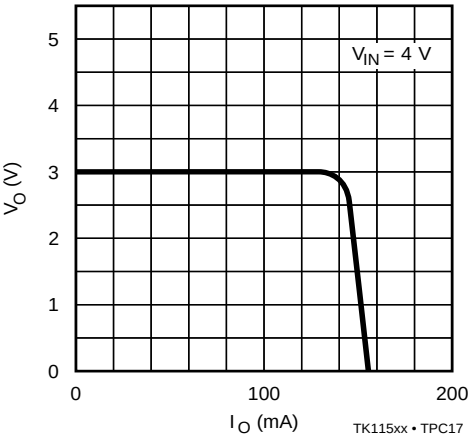
OUTPUT VOLTAGE vs
INPUT VOLTAGE



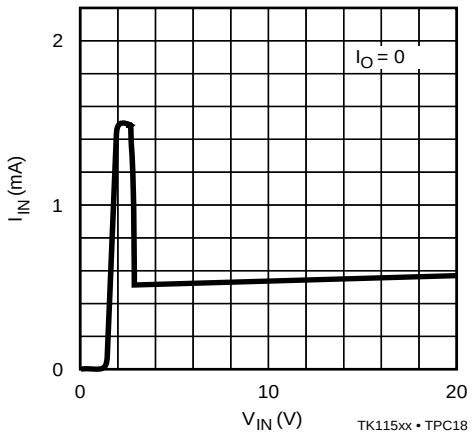
QUIESCENT CURRENT vs
LOAD CURRENT



SHORT CIRCUIT
PROTECTION



INPUT CURRENT vs
INPUT VOLTAGE

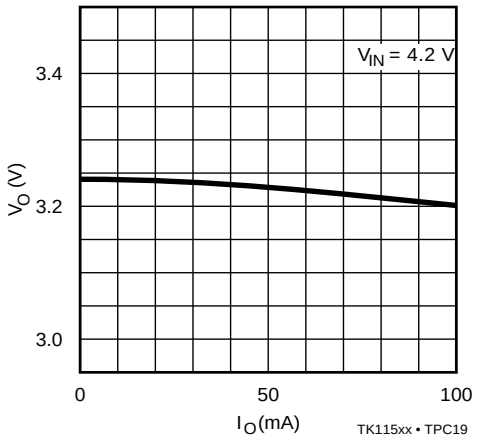


TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11532

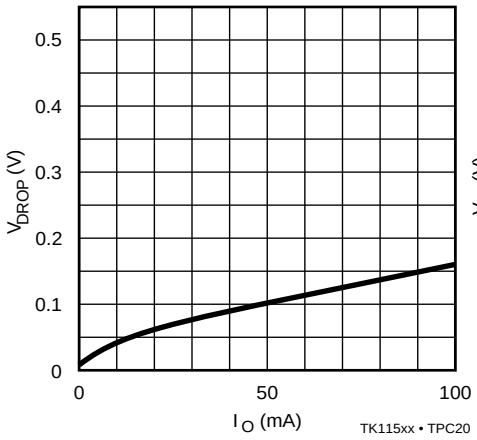
T_A = 25 °C unless otherwise specified

OUTPUT VOLTAGE vs OUTPUT CURRENT



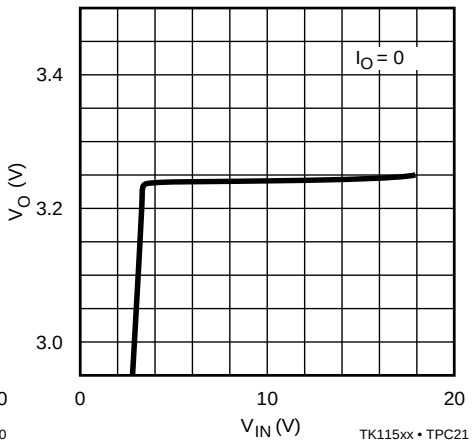
TK115xx • TPC19

DROPOUT VOLTAGE vs LOAD CURRENT



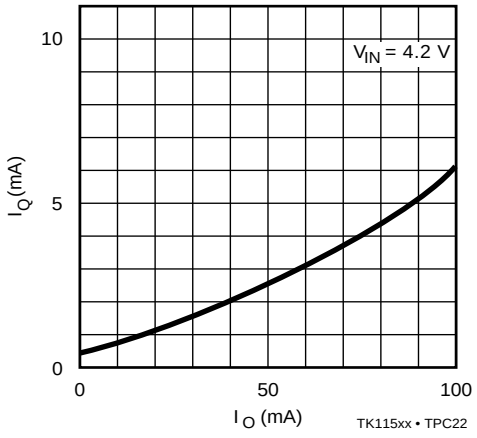
TK115xx • TPC20

OUTPUT VOLTAGE vs INPUT VOLTAGE



