DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR

μPA1774

SWITCHING
DUAL P-CHANNEL POWER MOS FET

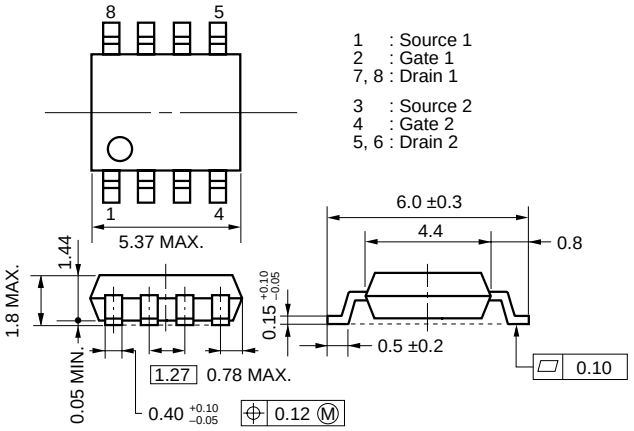
DESCRIPTION

The μPA1774 is Dual P-channel MOS Field Effect Transistor.

FEATURES

- Dual chip type
- Low on-state resistance
  $R_{DS(on)1}$ = 250 mΩ MAX. (V_{GS} = –10 V, I_D = –2.0 A)
  $R_{DS(on)2}$ = 300 mΩ MAX. (V_{GS} = –4.5 V, I_D = –2.0 A)
  $R_{DS(on)3}$ = 330 mΩ MAX. (V_{GS} = –4.0 V, I_D = –2.0 A)
- Low input capacitance
  C_{iss} = 420 pF TYP.
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit: mm)



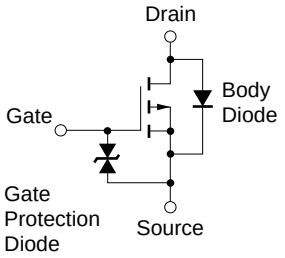
ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1774G	Power SOP8

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected.)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	–60	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	∓20	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	∓2.8	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	∓18	A
Total Power Dissipation (1 unit) Note2	P_T	0.6	W
Total Power Dissipation (2 unit) Note2	P_T	0.8	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to 150	°C
Single Avalanche Current Note3	I_{AS}	–2.8	A
Single Avalanche Energy Note3	E_{AS}	0.78	mJ

EQUIVALENT CIRCUIT (1/2 circuit)



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on Glass Epoxy Board of 1600 mm^2 x 1.6 mm. Drain pad size: 264 mm^2 x 35 μm, T_A = 25°C
3. Starting T_{ch} = 25°C, V_{DD} = –30 V, R_G = 25 Ω, V_{GS} = –20→0 V

Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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Document No. G15380EJ2V0DS00 (2nd edition)
Date Published June 2002 NS CP(K)
Printed in Japan

