

COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

...designed for low and medium frequency power application such as power switching, audio amplifier, hammer drivers, and shunt and series regulators.

FEATURES:

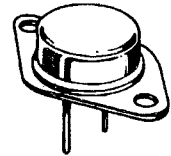
- * High Gain Darlington Performance
- * DC Current Gain $h_{FE} = 3000(\text{Typ}) @ I_C = 5.0 \text{ A}$
- * True Complementary Specifications

NPN	PNP
2N6383	2N6648
2N6384	2N6649
2N6385	2N6650

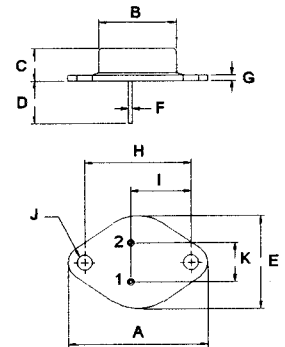
10 AMPERE
COMPLEMENTARY
SILICON POWER
DARLINGTON TRANSISTOR
40-80 VOLTS
100 WATTS

MAXIMUM RATINGS

Characteristic	Symbol	2N6383 2N6648	2N6384 2N6649	2N6385 2N6650	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	80	V
Collector-Base Voltage	V_{CBO}	40	60	80	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	10 15			A
Base Current	I_B	0.25			A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	100 0.571			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	- 65 to +200			$^\circ\text{C}$



TO-3



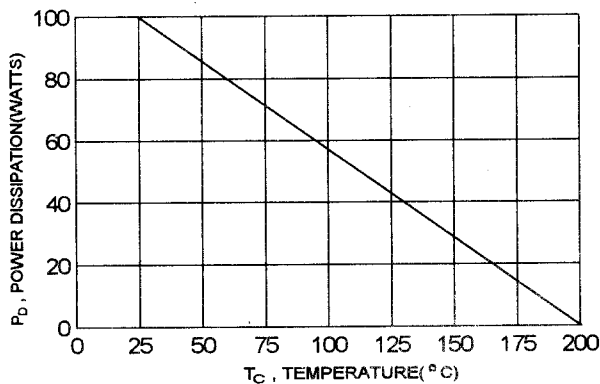
PIN 1. BASE
2. EMITTER
COLLECTOR (CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.75	$^\circ\text{C}/\text{W}$

FIGURE -1 POWER DERATING



2N6383, 2N6384, 2N6385 NPN / 2N6648, 2N6649, 2N6650 PNP

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) ($I_c = 200 \text{ mA}, I_B = 0$)	2N6383, 2N6648 2N6384, 2N6649 2N6385, 2N6650	$V_{CE(sus)}$	40 60 80	V
Collector Cutoff Current ($V_{CE} = 40 \text{ V}, I_B = 0$) ($V_{CE} = 60 \text{ V}, I_B = 0$) ($V_{CE} = 80 \text{ V}, I_B = 0$)	2N6383, 2N6648 2N6384, 2N6649 2N6385, 2N6650	I_{CEO}	1.0 1.0 1.0	mA
Collector Cutoff Current ($V_{CE} = 40 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}$) ($V_{CE} = 60 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}$) ($V_{CE} = 80 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}$) ($V_{CE} = 40 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}, T_c = 125^\circ\text{C}$) ($V_{CE} = 60 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}, T_c = 125^\circ\text{C}$) ($V_{CE} = 80 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}, T_c = 125^\circ\text{C}$)	2N6383, 2N6648 2N6384, 2N6649 2N6385, 2N6650 2N6383, 2N6648 2N6384, 2N6649 2N6385, 2N6650	I_{CEX}	0.3 0.3 0.3 3.0 3.0 3.0	mA
Emitter Cutoff Current ($V_{EB} = 5.0 \text{ V}, I_c = 0$)		I_{EBO}	10	mA

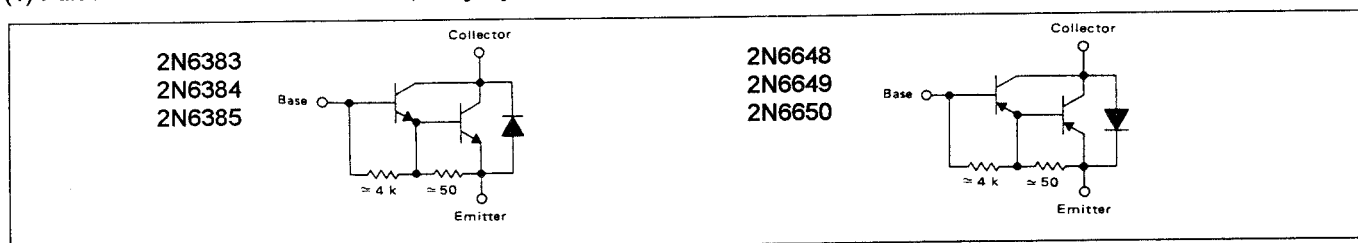
ON CHARACTERISTICS (1)

DC Current Gain ($I_c = 5.0 \text{ A}, V_{CE} = 3.0 \text{ V}$) ($I_c = 10 \text{ A}, V_{CE} = 3.0 \text{ V}$)	h_{FE}	1000 100	20000	
Collector-Emitter Saturation Voltage ($I_c = 5.0 \text{ A}, I_B = 10 \text{ mA}$) ($I_c = 10 \text{ A}, I_B = 100 \text{ mA}$)	$V_{CE(sat)}$		2.0 3.0	V
Base-Emitter On Voltage ($I_c = 5.0 \text{ A}, V_{CE} = 3.0 \text{ V}$) ($I_c = 10 \text{ A}, V_{CE} = 3.0 \text{ V}$)	$V_{BE(on)}$		2.8 4.5	V