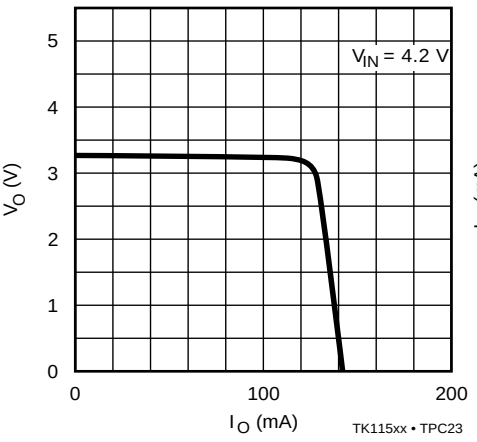
TK115xx • TPC21

QUIESCENT CURRENT vs LOAD CURRENT



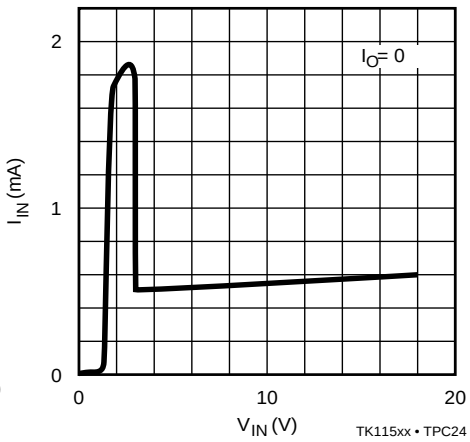
TK115xx • TPC22

SHORT CIRCUIT PROTECTION



TK115xx • TPC23

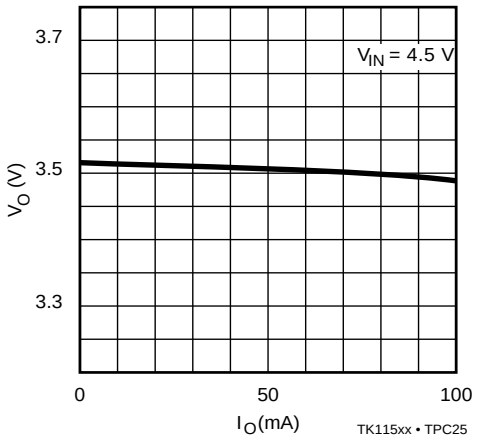
INPUT CURRENT vs INPUT VOLTAGE



TK115xx • TPC24

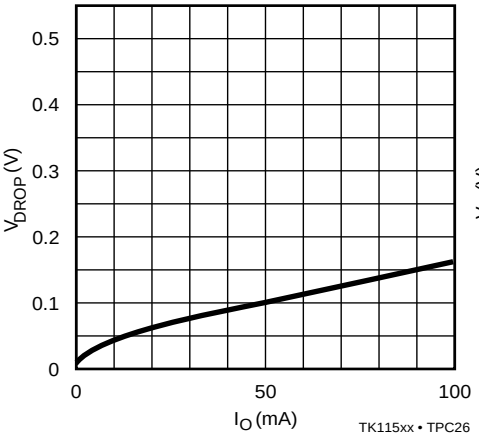
TK11535

OUTPUT VOLTAGE vs OUTPUT CURRENT



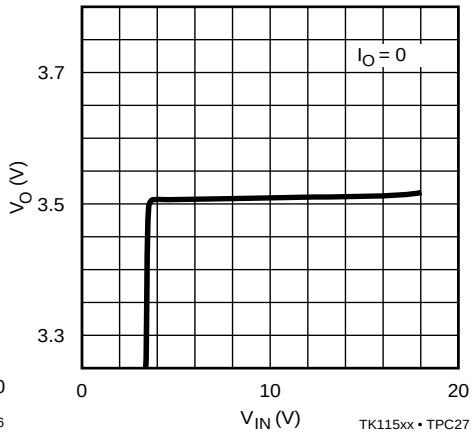
TK115xx • TPC25

DROPOUT VOLTAGE vs LOAD CURRENT



TK115xx • TPC26

OUTPUT VOLTAGE vs INPUT VOLTAGE



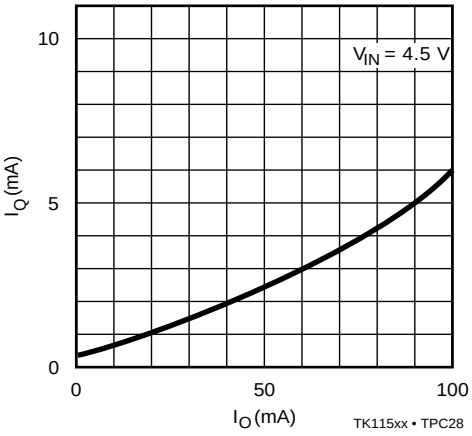
TK115xx • TPC27

TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11535 (CONT.)

