

## SWITCHMODE SERIES NPN POWER TRANSISTORS

... designed for use in high-voltage, high-speed, power switching in inductive circuit, they are particularly suited for 115 and 220 V switchmode applications such as switching regulator's, inverters, DC -DC and converter

### FEATURES:

\*Collector-Emitter Sustaining Voltage-

$$V_{CEX} = 350 \text{ V to } 450 \text{ V}$$

\* Collector-Emitter Saturation Voltage -

$$V_{CE(sat)} = 2.0 \text{ V (Max.) @ } I_C = 5.0 \text{ A, } I_B = 1.0 \text{ A}$$

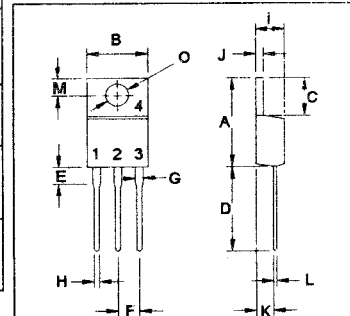
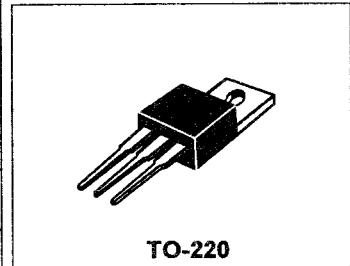
\* Switching Time -  $t_f = 0.5 \text{ us (Max.) @ } I_C = 5.0 \text{ A}$

**NPN**  
**2N6738**  
**2N6739**  
**2N6740**

**8.0 AMPERE**  
**SILICON POWER**  
**TRANSISTORS**  
**300-400 VOLTS**  
**100 WATTS**

### MAXIMUM RATINGS

Characteristic	Symbol	2N6738	2N6739	2N6740	Unit
Collector-Emitter Voltage $V_{BE} = -1.5\text{V}$	$V_{CEV}$	450	550	650	V
Collector-Emitter Voltage $V_{BE} = -1.5\text{V}$	$V_{CEX}$	350	400	450	V
Collector-Emitter Voltage	$V_{CEO}$	300	350	400	V
Emitter-Base Voltage	$V_{EBO}$	8.0			V
Collector Current - Continuous	$I_C$	8.0			A
- Peak	$I_{CM}$	10			
Base current	$I_B$	4.0			A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	100			W
Derate above $25^\circ\text{C}$		0.8			W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to 150			$^\circ\text{C}$

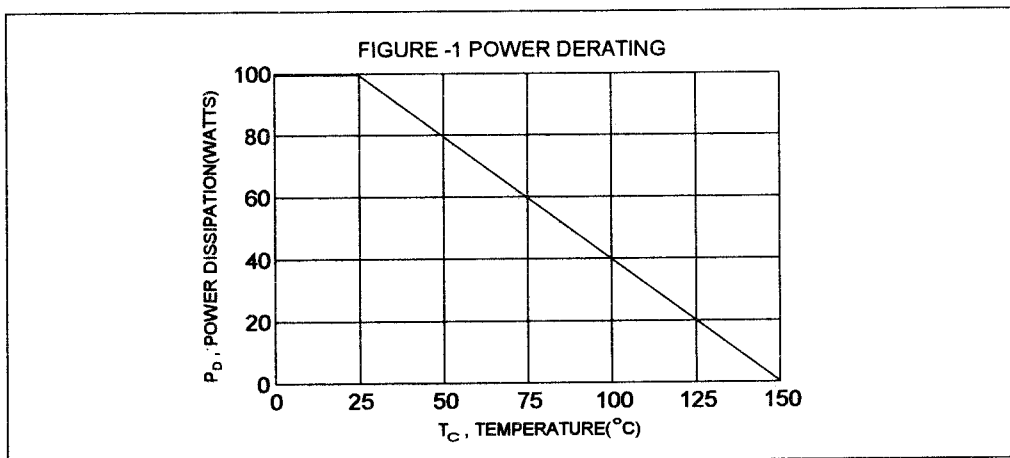


PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR(CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.25	$^\circ\text{C/W}$

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



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 ( $I_C = 200\text{ mA}$ , $I_B = 0$ )	2N6738 2N6739 2N6740	$V_{CEO(sus)}$	300 350 400	V
Collector Cutoff Current ( $V_{CEV} = \text{Rated Value}$ , $V_{BE(off)} = -1.5\text{ V}$ ) ( $V_{CEV} = \text{Rated Value}$ , $V_{BE(off)} = -1.5\text{ V}$ , $T_c = 100^\circ\text{C}$ )		$I_{CEV}$	0.1 1.0	mA
Emitter Cutoff Current ( $V_{EB} = 8.0\text{ V}$ , $I_C = 0$ )		$I_{EBO}$	2.0	mA

## ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 5.0\text{ A}$ , $V_{CE} = 3.0\text{ V}$ )		hFE	10	40	
Collector-Emitter Saturation Voltage ( $I_C = 5.0\text{ A}$ , $I_B = 1.0\text{ A}$ ) ( $I_C = 8.0\text{ A}$ , $I_B = 4.0\text{ A}$ )		$V_{CE(sat)}$		1.0 2.0	V
Base-Emitter Saturation Voltage ( $I_C = 5.0\text{ A}$ , $I_B = 1.0\text{ A}$ )		$V_{BE(sat)}$		1.6	V

