

## *NPN Epitaxial Silicon Transistor*

### Features

- High Current Capability:  $I_C = 17\text{ A}$
- High Power Dissipation: 150 W
- High Frequency: 30 MHz
- High Voltage:  $V_{CEO} = 250\text{ V}$
- Wide S.O.A. for Reliable Operation
- Excellent Gain Linearity for Low THD
- Thermal and Electrical Spice Models are Available
- These Devices are Pb-Free and are RoHS Compliant

### Applications

- High-Fidelity Audio Output Amplifier
- General Purpose Power Amplifier

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Collector-Base Voltage	$V_{CBO}$	250	V
Collector-Emitter Voltage	$V_{CEO}$	250	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Collector Current (DC)	$I_C$	17	A
Base Current	$I_B$	1.5	A
Total Device Dissipation ( $T_C = 25^\circ\text{C}$ ) Derate Above $25^\circ\text{C}$	$P_D$	150 1.04	W W/ $^\circ\text{C}$
Junction and Storage Temperature	$T_J, T_{STG}$	-50 ~ +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS (Note 1)

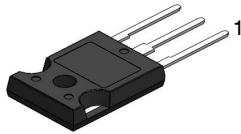
( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Max.	Units
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.83	$^\circ\text{C/W}$

1. Device mounted on minimum pad size.

### $h_{FE}$ CLASSIFICATION

Classification	R	O
$h_{FE1}$	55 ~ 110	80 ~ 160



**TO-247-3**

1. Base
2. Collector
3. Emitter

**ORDERING INFORMATION**

HT2SC5200-ODZ  
HT2SC5200-RDZ

&HT2SC5200 = Specific Device Code  
&O,R = Version  
&D = Packaging  
&Z = Pb-Free Package  
&# = Date Code

$T_A = -50^\circ$  to  $150^\circ\text{C}$  for all packages

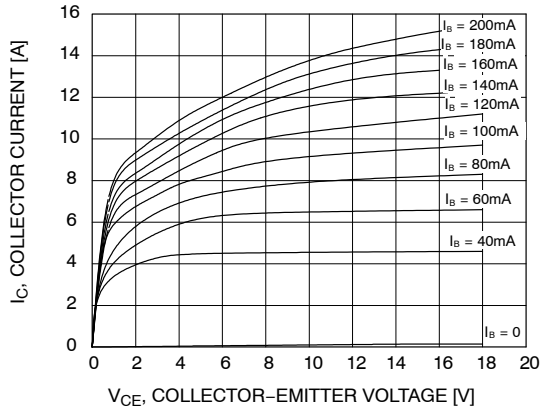
**ELECTRICAL CHARACTERISTICS** (Note 2) ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{CBO}$	Collector–Base Breakdown Voltage	$I_C = 5\text{ mA}, I_E = 0$	250			V
$BV_{CEO}$	Collector–Emitter Breakdown Voltage	$I_C = 10\text{ mA}, R_{BE} = \infty$	250			V
$BV_{EBO}$	Emitter–Base Breakdown Voltage	$I_E = 5\text{ mA}, I_C = 0$	5			V
$I_{CBO}$	Collector Cut–Off Current	$V_{CB} = 230\text{ V}, I_E = 0$			5.0	$\mu\text{A}$
$I_{EBO}$	Emitter Cut–Off Current	$V_{EB} = 5\text{ V}, I_C = 0$			5.0	$\mu\text{A}$
$h_{FE1}$	DC Current Gain	$V_{CE} = 5\text{ V}, I_C = 1\text{ A}$	55		160	
$h_{FE2}$	DC Current Gain	$V_{CE} = 5\text{ V}, I_C = 7\text{ A}$	35	60		
$V_{CE(sat)}$	Collector–Emitter Saturation Voltage	$I_C = 8\text{ A}, I_B = 0.8\text{ A}$		0.4	3.0	V
$V_{BE(on)}$	Base–Emitter On Voltage	$V_{CE} = 5\text{ V}, I_C = 7\text{ A}$		1.0	1.5	V
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 5\text{ V}, I_C = 1\text{ A}$		30		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$		200		pF

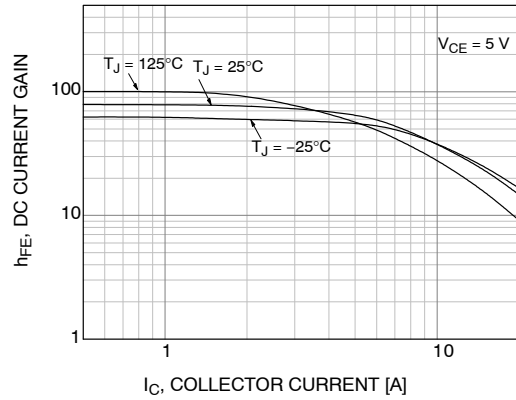
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pulse Test: Pulse Width = 20  $\mu\text{s}$ , Duty Cycle  $\leq 2\%$