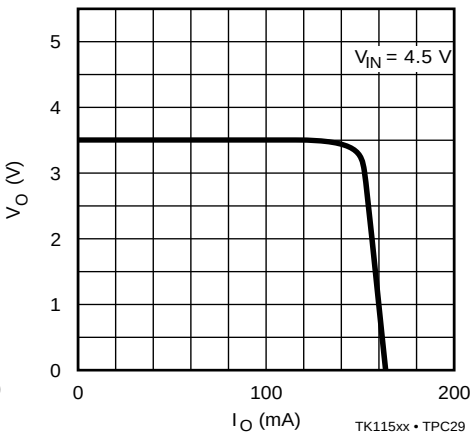
T_A = 25 °C unless otherwise specified

QUIESCENT CURRENT vs LOAD CURRENT



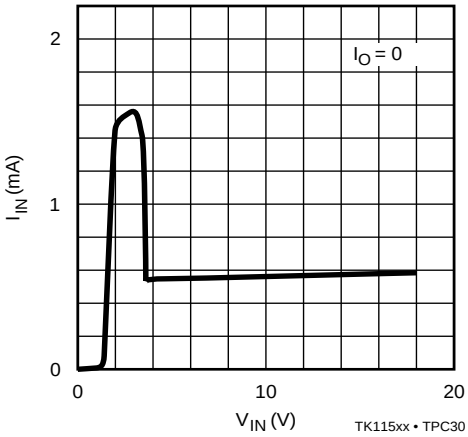
TK115xx • TPC28

SHORT CIRCUIT PROTECTION



TK115xx • TPC29

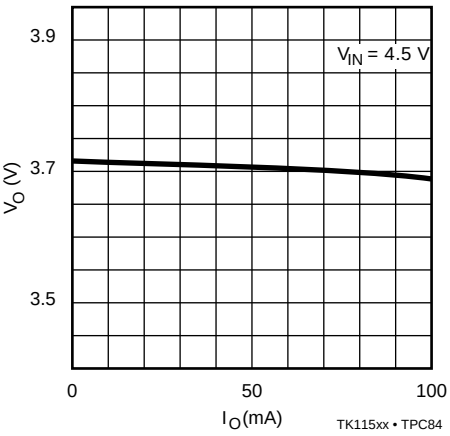
INPUT CURRENT vs INPUT VOLTAGE



TK115xx • TPC30

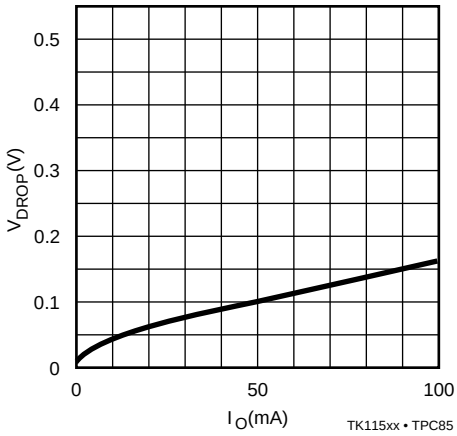
TK11537

OUTPUT VOLTAGE vs OUTPUT CURRENT



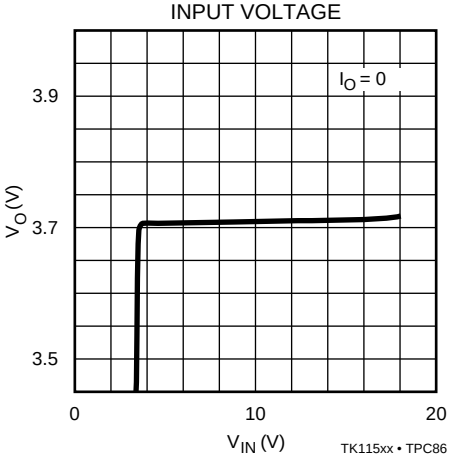
TK115xx • TPC84

DROPOUT VOLTAGE vs LOAD CURRENT



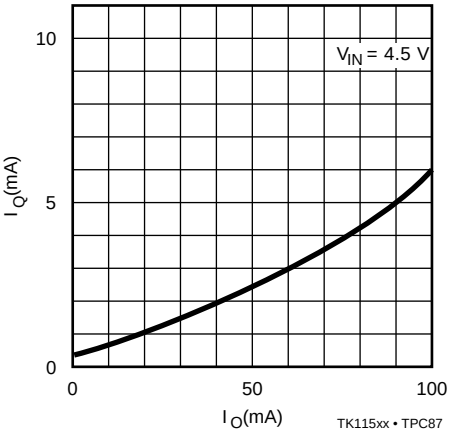
TK115xx • TPC85

OUTPUT VOLTAGE vs INPUT VOLTAGE



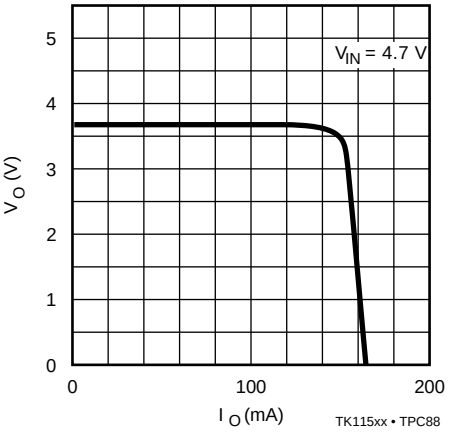
TK115xx • TPC86

QUIESCENT CURRENT vs LOAD CURRENT



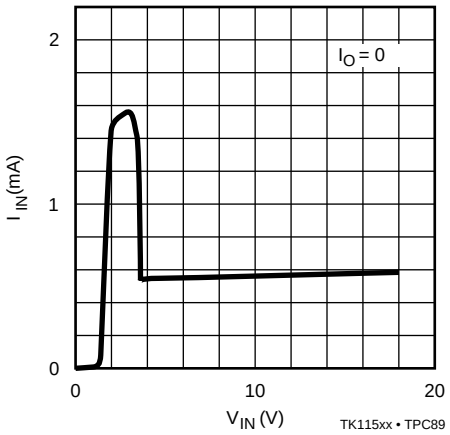
TK115xx • TPC87

SHORT CIRCUIT PROTECTION



TK115xx • TPC88

INPUT CURRENT vs INPUT VOLTAGE



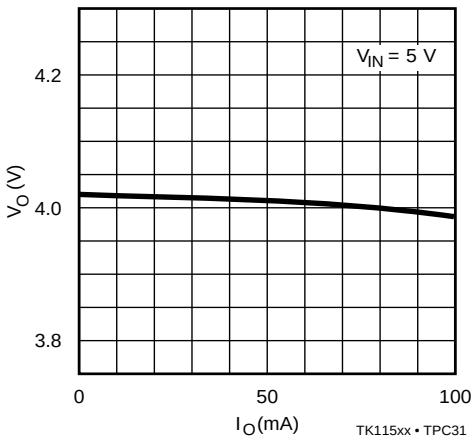
TK115xx • TPC89

TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11540