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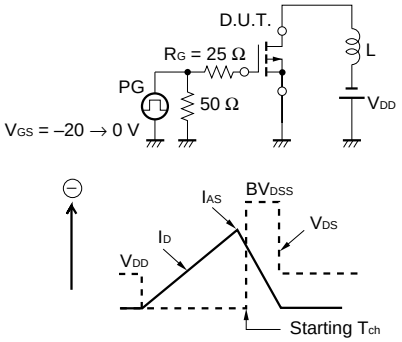
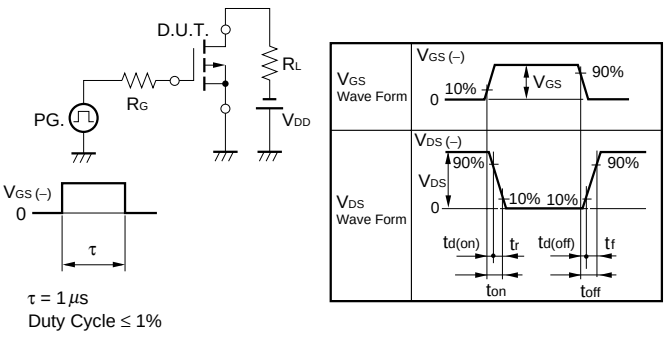
ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –60 V, V_{GS} = 0 V			–10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ∓16 V, V_{DS} = 0 V			∓10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = 1 mA	–1.5	–2.0	–2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –2.0 A	2.5	4.3		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = –10 V, I_D = –2.0 A		200	250	mΩ
	$R_{DS(on)2}$	V_{GS} = –4.5 V, I_D = –2.0 A		230	300	mΩ
	$R_{DS(on)3}$	V_{GS} = –4.0 V, I_D = –2.0 A		240	330	mΩ
Input Capacitance	C_{iss}	V_{DS} = –10 V		420		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		80		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		30		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = –30 V, I_D = –2.0 A		8		ns
Rise Time	t_r	V_{GS} = –10 V		5		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 0 Ω		35		ns
Fall Time	t_f			8		ns
Total Gate Charge	Q_G	V_{DD} = –48 V		10		nC
Gate to Source Charge	Q_{GS}	V_{GS} = –10 V		1.7		nC
Gate to Drain Charge	Q_{GD}	I_D = –2.8 A		2.2		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 2.8 A, V_{GS} = 0 V		0.89		V
Reverse Recovery Time	t_{rr}	I_F = 2.8 A, V_{GS} = 0 V		45		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		65		μC

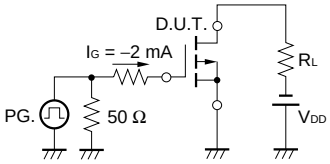
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME



TEST CIRCUIT 3 GATE CHARGE



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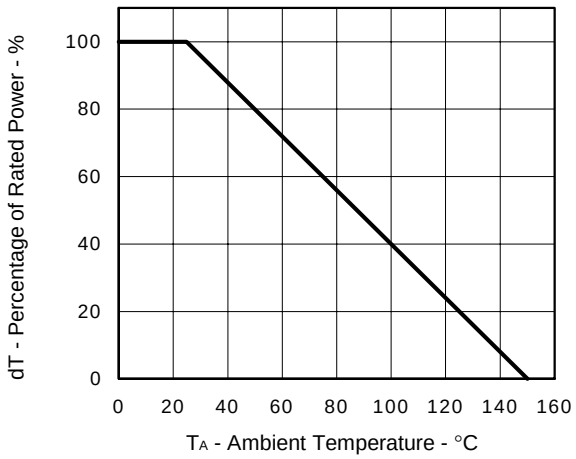
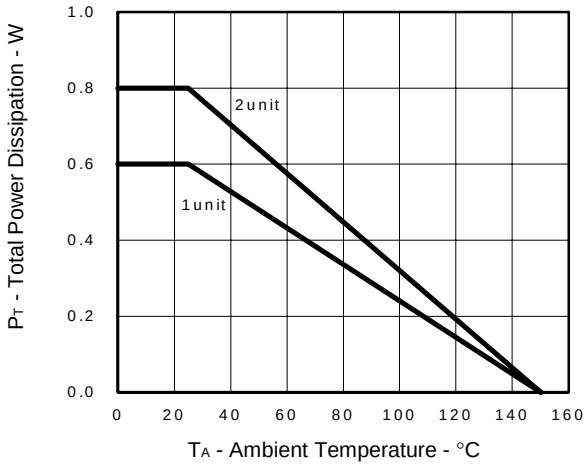
TYPICAL CHARACTERISTICS (T_A = 25°C)

