

## NPN SILICON POWER TRANSISTORS

...designed for use in TV horizontal deflection output applications

### FEATURES:

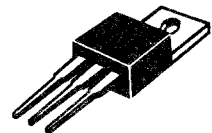
- \* Low Collector-Emitter Saturation Voltage  
 $V_{CE(sat)} = 1.0V(\text{Max}) @ I_C = 4.0A, I_B = 0.4A$
- \* DC Current Gain  
 $hFE = 30-150 @ I_C = 1.0A$
- \* Large Collector Current Capability

**NPN**  
**2SC2233**

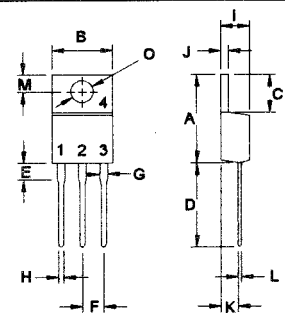
**4.0 AMPERE**  
**SILICON POWER**  
**TRANSISTORS**  
**60 VOLTS**  
**40 WATTS**

### MAXIMUM RATINGS

Characteristic	Symbol	2SC2233	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	V
Collector-Base Voltage	$V_{CBO}$	200	V
Emitter-Base Voltage	$V_{EBO}$	5.0	V
Collector Current - Continuous - Peak	$I_C$ $I_{CM}$	4.0 10	A
Base current	$I_B$	2.0	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	40 0.32	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$



**TO-220**



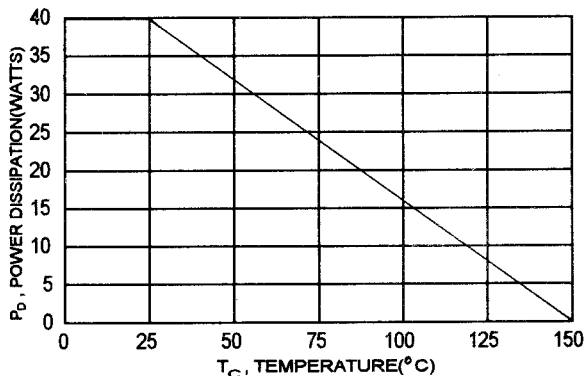
PIN 1.BASE  
2.COLLECTOR  
3.EMITTER  
4.COLLECTOR(CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	3.125	$^\circ\text{C/W}$

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

FIGURE -1 POWER DERATING



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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Voltage ( $I_C = 50\text{ mA}$ , $I_B = 0$ )	$V_{CE0}$	60		V
Emitter-Base Voltage ( $I_B = 1.0\text{ mA}$ , $I_C = 0$ )	$V_{EBO}$	5.0		V
Collector Cutoff Current ( $V_{CB} = 170\text{ V}$ , $I_E = 0$ )	$I_{CBO}$		10	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$		10	$\mu\text{A}$

**ON CHARACTERISTICS (1)**

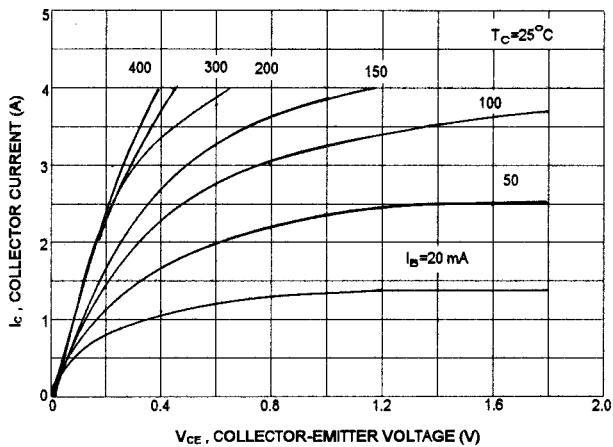
DC Current Gain ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 4.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	hFE	30 20	150	
Collector-Emitter Saturation Voltage ( $I_C = 4.0\text{ A}$ , $I_B = 400\text{ mA}$ )	$V_{CE(\text{sat})}$		1.0	V
Base-Emitter Saturation Voltage ( $I_C = 4.0\text{ A}$ , $I_B = 400\text{ mA}$ )	$V_{BE(\text{sat})}$		1.5	V