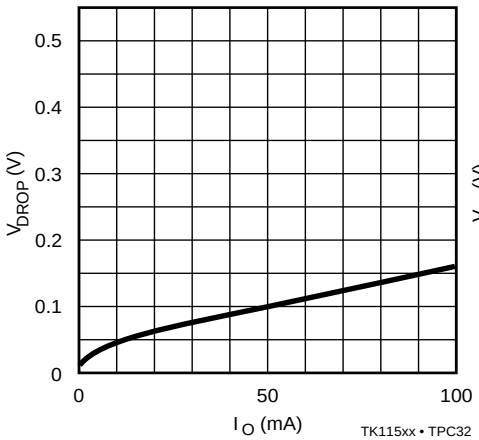
T_A = 25 °C unless otherwise specified

OUTPUT VOLTAGE vs OUTPUT CURRENT



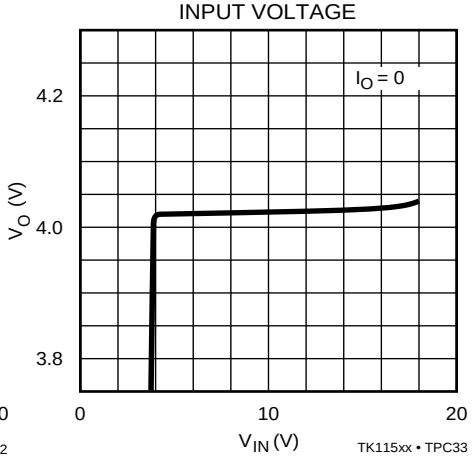
TK115xx • TPC31

DROPOUT VOLTAGE vs LOAD CURRENT



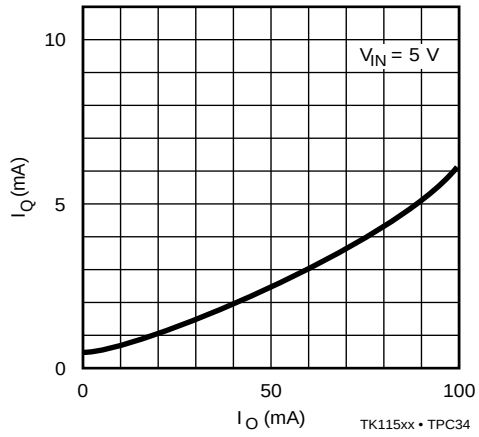
TK115xx • TPC32

OUTPUT VOLTAGE vs INPUT VOLTAGE



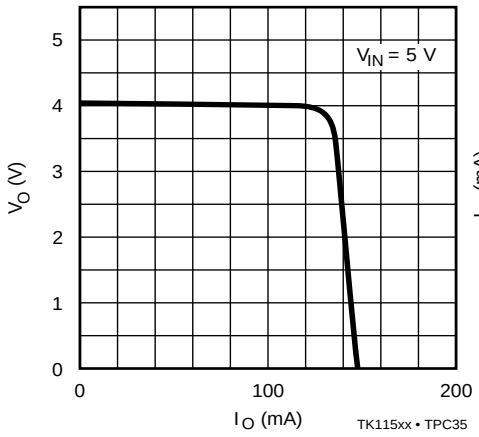
TK115xx • TPC33

QUIESCENT CURRENT vs LOAD CURRENT



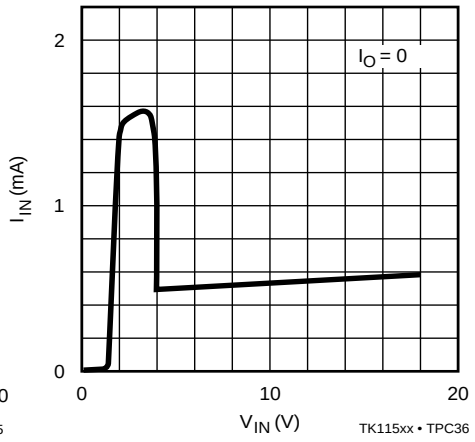
TK115xx • TPC34

SHORT CIRCUIT PROTECTION



TK115xx • TPC35

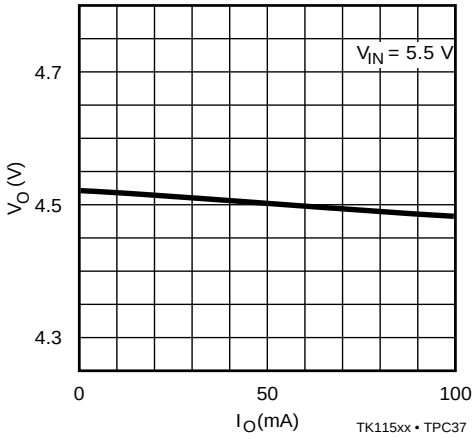
INPUT CURRENT vs INPUT VOLTAGE



TK115xx • TPC36

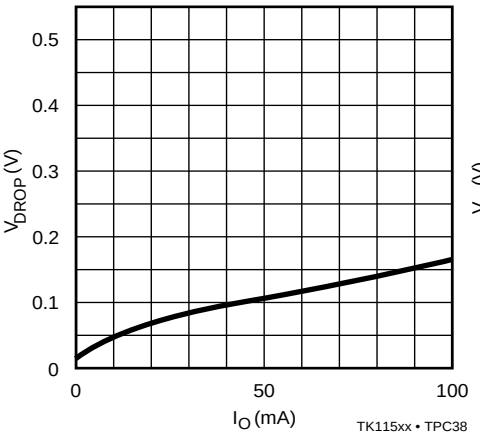
TK11545

OUTPUT VOLTAGE vs OUTPUT CURRENT



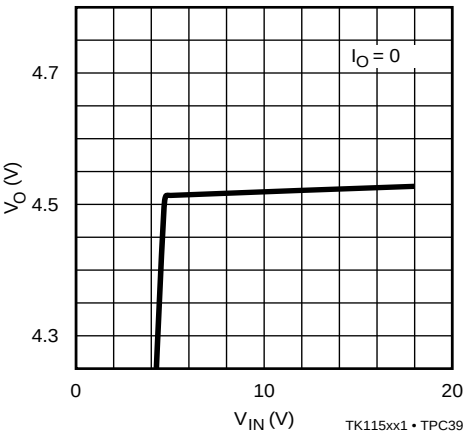
TK115xx • TPC37

DROPOUT VOLTAGE vs LOAD CURRENT



TK115xx • TPC38

OUTPUT VOLTAGE vs INPUT VOLTAGE



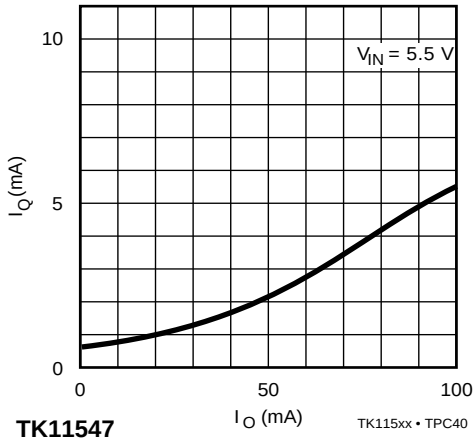
TK115xx1 • TPC39

TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11545 (CONT.)