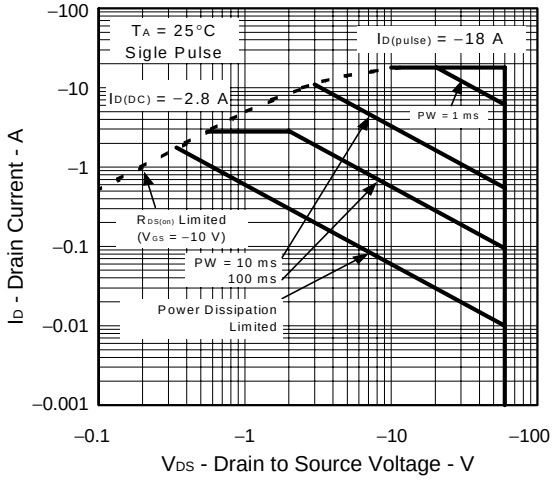
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



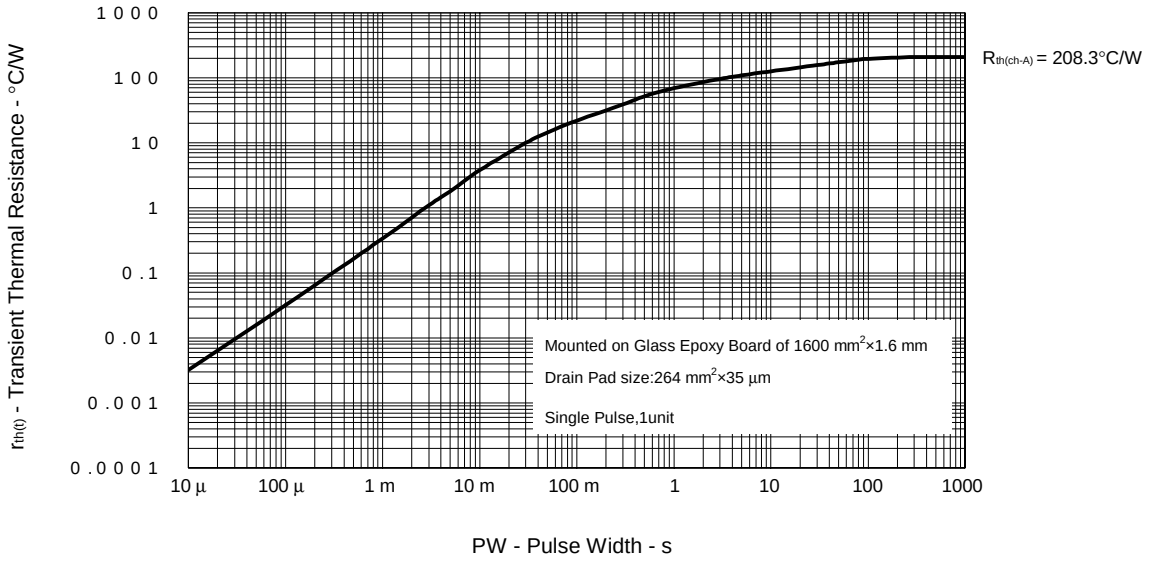
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



