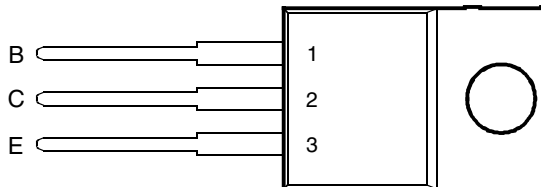




- Designed for Complementary Use with BDW53, BDW53A, BDW53B, BDW53C and BDW53D
- 40 W at 25°C Case Temperature
- 4 A Continuous Collector Current
- Minimum  $h_{FE}$  of 750 at 3V, 1.5 A

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 ( $I_E = 0$ )	BDW54	$V_{CBO}$	-45	V
	BDW54A		-60	
	BDW54B		-80	
	BDW54C		-100	
	BDW54D		-120	
Collector-emitter voltage ( $I_B = 0$ ) (see Note 1)	BDW54	$V_{CEO}$	-45	V
	BDW54A		-60	
	BDW54B		-80	
	BDW54C		-100	
	BDW54D		-120	
Emitter-base voltage		$V_{EBO}$	-5	V
Continuous collector current		$I_C$	-4	A
Continuous base current		$I_B$	-50	mA
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		$P_{tot}$	40	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)		$\frac{1}{2}LI_C^2$	25	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 0.32 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,  $R_{BE} = 100 \Omega$ ,  $V_{BE(off)} = 0$ ,  $R_S = 0.1 \Omega$ ,  $V_{CC} = -20$  V.

**PRODUCT INFORMATION**

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

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$ Collector-emitter breakdown voltage	$I_C = -30 \text{ mA}$	$I_B = 0$	(see Note 5)	BDW54 BDW54A BDW54B BDW54C BDW54D			V
$I_{CEO}$ Collector-emitter cut-off current	$V_{CE} = -30 \text{ V}$ $V_{CE} = -30 \text{ V}$ $V_{CE} = -40 \text{ V}$ $V_{CE} = -50 \text{ V}$ $V_{CE} = -60 \text{ V}$	$I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$		BDW54 BDW54A BDW54B BDW54C BDW54D		-0.5 -0.5 -0.5 -0.5 -0.5	mA
$I_{CBO}$ Collector cut-off current	$V_{CB} = -45 \text{ V}$ $V_{CB} = -60 \text{ V}$ $V_{CB} = -80 \text{ V}$ $V_{CB} = -100 \text{ V}$ $V_{CB} = -120 \text{ V}$ $V_{CB} = -45 \text{ V}$ $V_{CB} = -60 \text{ V}$ $V_{CB} = -80 \text{ V}$ $V_{CB} = -100 \text{ V}$ $V_{CB} = -120 \text{ V}$	$I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$	$T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$	BDW54 BDW54A BDW54B BDW54C BDW54D BDW54 BDW54A BDW54B BDW54C BDW54D		-0.2 -0.2 -0.2 -0.2 -0.2 -5 -5 -5 -5 -5	mA
$I_{EBO}$ Emitter cut-off current	$V_{EB} = -5 \text{ V}$	$I_C = 0$				-2	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = -3 \text{ V}$ $V_{CE} = -3 \text{ V}$	$I_C = -1.5 \text{ A}$ $I_C = -4 \text{ A}$	(see Notes 5 and 6)	750 100		20000	
$V_{BE(on)}$ Base-emitter voltage	$V_{CE} = -3 \text{ V}$	$I_C = -1.5 \text{ A}$	(see Notes 5 and 6)			-2.5	V
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = -30 \text{ mA}$ $I_B = -40 \text{ mA}$	$I_C = -1.5 \text{ A}$ $I_C = -4 \text{ A}$	(see Notes 5 and 6)			-2.5 -4	V
$V_{EC}$ Parallel diode forward voltage	$I_E = -4 \text{ A}$	$I_B = 0$				-3.5	V