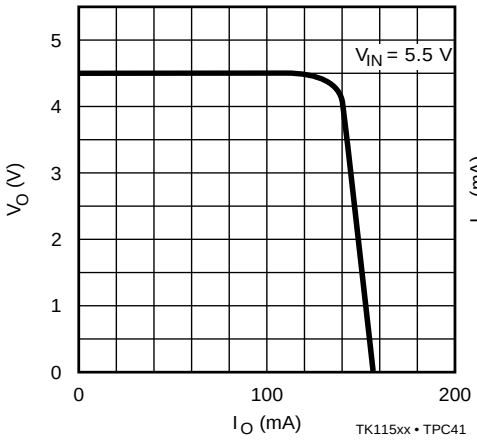
T_A = 25 °C unless otherwise specified

QUIESCENT CURRENT vs LOAD CURRENT



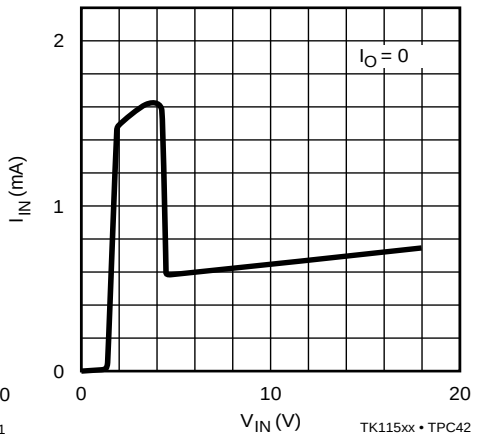
TK115xx • TPC40

SHORT CIRCUIT PROTECTION



TK115xx • TPC41

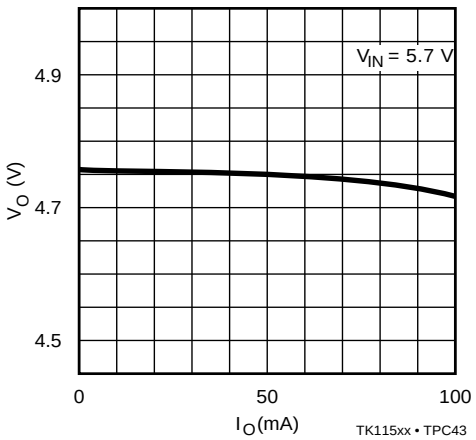
INPUT CURRENT vs INPUT VOLTAGE



TK115xx • TPC42

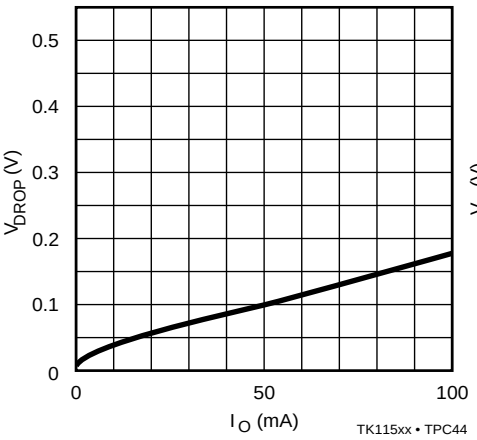
TK11547

OUTPUT VOLTAGE vs OUTPUT CURRENT



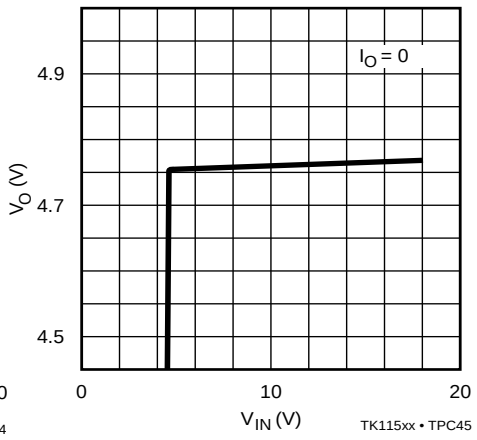
TK115xx • TPC43

DROPOUT VOLTAGE vs LOAD CURRENT



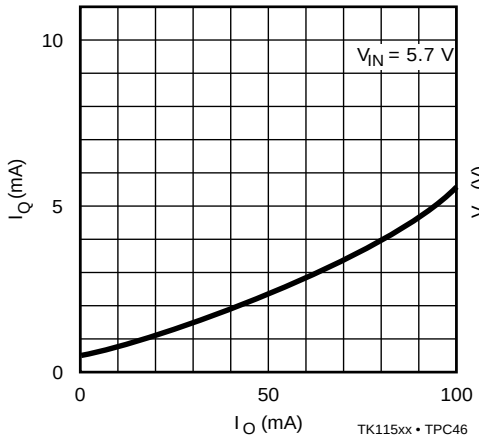
TK115xx • TPC44

OUTPUT VOLTAGE vs INPUT VOLTAGE



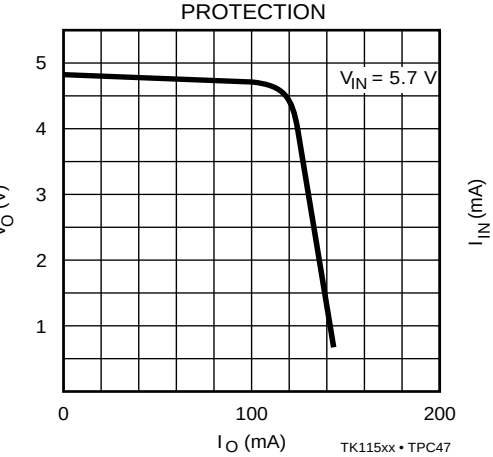
TK115xx • TPC45

QUIESCENT CURRENT vs LOAD CURRENT



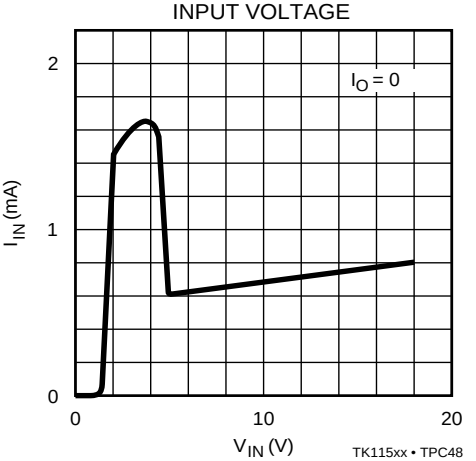
TK115xx • TPC46

SHORT CIRCUIT PROTECTION



TK115xx • TPC47

INPUT CURRENT vs INPUT VOLTAGE



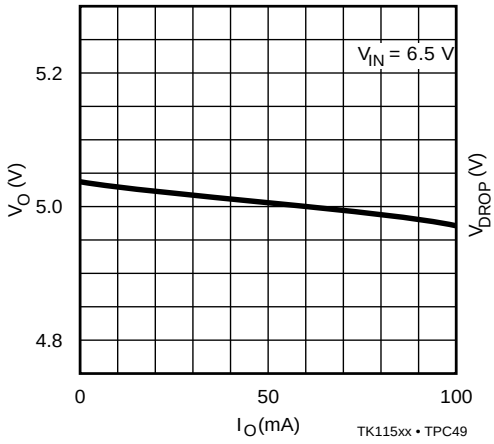
TK115xx • TPC48

TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11550

