



## NPN SILICON POWER TRANSISTOR

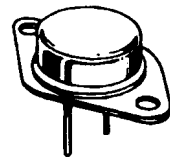
...2N3441 transistor is designed for use in general purpose switching and linear amplifier application requiring high breakdown voltages.

### FEATURES

- \* Driver for High Power Outputs
- \* Series and Shunt Regulators
- \* Solenoid and Relay Drivers
- \* Power Switching Circuits

**NPN  
2N3441**

**3 AMPERE  
SILICON POWER  
TRANSISTORS  
140 VOLTS  
25 WATTS**



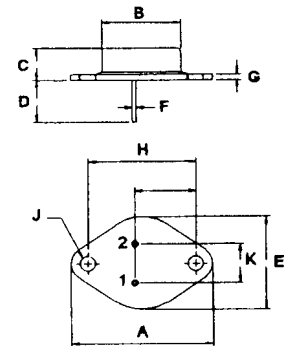
**TO-66**

### MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	160	V
Collector-Emitter Voltage	$V_{CEO}$	140	V
Emitter-Base Voltage	$V_{EBO}$	7.0	V
Collector Current - Continuous	$I_C$	3.0	A
Base Current-Continuous	$I_B$	2.0	A
Total Power Dissipation @ $T_c = 25^\circ C$ Derate above $25^\circ C$	$P_D$	25 0.142	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +200	$^\circ C$

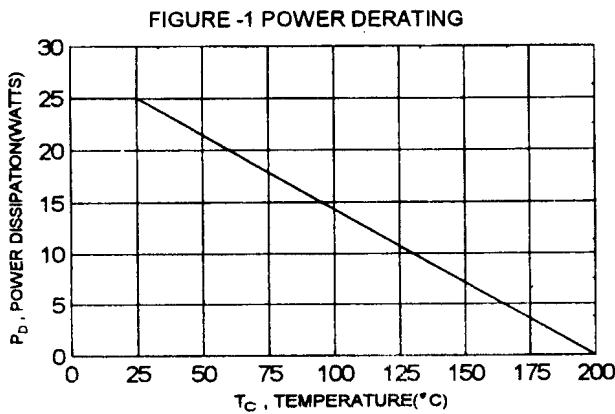
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	7.0	$^\circ C/W$



PIN 1. BASE  
2. EMITTER  
COLLECTOR (CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	30.60	32.52
B	13.85	14.16
C	6.54	7.22
D	9.50	10.50
E	17.26	18.46
F	0.76	0.92
G	1.38	1.65
H	24.16	24.78
I	13.84	15.60
J	3.32	3.92
K	4.86	5.34



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

Characteristic	Symbol	Min	Max	Unit
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## OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage(1) ( $I_C = 50 \text{ mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	140		V
Collector Cutoff Current ( $V_{CE} = 140 \text{ V}$ , $I_B = 0$ )	$I_{CEO}$		50	mA
Collector Cutoff Current ( $V_{CE} = 140 \text{ V}$ , $V_{BE(on)} = 1.5 \text{ V}$ )	$I_{CEX}$		5.0	mA
Emitter Cutoff Current ( $V_{EB} = 7.0 \text{ V}$ , $I_C = 0$ )	$I_{EBO}$		1.0	mA

## ON CHARACTERISTICS (1)

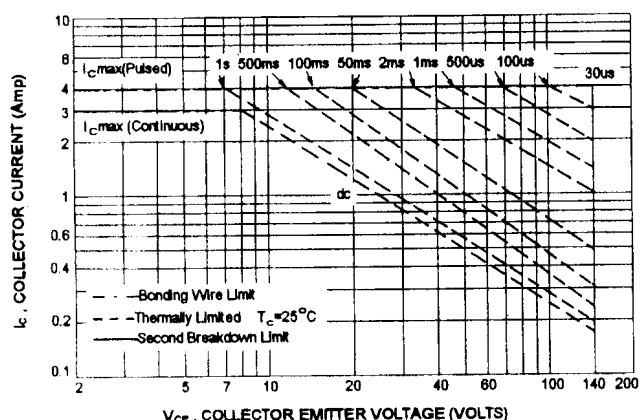
DC Current Gain ( $I_C = 0.5 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ ) ( $I_C = 2.7 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ )	hFE	25 5.0	100	
Collector-Emitter Saturation Voltage ( $I_C = 2.7 \text{ A}$ , $I_B = 0.9 \text{ A}$ )	$V_{CE(sat)}$		6.0	V
Base-Emitter On Voltage ( $I_C = 2.7 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ )	$V_{BE(on)}$		6.7	V

## DYNAMIC CHARACTERISTICS

Small-Signal Current Gain ( $I_C = 0.5 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ , $f = 1.0 \text{ KHz}$ )	$h_{fe}$	15		
Small-Signal Current Gain ( $I_C = 0.5 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ , $f = 0.4 \text{ MHz}$ )	$ h_{fe} $	5.0		

(1) Pulse Test: Pulse width = 300 us , Duty Cycle  $\leq 2.0\%$ 

## ACTIVE REGION SAFE OPERATING AREA (SOA)



There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is base on  $T_{J(PK)} = 200^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 200^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.