## DYNAMIC CHARACTERISTICS

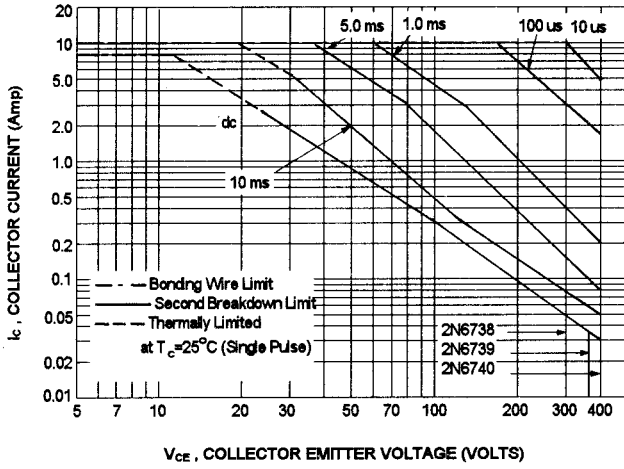
Current-Gain-Bandwidth Product (2) ( $I_C = 200\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )		$f_T$	10	60	MHz
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## SWITCHING CHARACTERISTICS

Delay Time	$V_{CC} = 125\text{ V}$ , $I_C = 5.0\text{ A}$ $I_{B1} = -I_{B2} = 1.0\text{ A}$ $t_p = 20\text{ us}$ , Duty Cycle $\leq 1.0\%$	$t_d$	0.1	us
Rise Time		$t_r$	0.4	us
Storage Time		$t_s$	2.5	us
Fall Time		$t_f$	0.5	us

(1) Pulse Test: Pulse width = 300 us, Duty Cycle  $\leq 2.0\%$ (2)  $f_T = |h_{fe}| \cdot f_{test}$

FIG-2 ACTIVE REGION SAFE OPERATING AREA



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 FIG-2 is base on  $T_C = 25^\circ\text{C}$ ;  $T_{J(PK)}$  is variable depending on power level. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_C \geq 25^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIG-3 "ON" VOLTAGES

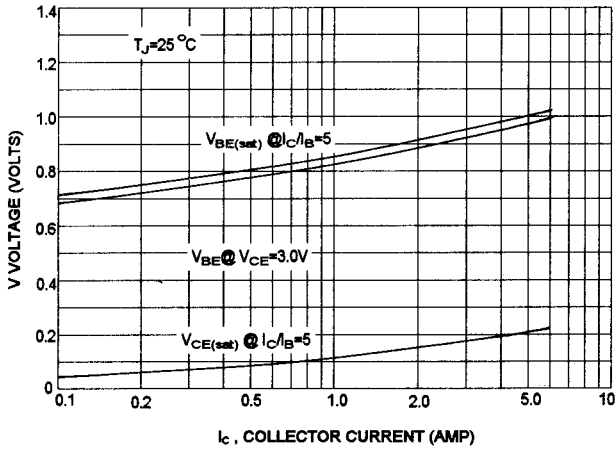


FIG-4 DC CURRENT GAIN

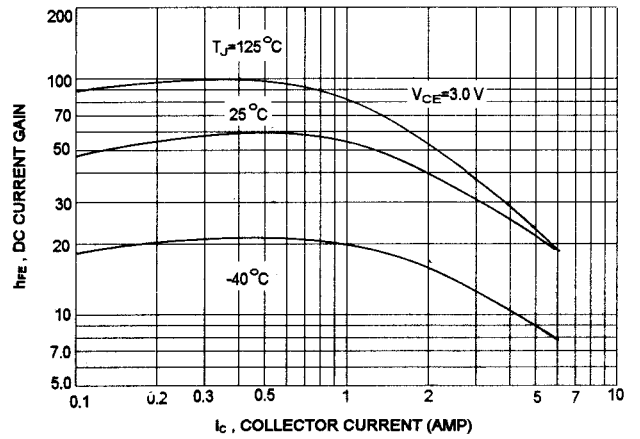


FIG-5 TURN-ON TIME

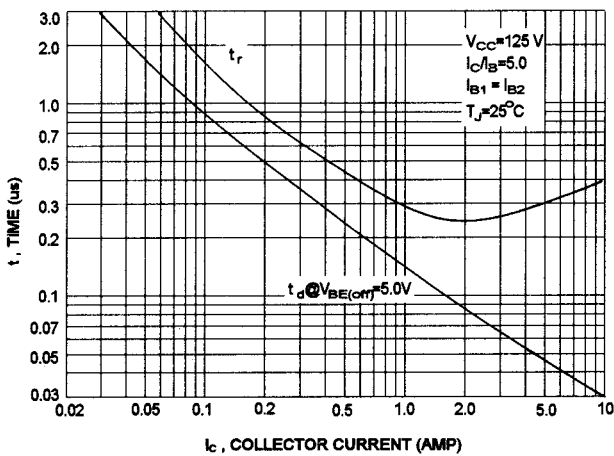


FIG-6 TURN-OFF TIME