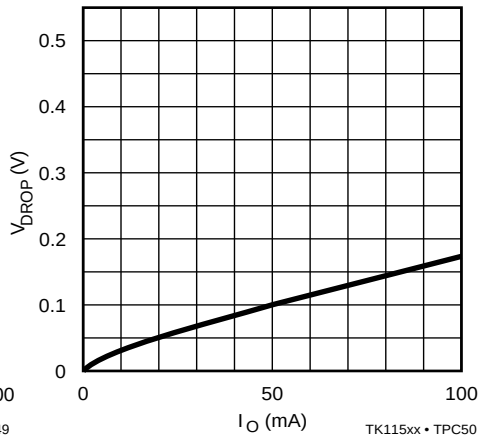
T_A = 25 °C unless otherwise specified

OUTPUT VOLTAGE vs OUTPUT CURRENT



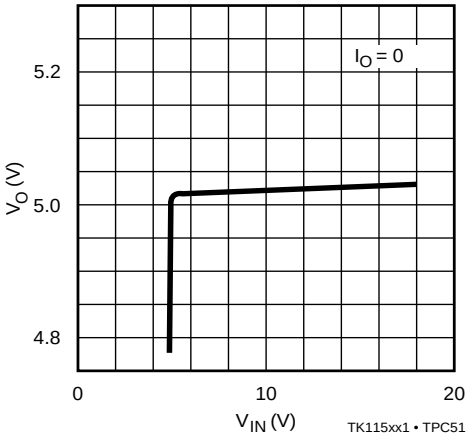
TK115xx • TPC49

DROPOUT VOLTAGE vs LOAD CURRENT



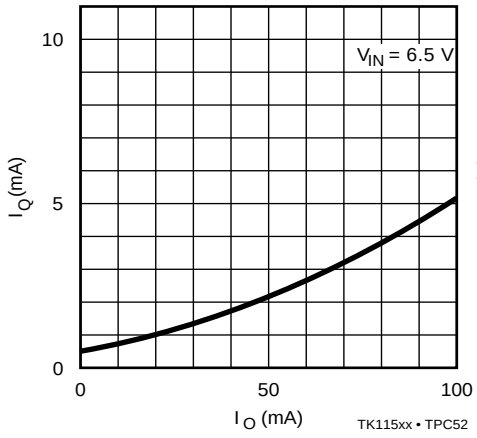
TK115xx • TPC50

OUTPUT VOLTAGE vs INPUT VOLTAGE



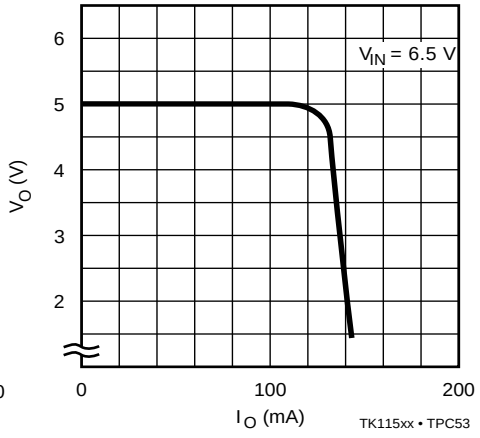
TK115xx1 • TPC51

QUIESCENT CURRENT vs LOAD CURRENT



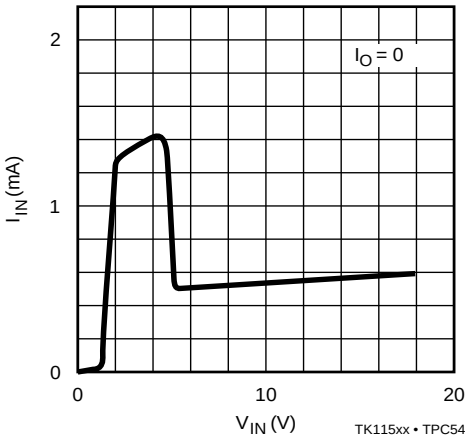
TK115xx • TPC52

SHORT CIRCUIT PROTECTION



TK115xx • TPC53

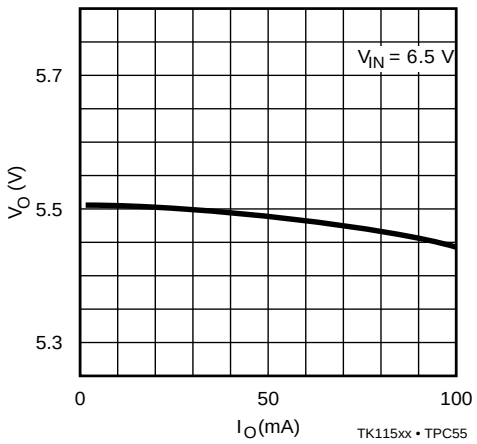
INPUT CURRENT vs INPUT VOLTAGE



TK115xx • TPC54

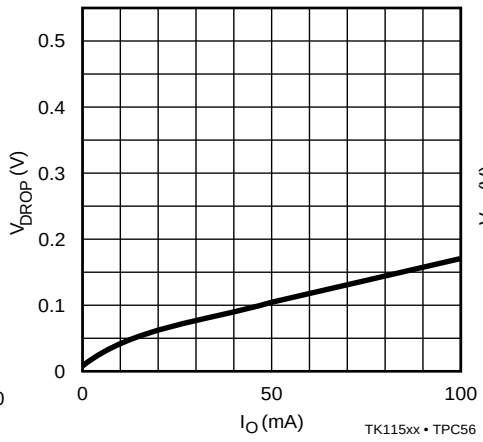
TK11555

OUTPUT VOLTAGE vs OUTPUT CURRENT



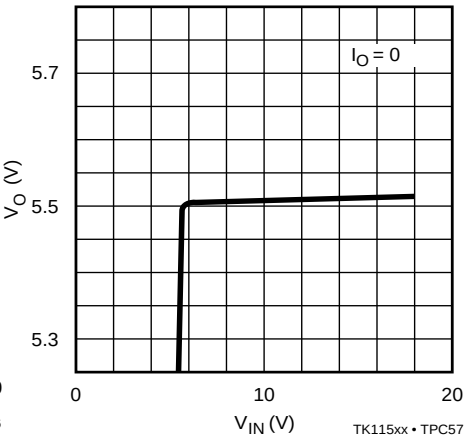
TK115xx • TPC55

DROPOUT VOLTAGE vs LOAD CURRENT



TK115xx • TPC56

OUTPUT VOLTAGE vs INPUT VOLTAGE



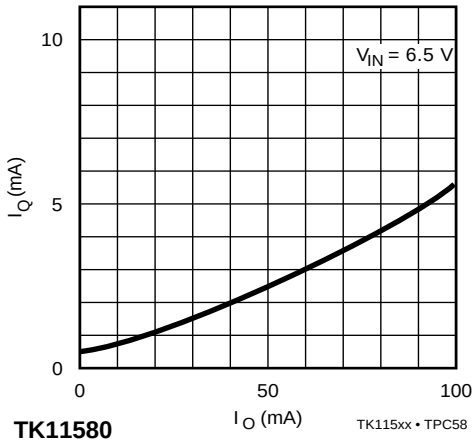
TK115xx • TPC57

TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11555 (CONT.)