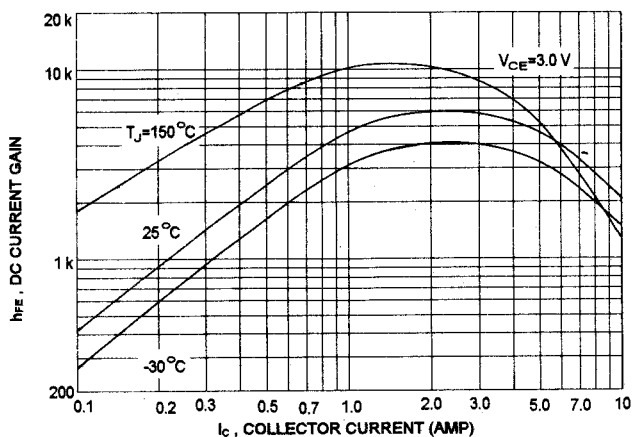
DYNAMIC CHARACTERISTICS

Small-Signal Current Gain ($I_c = 1.0 \text{ A}, V_{CE} = 5.0 \text{ V}, f = 1.0 \text{ KHz}$)	h_{fe}	1000		
Output Capacitance ($V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$)	C_{ob}		200	pF

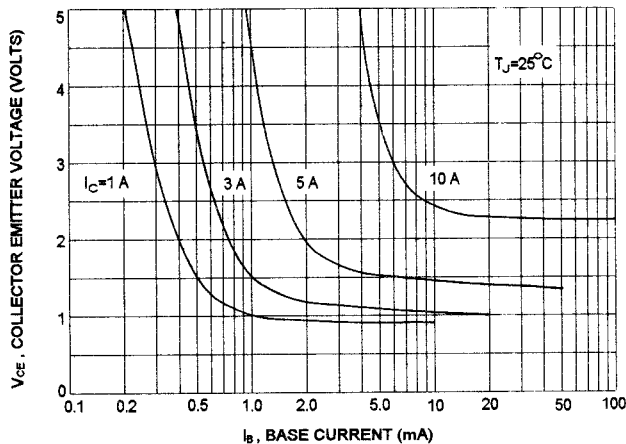
(1) Pulse Test: Pulse width = 300 us , Duty Cycle $\leq 2.0\%$



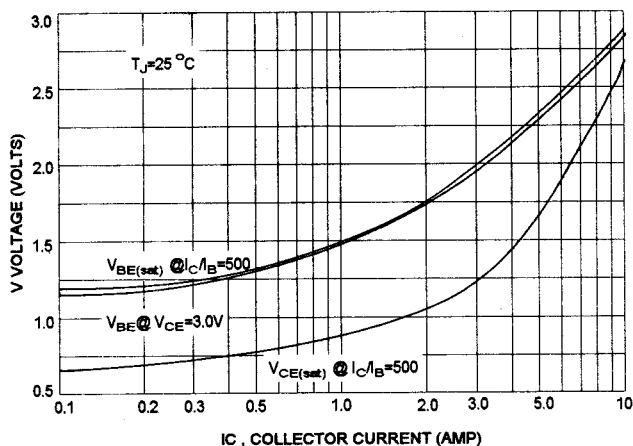
DC CURRENT GAIN



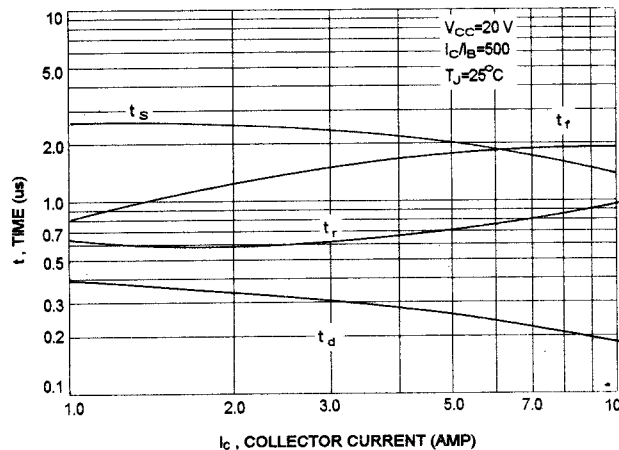
COLLECTOR SATURATION REGION



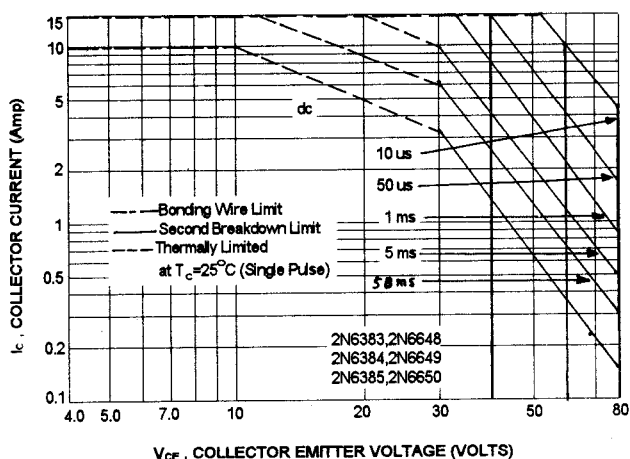
"ON" VOLTAGES



SWITCHING TIME



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.