NOTES: 5. These parameters must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

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			3.125	$^\circ\text{C/W}$
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	$^\circ\text{C/W}$

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

PARAMETER	TEST CONDITIONS †			MIN	TYP	MAX	UNIT
$t_{on}$ Turn-on time	$I_C = -2 \text{ A}$	$I_{B(on)} = -8 \text{ mA}$	$I_{B(off)} = 8 \text{ mA}$		1		$\mu\text{s}$
$t_{off}$ Turn-off time	$V_{BE(off)} = 5 \text{ V}$	$R_L = 15 \Omega$	$t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		4.5		$\mu\text{s}$

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

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN  
vs  
COLLECTOR CURRENT

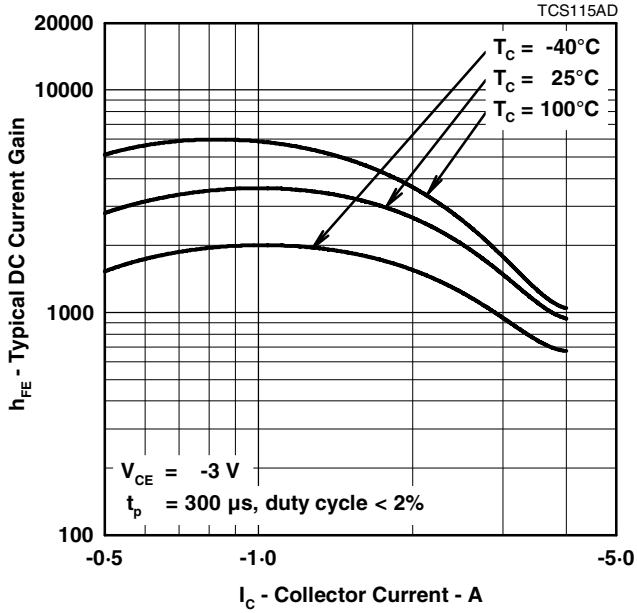


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE  
vs  
COLLECTOR CURRENT

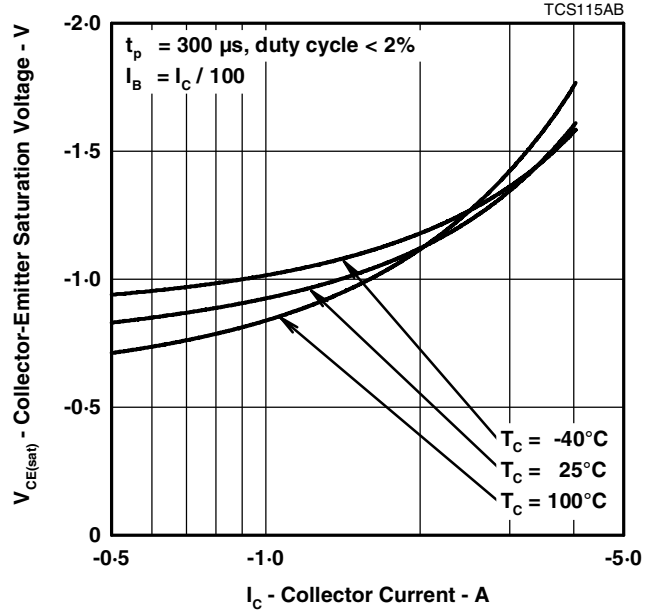


Figure 2.