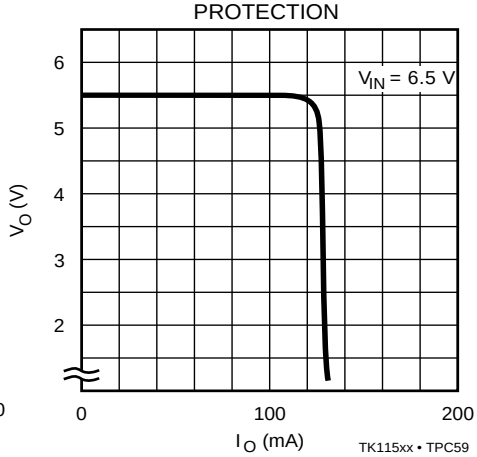
T_A = 25 °C unless otherwise specified

QUIESCENT CURRENT vs LOAD CURRENT



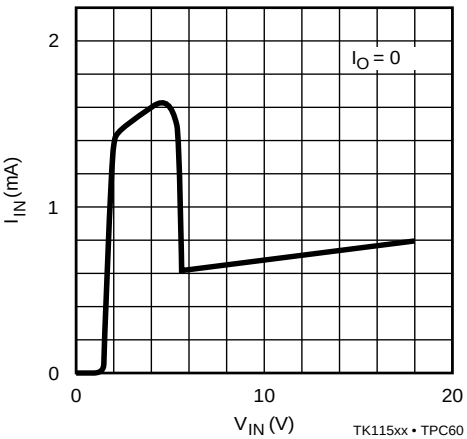
TK115xx • TPC58

SHORT CIRCUIT PROTECTION



TK115xx • TPC59

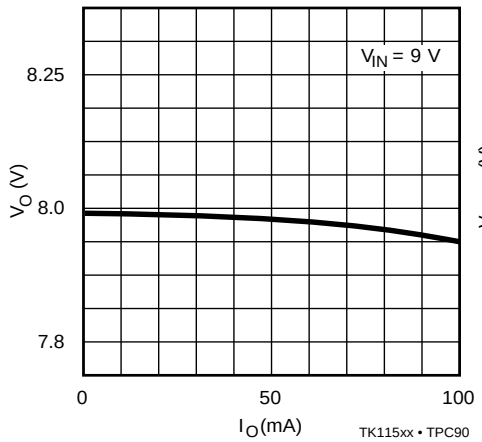
INPUT CURRENT vs INPUT VOLTAGE



TK115xx • TPC60

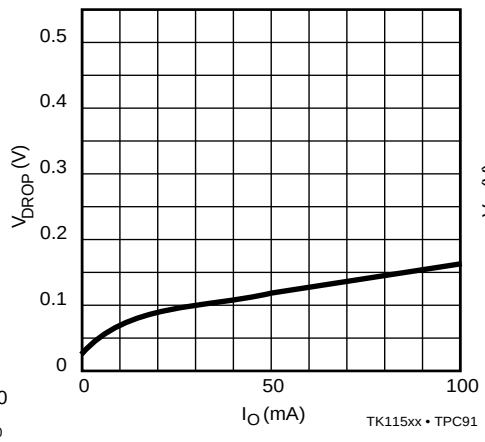
TK11580

OUTPUT VOLTAGE vs OUTPUT CURRENT



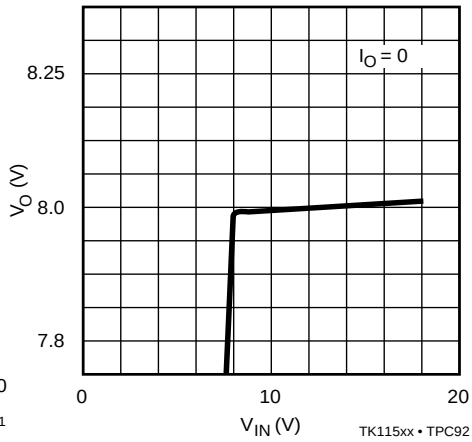
TK115xx • TPC90

DROPOUT VOLTAGE vs LOAD CURRENT



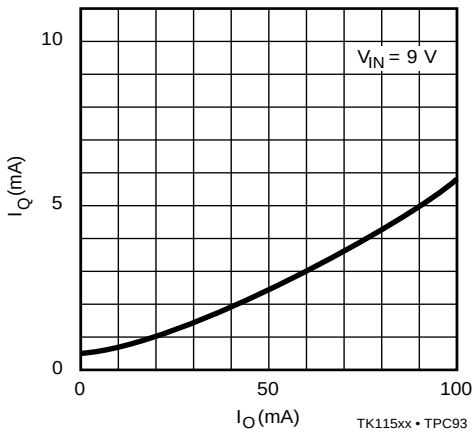
TK115xx • TPC91

OUTPUT VOLTAGE vs INPUT VOLTAGE



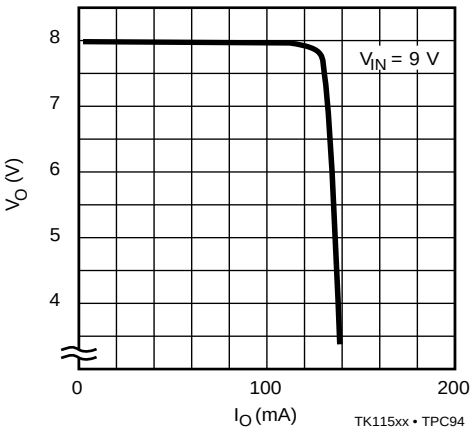
TK115xx • TPC92

QUIESCENT CURRENT vs LOAD CURRENT



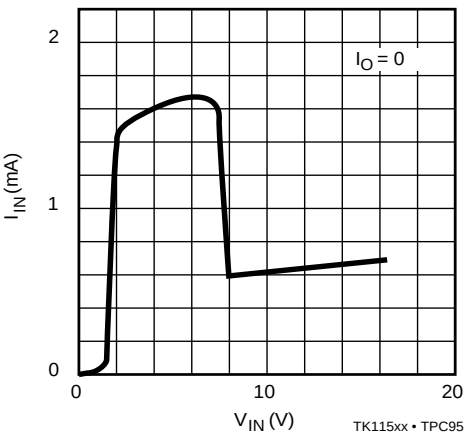
TK115xx • TPC93

SHORT CIRCUIT PROTECTION



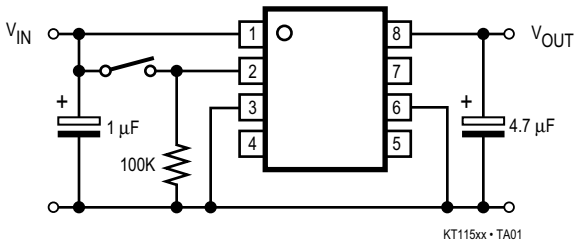
TK115xx • TPC94

INPUT CURRENT vs INPUT VOLTAGE

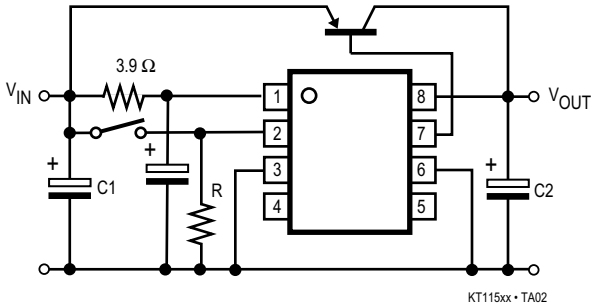


TK115xx • TPC95

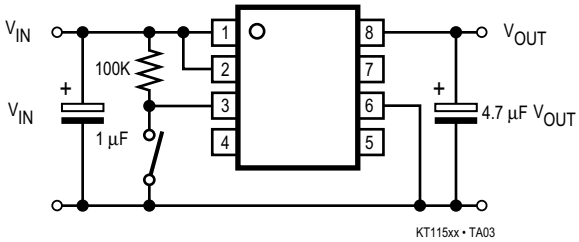
TYPICAL APPLICATIONS



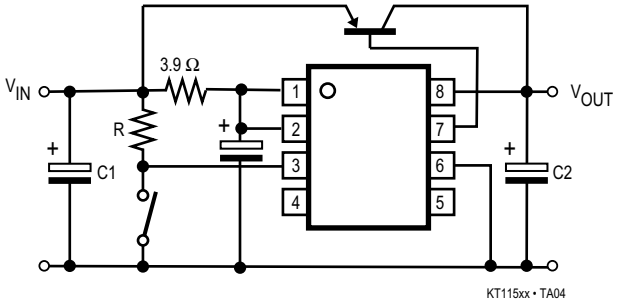
ACTIVE HIGH CONTROL



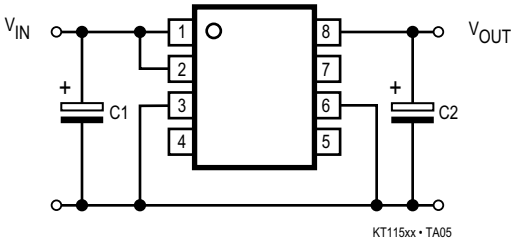
ACTIVE HIGH CONTROL WITH CURRENT BOOST



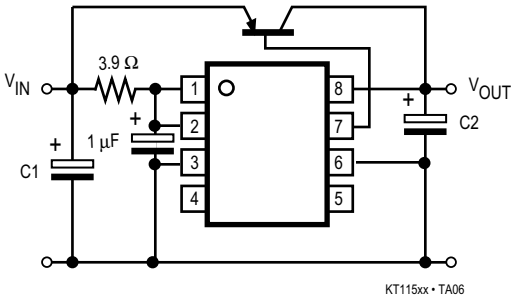
ACTIVE LOW CONTROL



ACTIVE LOW CONTROL WITH CURRENT BOOST

