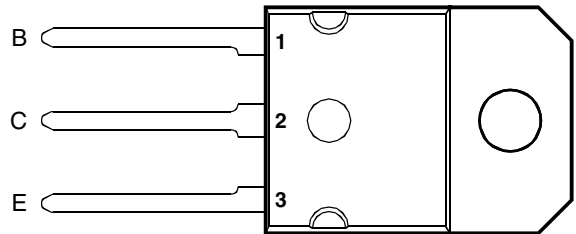


- Designed for Complementary Use with TIP145, TIP146 and TIP147
- 125 W at 25°C Case Temperature
- 10 A Continuous Collector Current
- Minimum  $h_{FE}$  of 1000 at 4 V, 5 A

**SOT-93 PACKAGE  
(TOP VIEW)**



Pin 2 is in electrical contact with the mounting base.

MDTRAAA

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	TIP140	$V_{CBO}$	60	V
	TIP141		80	
	TIP142		100	
Collector-emitter voltage ( $I_B = 0$ )	TIP140	$V_{CEO}$	60	V
	TIP141		80	
	TIP142		100	
Emitter-base voltage		$V_{EBO}$	5	V
Continuous collector current		$I_C$	10	A
Peak collector current (see Note 1)		$I_{CM}$	15	A
Continuous base current		$I_B$	0.5	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		$P_{tot}$	125	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		$P_{tot}$	3.5	W
Unclamped inductive load energy (see Note 4)		$\frac{1}{2}LI_C^2$	100	mJ
Operating junction temperature range		$T_j$	-65 to +150	°C
Storage temperature range		$T_{stg}$	-65 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds		$T_L$	260	°C

- NOTES: 1. This value applies for  $t_p \leq 0.3$  ms, duty cycle  $\leq 10\%$ .  
 2. Derate linearly to 150°C case temperature at the rate of 1 W/°C.  
 3. Derate linearly to 150°C free air temperature at the rate of 28 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**

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$ Collector-emitter breakdown voltage	$I_C = 30 \text{ mA}$ (see Note 5)	$I_B = 0$	TIP140 TIP141 TIP142	60 80 100			V
$I_{CEO}$ Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 40 \text{ V}$ $V_{CE} = 50 \text{ V}$	$I_B = 0$ $I_B = 0$ $I_B = 0$	TIP140 TIP141 TIP142			2 2 2	mA
$I_{CBO}$ Collector cut-off current	$V_{CB} = 60 \text{ V}$ $V_{CB} = 80 \text{ V}$ $V_{CB} = 100 \text{ V}$	$I_E = 0$ $I_E = 0$ $I_E = 0$	TIP140 TIP141 TIP142			1 1 1	mA
$I_{EBO}$ Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				2	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = 4 \text{ V}$ $V_{CE} = 4 \text{ V}$	$I_C = 5 \text{ A}$ $I_C = 10 \text{ A}$	(see Notes 5 and 6)	1000 500			
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 10 \text{ mA}$ $I_B = 40 \text{ mA}$	$I_C = 5 \text{ A}$ $I_C = 10 \text{ A}$	(see Notes 5 and 6)			2 3	V
$V_{BE}$ Base-emitter voltage	$V_{CE} = 4 \text{ V}$	$I_C = 10 \text{ A}$	(see Notes 5 and 6)			3	V
$V_{EC}$ Parallel diode forward voltage	$I_E = 10 \text{ A}$	$I_B = 0$	(see Notes 5 and 6)			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.

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

PARAMETER	TEST CONDITIONS †			MIN	TYP	MAX	UNIT
$t_{on}$ Turn-on time	$I_C = 10 \text{ A}$	$I_{B(on)} = 40 \text{ mA}$	$I_{B(off)} = -40 \text{ mA}$		0.9		$\mu\text{s}$
$t_{off}$ Turn-off time	$V_{BE(off)} = -4.2 \text{ V}$	$R_L = 3 \Omega$	$t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		11		$\mu\text{s}$