**DYNAMIC CHARACTERISTICS**

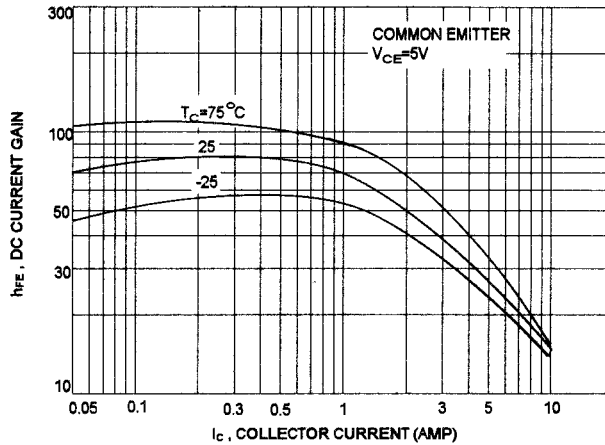
Current-Gain-Bandwidth Product ( $I_C = 0.5\text{ A}$ , $V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	5.0		MHz
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(1) Pulse Test: Pulse Width  $\approx 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

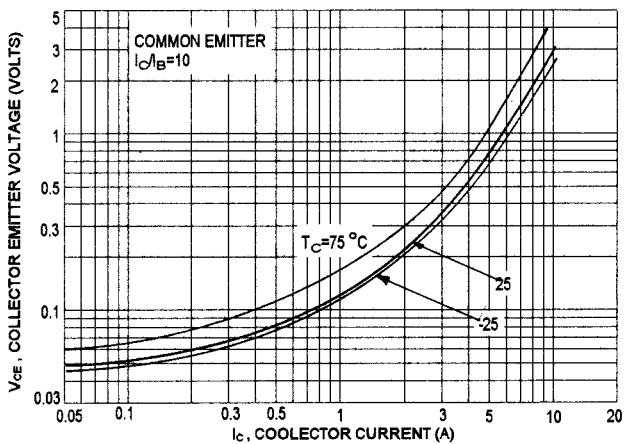
Ic - Vce



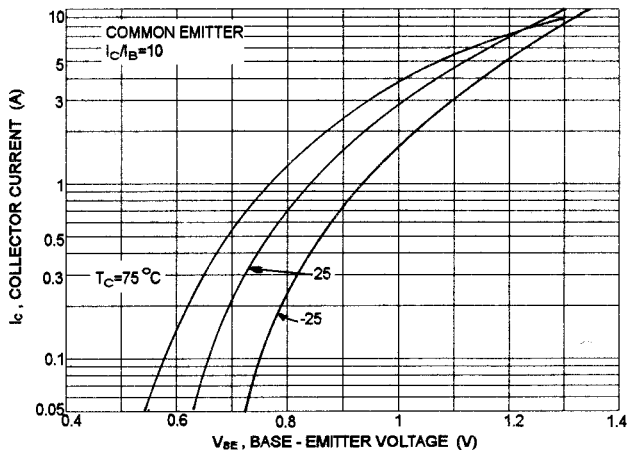
DC CURRENT GAIN



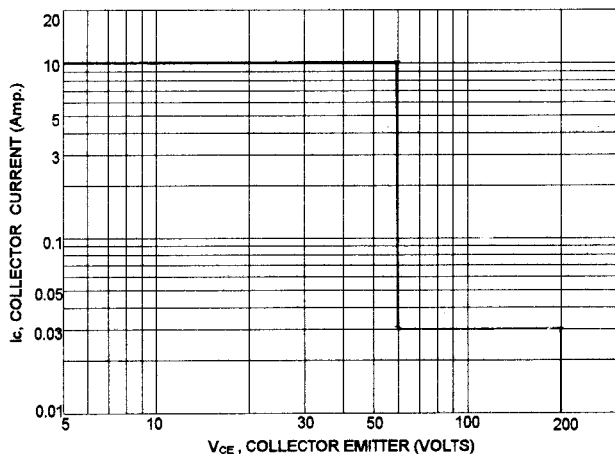
VCE(sat) - Ic



Ic - Vbe



SAFE OPERATING AREA



VCE(sat) - Ib