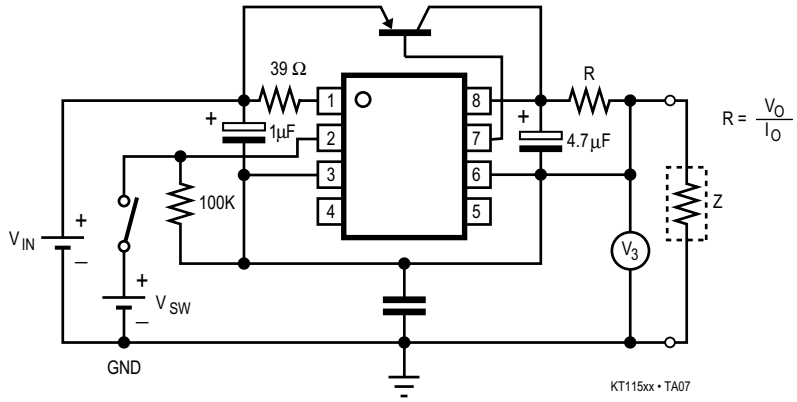


NO SWITCH CONTROL

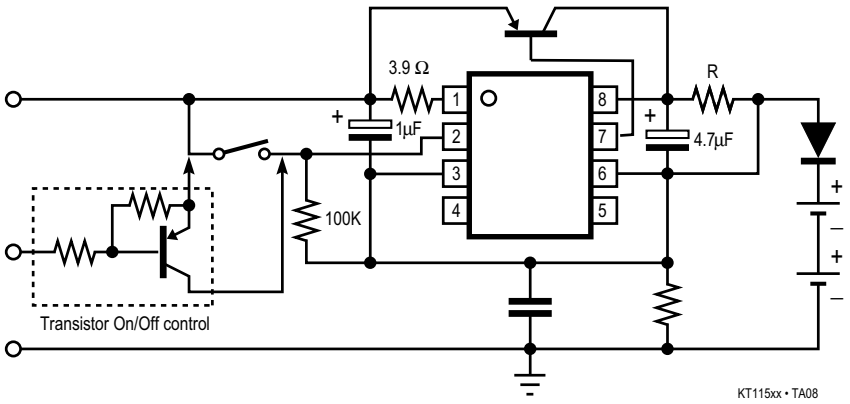


NO SWITCH CONTROL WITH CURRENT BOOST

TYPICAL APPLICATIONS (CONT.)



CURRENT MODE REGULATOR WITH ON/OFF CONTROL AND CURRENT BOOST



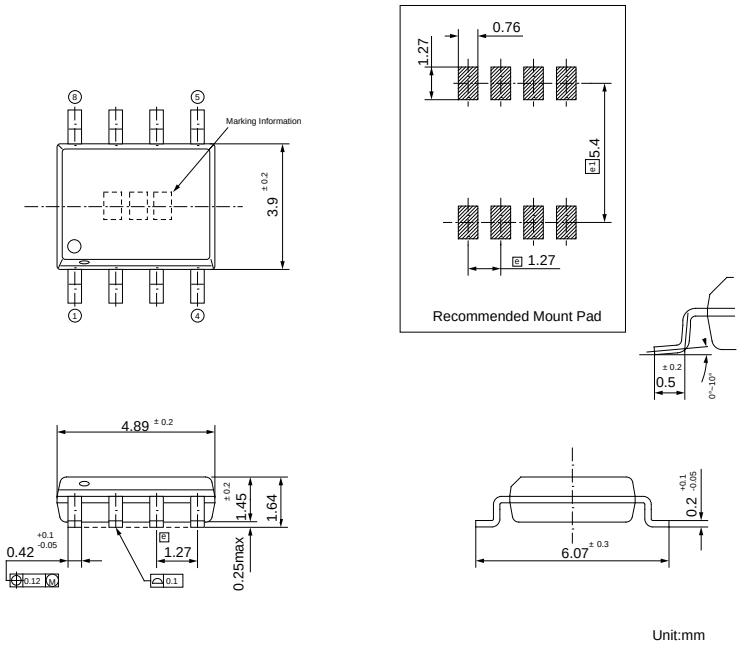
BATTERY CHARGER WITH ON/OFF CONTROL AND CURRENT BOOST

APPLICATION HINTS

Maximize copper foil area connecting to all IC pins for optimum performance. Place input and output bypass capacitors close to the GND pin. For best transient behavior and lowest output impedance, use as large a capacitor value as possible. The temperature coefficient of the capacitance and Equivalent Series Resistance (ESR) should be taken into account. These parameters can influence power supply noise and ripple rejection. In extreme cases, oscillation may occur. In order to maintain stability, the output bypass capacitor value should be minimum 1 μF for Tantalum electrolytic or 4.7 μF for Aluminum electrolytic at $T_A = 25\ ^oC$.

PACKAGE OUTLINE

SOP-8



Unit:mm

Marking Information

TK11530	530
TK11532	532
TK11535	535
TK11537	537
TK11540	540
TK11545	545
TK11547	547
TK11550	550
TK11555	555
TK11580	580

TOKO

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