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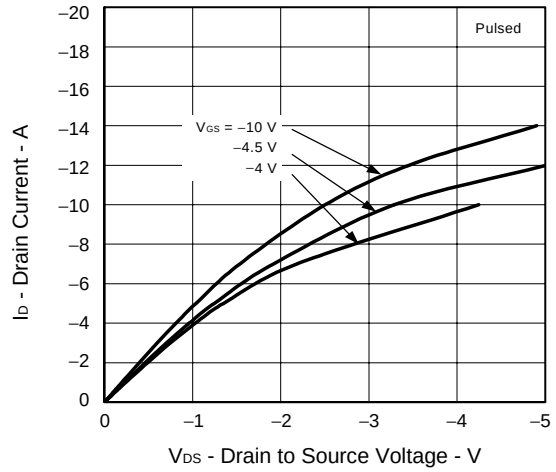
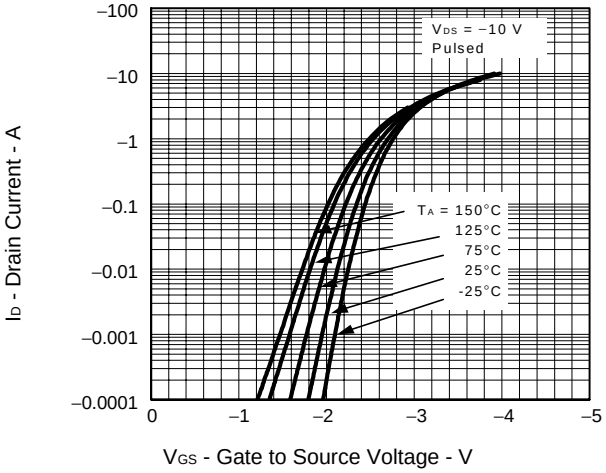
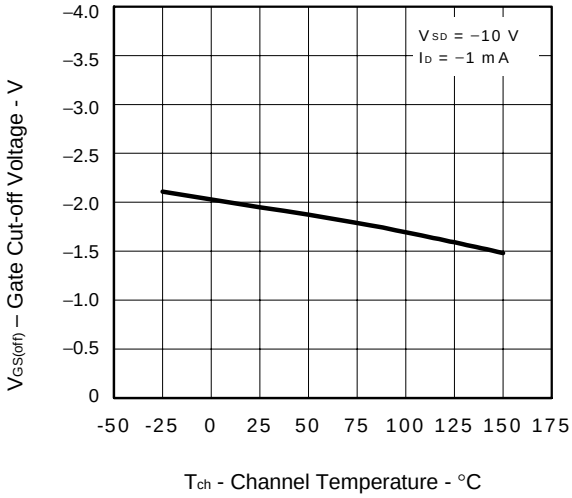
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



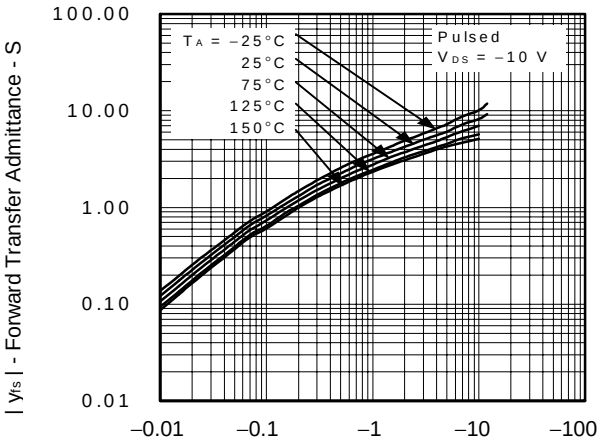
FORWARD TRANSFER CHARACTERISTICS



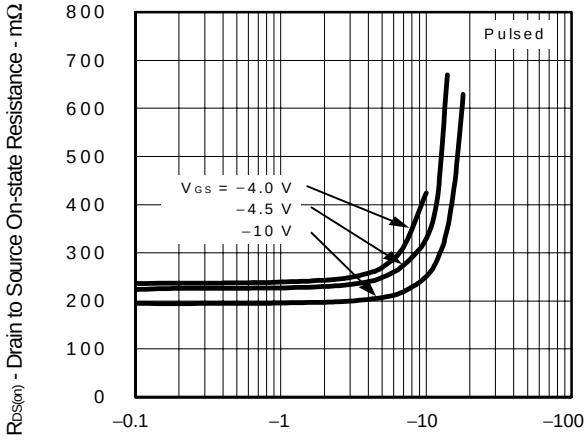
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



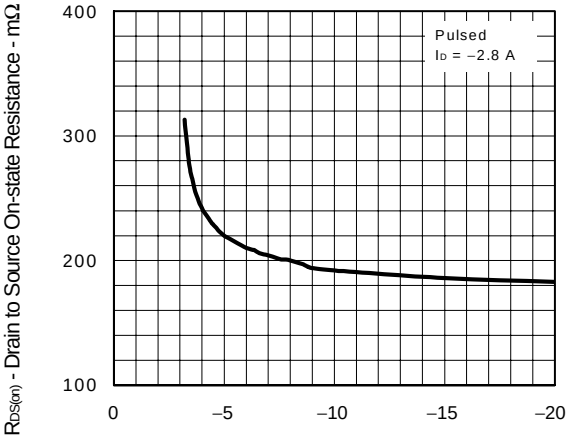
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



