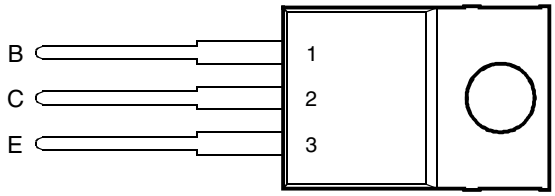
BOURNS®

- **Designed for Complementary Use with BDW63, BDW63A, BDW63B, BDW63C and BDW63D**
- **60 W at 25°C Case Temperature**
- **6 A Continuous Collector Current**
- **Minimum h_{FE} of 750 at 3V, 2 A**

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage (I_E = 0)	BDW64	V_{CBO}	-45	V
	BDW64A		-60	
	BDW64B		-80	
	BDW64C		-100	
	BDW64D		-120	
Collector-emitter voltage (I_B = 0) (see Note 1)	BDW64	V_{CEO}	-45	V
	BDW64A		-60	
	BDW64B		-80	
	BDW64C		-100	
	BDW64D		-120	
Emitter-base voltage		V_{EBO}	-5	V
Continuous collector current		I_C	-6	A
Continuous base current		I_B	-0.1	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		P_{tot}	60	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		P_{tot}	2	W
Unclamped inductive load energy (see Note 4)		$½LI_C^2$	50	mJ
Operating junction temperature range		T_j	-65 to +150	°C
Operating temperature range		T_{stg}	-65 to +150	°C
Operating free-air temperature range		T_A	-65 to +150	°C

NOTES: 1. These values apply when the base-emitter diode is open circuited.
2. Derate linearly to 150°C case temperature at the rate of 0.48 W/°C.
3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.
4. This rating is based on the capability of the transistor to operate safely in a circuit of: L = 20 mH, $I_{B(on)}$ = -5 mA, R_{BE} = 100 Ω, $V_{BE(off)}$ = 0, R_S = 0.1 Ω, V_{CC} = -20 V.

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS				MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C = -30 mA	I_B = 0	(see Note 5)	BDW64	-45			V
					BDW64A	-60			
					BDW64B	-80			
					BDW64C	-100			
					BDW64D	-120			
I_{CEO}	Collector-emitter cut-off current	V_{CE} = -30 V	I_B = 0		BDW64			-0.5	mA
		V_{CE} = -30 V	I_B = 0		BDW64A			-0.5	
		V_{CE} = -40 V	I_B = 0		BDW64B			-0.5	
		V_{CE} = -50 V	I_B = 0		BDW64C			-0.5	
		V_{CE} = -60 V	I_B = 0		BDW64D			-0.5	
I_{CBO}	Collector cut-off current	V_{CB} = -45 V	I_E = 0		BDW64			-0.2	mA
		V_{CB} = -60 V	I_E = 0		BDW64A			-0.2	
		V_{CB} = -80 V	I_E = 0		BDW64B			-0.2	
		V_{CB} = -100 V	I_E = 0		BDW64C			-0.2	
		V_{CB} = -120 V	I_E = 0		BDW64D			-0.2	
		V_{CB} = -45 V	I_E = 0	T_C = 150°C	BDW64			-5	
		V_{CB} = -60 V	I_E = 0	T_C = 150°C	BDW64A			-5	
		V_{CB} = -80 V	I_E = 0	T_C = 150°C	BDW64B			-5	
		V_{CB} = -100 V	I_E = 0	T_C = 150°C	BDW64C			-5	
		V_{CB} = -120 V	I_E = 0	T_C = 150°C	BDW64D			-5	
I_{EBO}	Emitter cut-off current	V_{EB} = -5 V	I_C = 0					-2	mA
h_{FE}	Forward current transfer ratio	V_{CE} = -3 V	I_C = -2 A	(see Notes 5 and 6)		750		20000	
		V_{CE} = -3 V	I_C = -6 A			100			
$V_{BE(on)}$	Base-emitter voltage	V_{CE} = -3 V	I_C = -2 A	(see Notes 5 and 6)				-2.5	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = -12 mA	I_C = -2 A	(see Notes 5 and 6)				-2.5	V
		I_B = -60 mA	I_C = -6 A					-4	
V_{EC}	Parallel diode forward voltage	I_E = -6 A	I_B = 0					-3.5	V