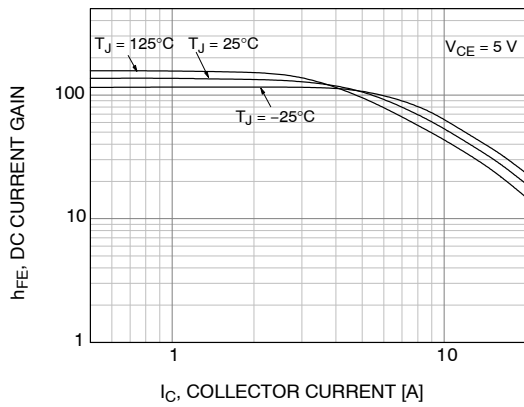
**TYPICAL CHARACTERISTICS**



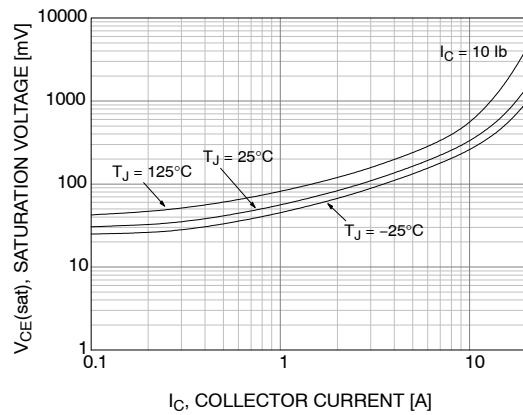
**Figure 1. Static Characteristic**



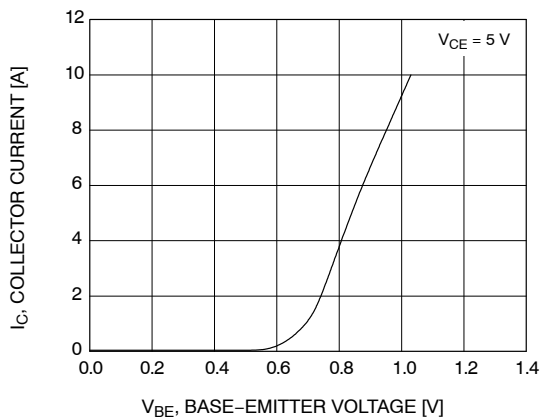
**Figure 2. DC Current Gain (R Grade)**



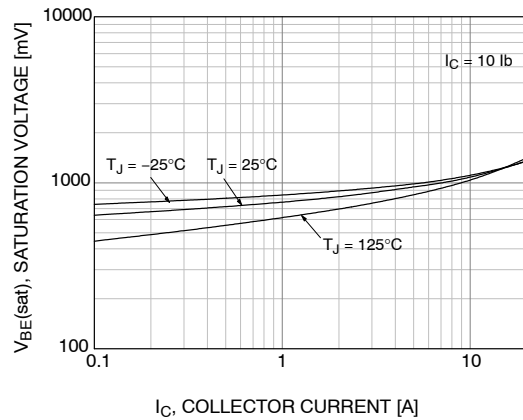
**Figure 3. DC Current Gain (O Grade)**



**Figure 4. Collector-Emitter Saturation Voltage**

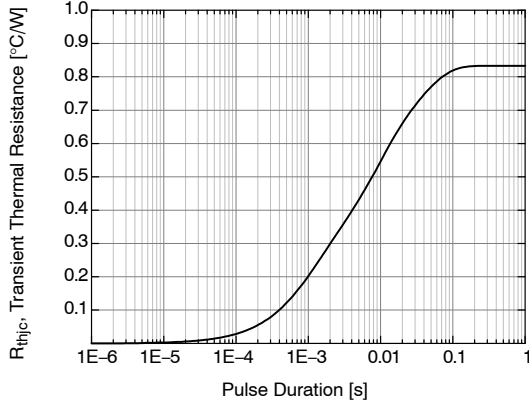


**Figure 5. Base-Emitter On Voltage**

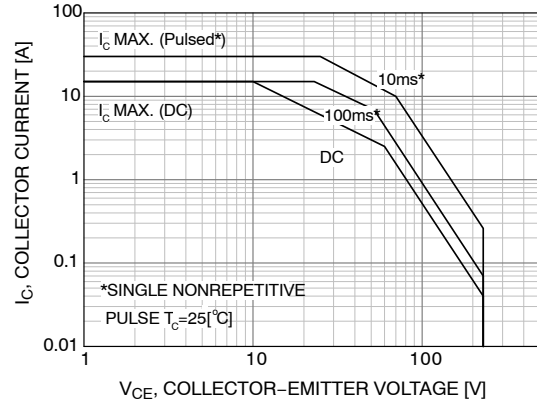


**Figure 6. Base-Emitter Saturation Voltage**

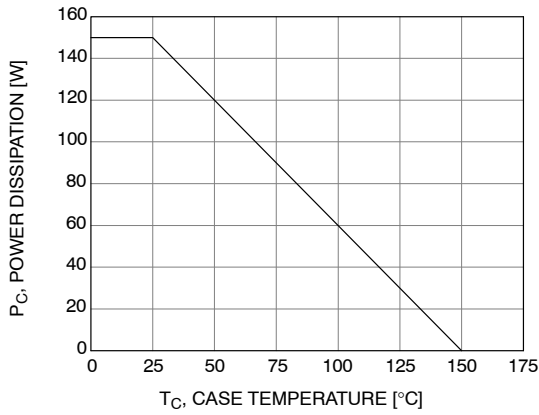
**TYPICAL CHARACTERISTICS**



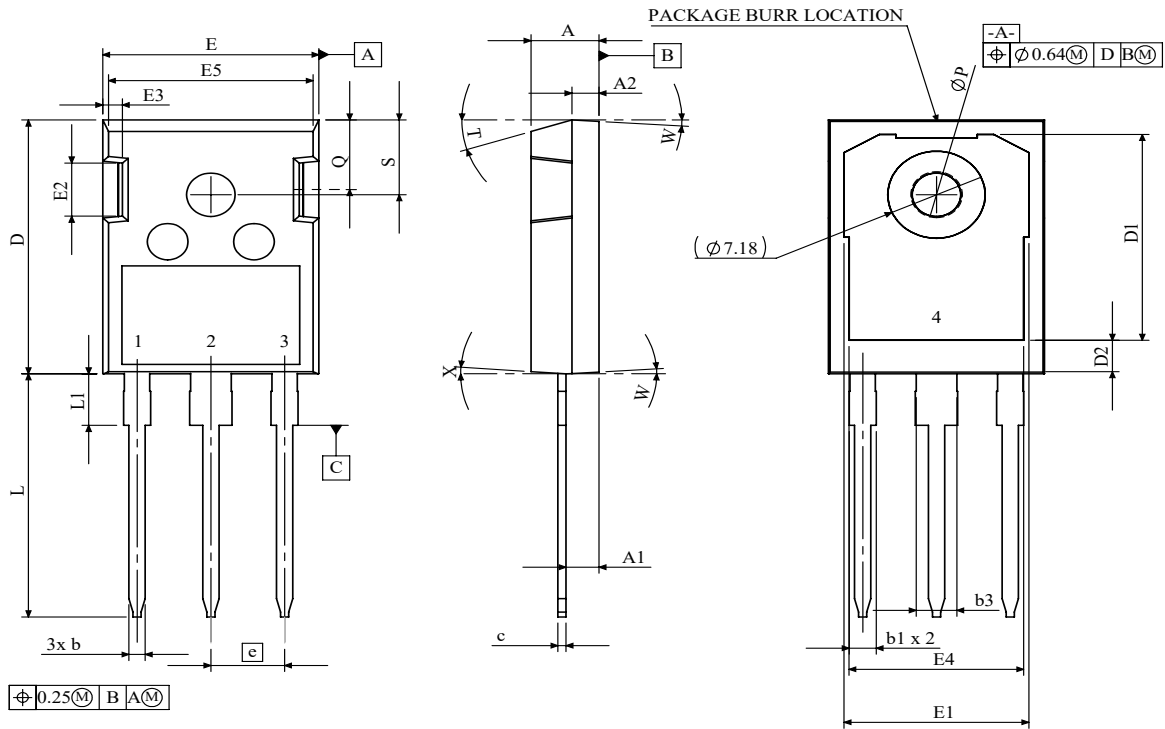
**Figure 7. Power Derating**



**Figure 8. Safe Operating Area**



**Figure 9. Power Derating**

**Package Dimensions – TO-247-3L**


SYMBOL	MIN (mm)	MAX (mm)
A	4.83	5.21
A1	2.27	2.52
A2	1.91	2.16
b	1.07	1.33
b1	1.91	2.41
b3	2.87	3.38
c	0.55	0.74
D	20.75	21.05
D1	16	17.4
D2	2.86	3.26
E	15.75	16.13
E1	13.5	14.55
E2	3.68	5.1
E3	1	1.9
E4	12.38	13.43
E5	14.65	15.05
e	5.44 BSC	
L	19.73	20.48
L1	3.97	4.69
$\phi P$	3.18	4.06
Q	5.42	5.96
S	5.85	6.49
T	17.5° REF.	
W	3.5° REF.	
X	4° REF.	

1	GATE
2	DRAIN
3	SOURCE
4	DRAIN

**NOTES:**

- ALL METAL SURFACES ARE TIN PLATED (MATTE), EXCEPT AREA OF CUT.
- DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
- ALL DIMENSIONS ARE LISTED IN MILLIMETERS. ANGLES ARE IN DEGREES.
- BURR OR MOLD FLASH SIZE (0.5 mm) IS NOT INCLUDED IN THE DIMENSIONS

**Recommended Solder Pad Layout**