BASE-EMITTER SATURATION VOLTAGE  
vs  
COLLECTOR CURRENT

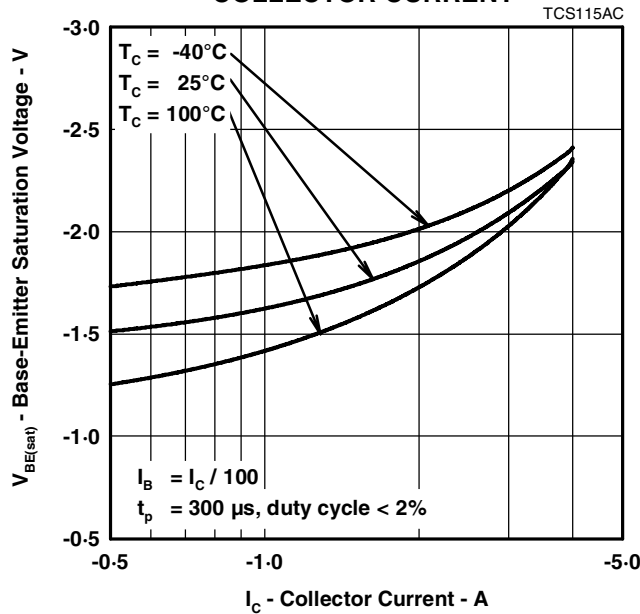


Figure 3.

**PRODUCT INFORMATION**

**MAXIMUM SAFE OPERATING REGIONS**

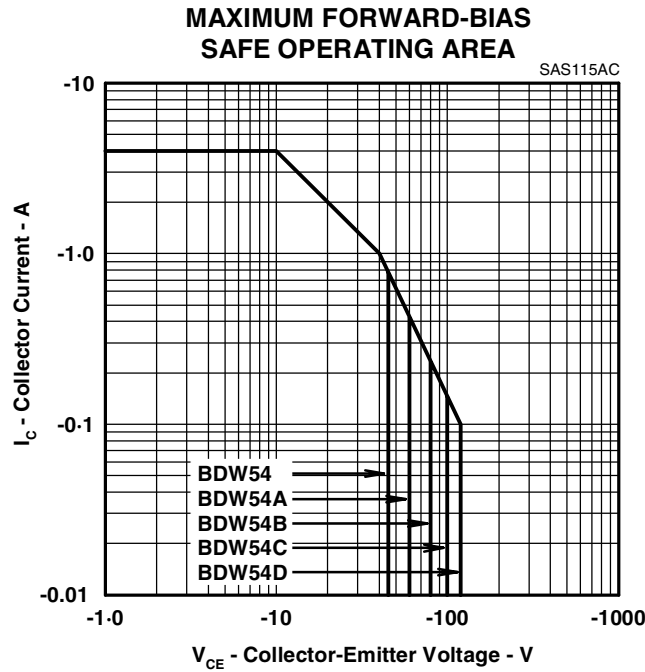


Figure 4.

**THERMAL INFORMATION**

**MAXIMUM POWER DISSIPATION  
vs  
CASE TEMPERATURE**

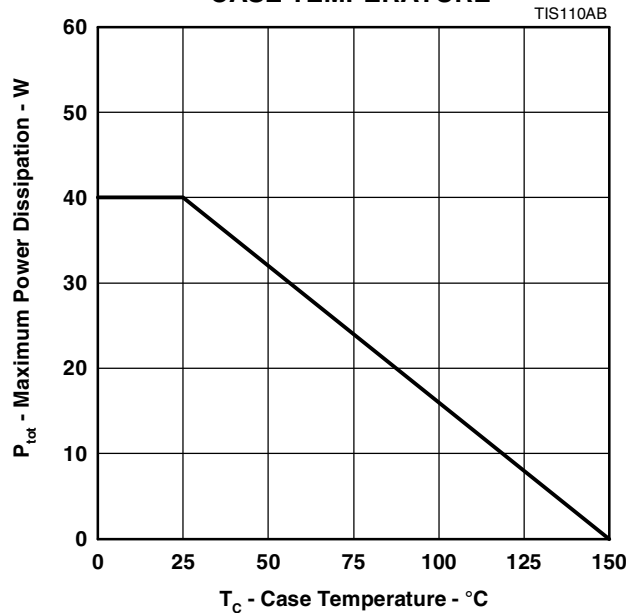


Figure 5.

**PRODUCT INFORMATION**