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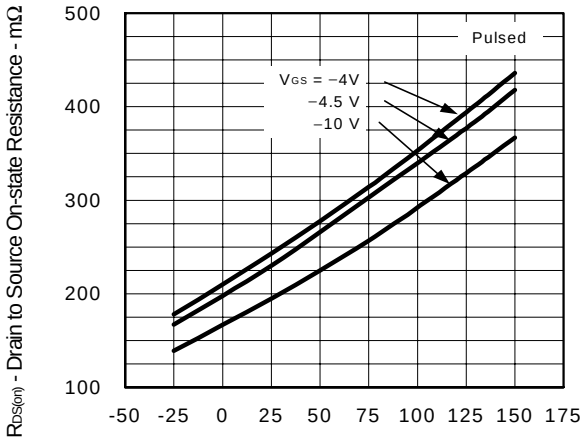
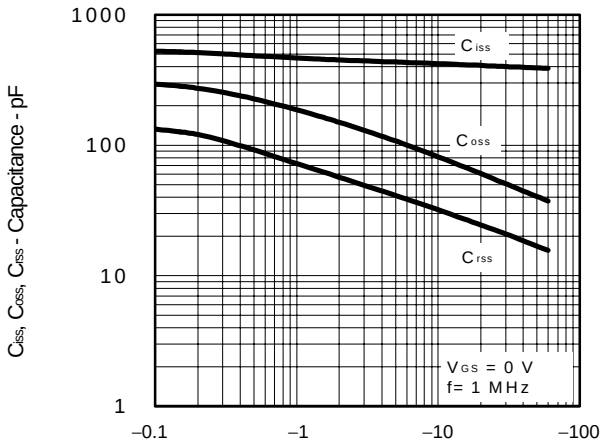
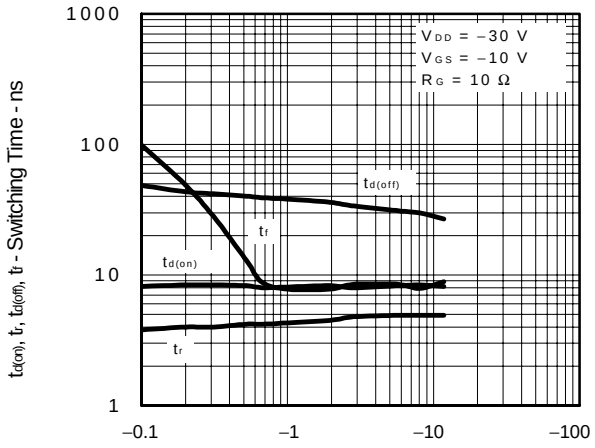
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



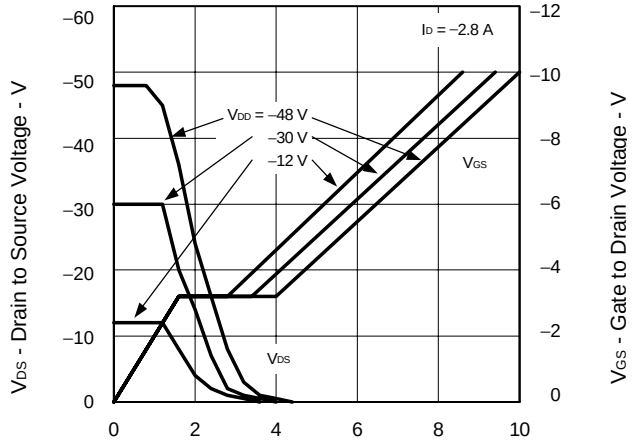
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



