

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 conveter

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

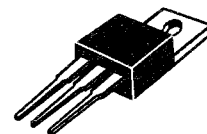
2N6739

2N6740

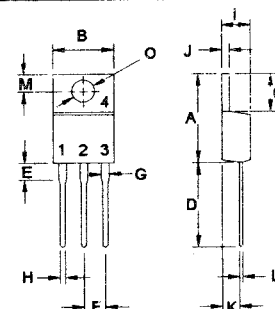
**8.0 AMPERE
SILICON POWER
TRANSISTORS
300-400 VOLTS
100 WATTS**

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			A
Base current	I_B	4.0			A
Total Power Dissipation @ $T_C = 25^\circ \text{C}$ Derate above 25°C	P_D	100 0.8			W W/ $^\circ \text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to 150			$^\circ \text{C}$



TO-220

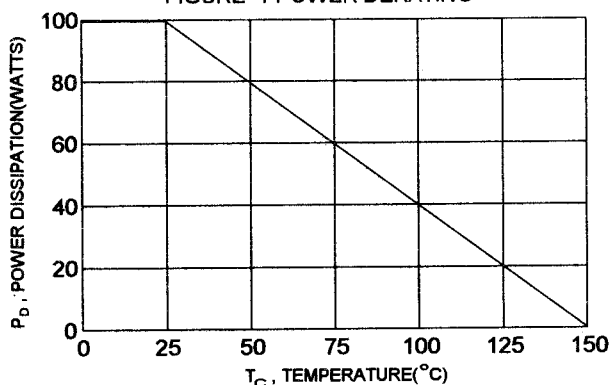


PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR(CASE)

THERMAL CHARACTERISTICS

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

FIGURE -1 POWER DERATING



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
----------------	--------	-----	-----	------

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 ($I_C = 5.0\text{ A}$, $V_{CE} = 3.0\text{ V}$)	h_{FE}	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

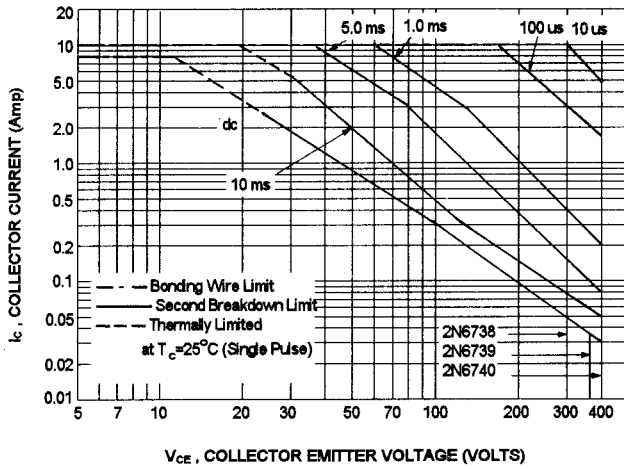
Current-Gain-Bandwidth Product (2) ($I_C = 200\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ MHz}$)	f_T	10	60	MHz
---	-------	----	----	-----

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) $f_T = |h_{fe}| \cdot f_{\text{test}}$

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

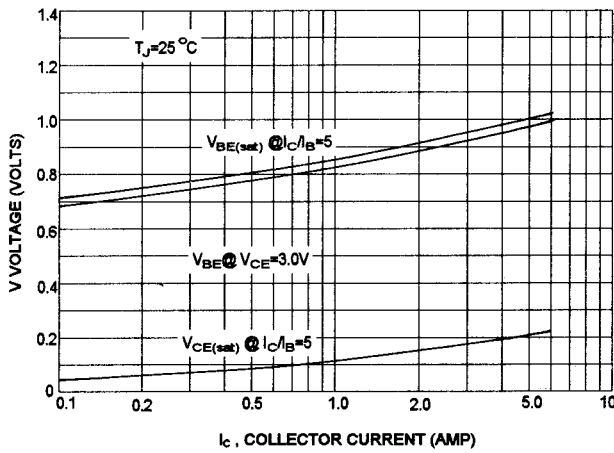


FIG-4 DC CURRENT GAIN

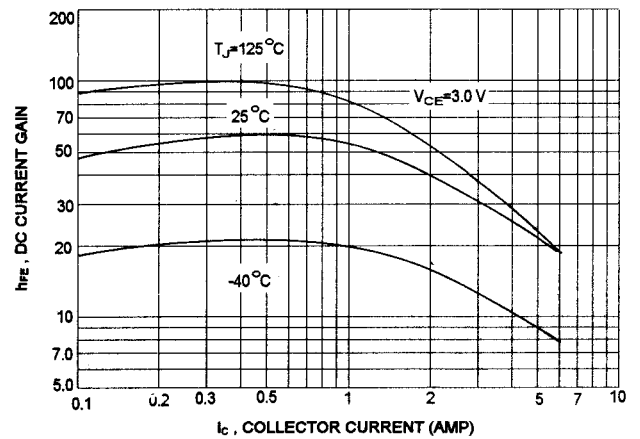


FIG-5 TURN-ON TIME

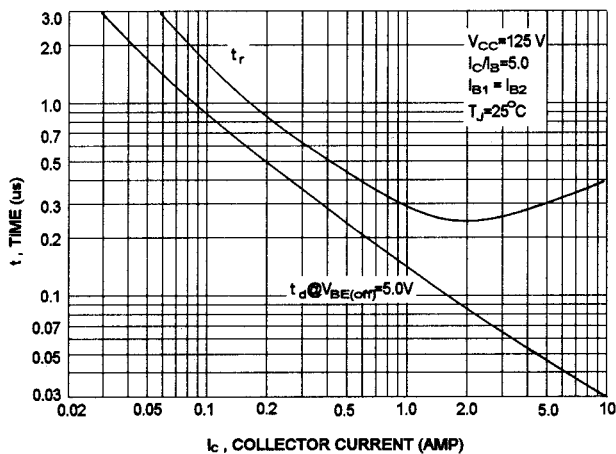


FIG-6 TURN-OFF TIME