NOTES: 5. These parameters must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 2%.
6. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			2.08	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			62.5	°C/W

resistive-load-switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_{on}	Turn-on time	I_C = -3 A	$I_{B(on)}$ = -12 mA	$I_{B(off)}$ = 12 mA		1		µs
t_{off}	Turn-off time	$V_{BE(off)}$ = 4.5 V	R_L = 10 Ω	t_p = 20 µs, dc ≤ 2%		5		µs

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT

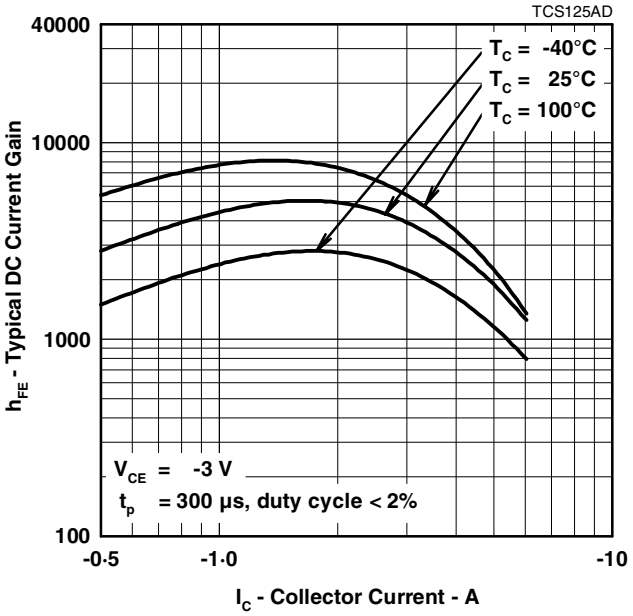


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

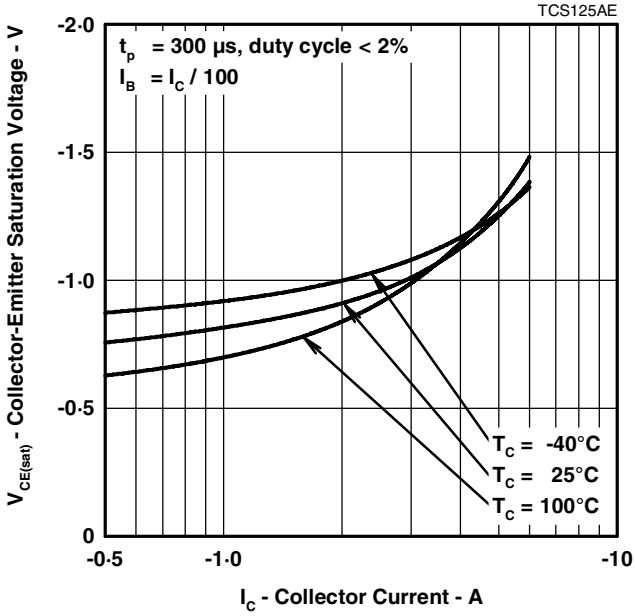


Figure 2.