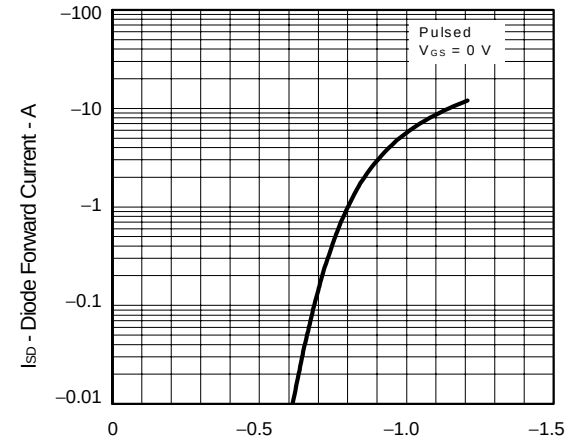
SWITCHING CHARACTERISTICS



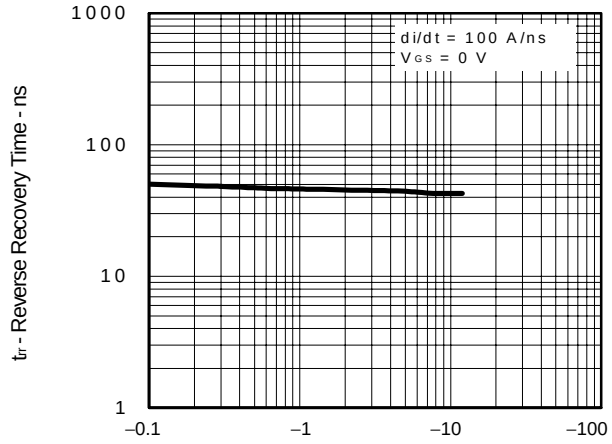
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DRAIN CURRENT



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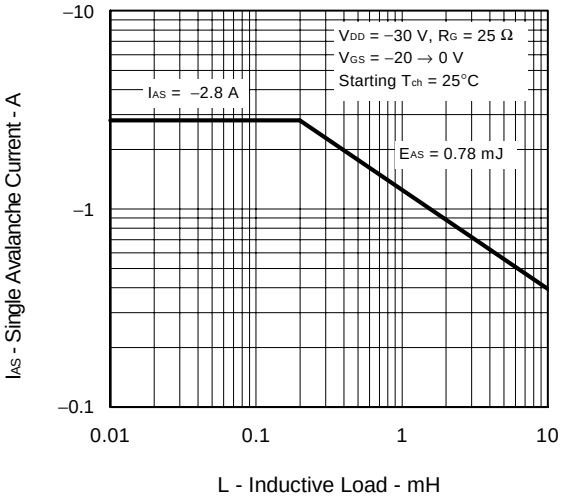
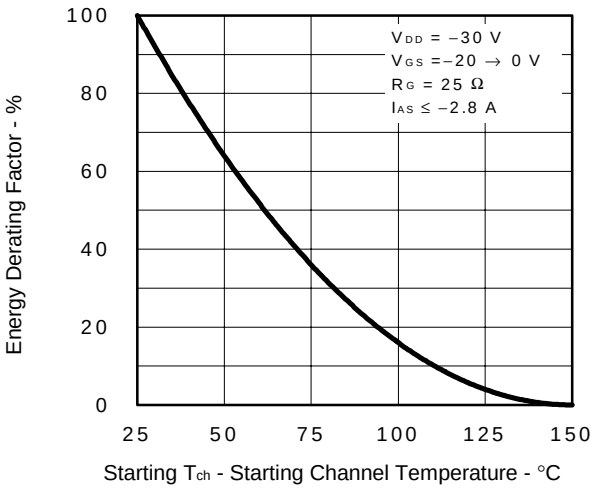
SINGLE AVALANCHE CURRENT vs.
INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY
DERATING FACTOR



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