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

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN  
vs  
COLLECTOR CURRENT

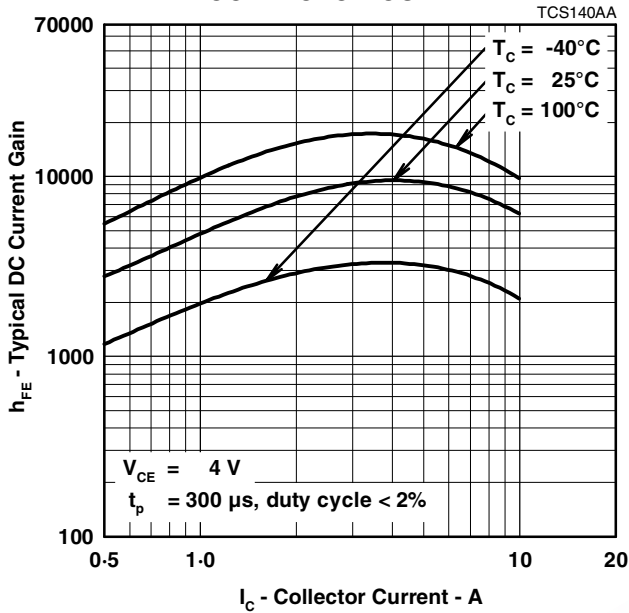


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE  
vs  
COLLECTOR CURRENT

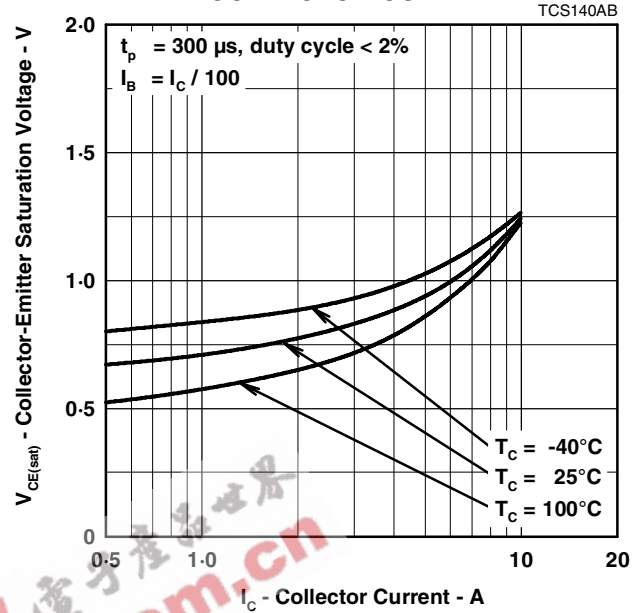


Figure 2.

BASE-EMITTER SATURATION VOLTAGE  
vs  
COLLECTOR CURRENT

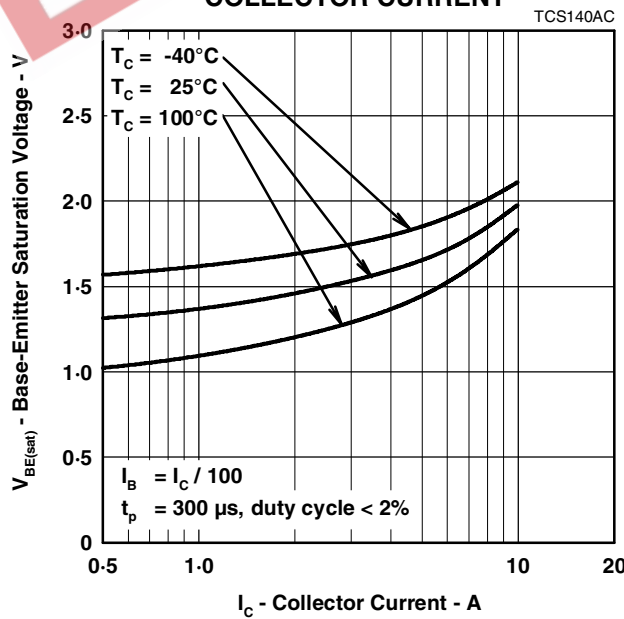


Figure 3.

**PRODUCT INFORMATION**

DECEMBER 1971 - REVISED SEPTEMBER 2002  
Specifications are subject to change without notice.

**MAXIMUM SAFE OPERATING REGIONS**

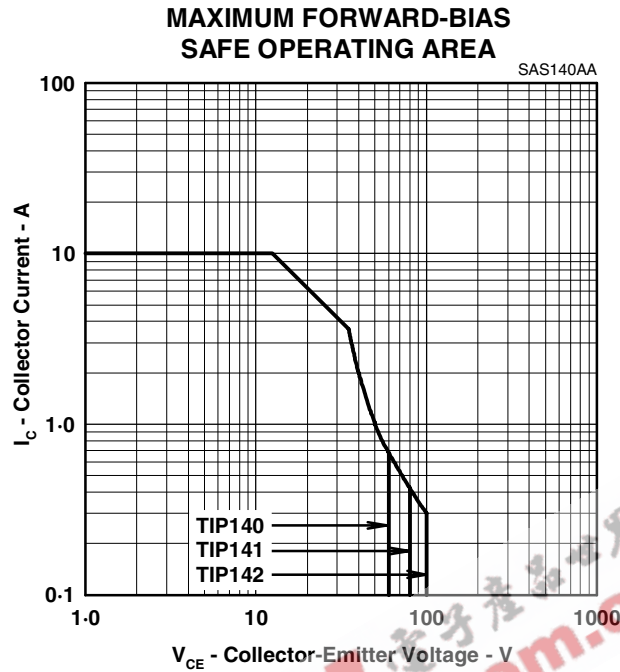


Figure 4.

**THERMAL INFORMATION**

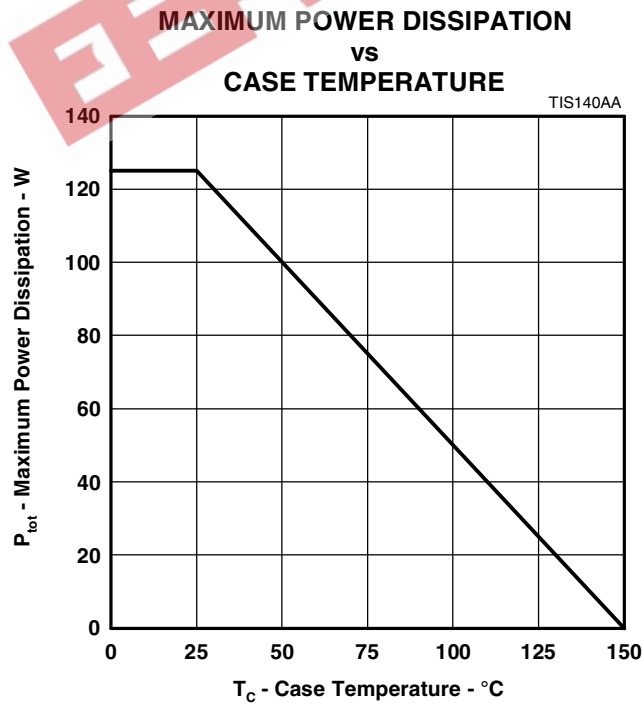


Figure 5.

**PRODUCT INFORMATION**

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