BASE-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

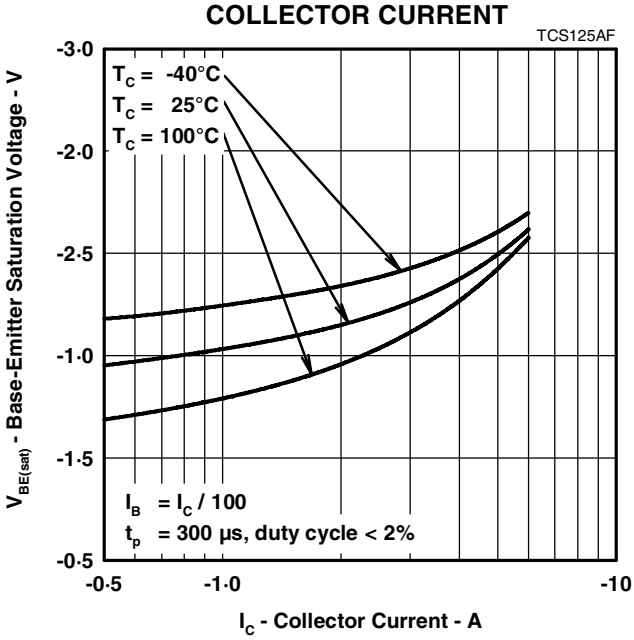


Figure 3.

MAXIMUM SAFE OPERATING REGIONS

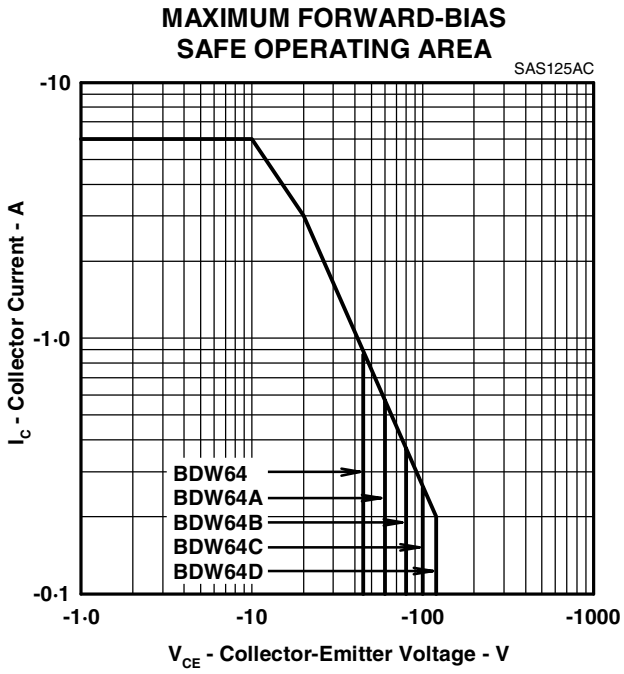


Figure 4.

THERMAL INFORMATION

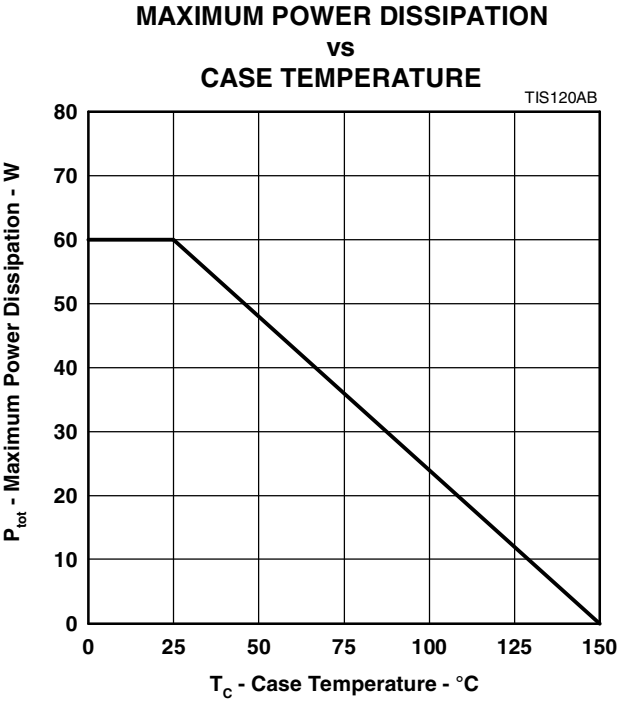


Figure 5.