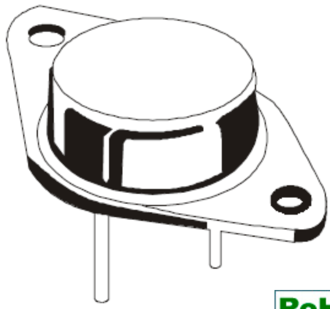
Darlington Power Transistor

NPN: 2N6383, 2N6384, 2N6385

PNP: 2N6648, 2N6649, 2N6650



TO-3

Features

- High Gain Dalington Performance
- DC Current Gain hFE = 3000(Typ) @ I_C = 5.0A
- True Complementary Specifications
- RoHS Compliant

Mechanical Data

Case:	TO-3, Metal Can Package
Terminals:	Solderable per MIL-STD-750
Weight:	20 grams (approx)

Maximum Ratings *(T_C=25ºC unless noted otherwise)*

Symbol	Description	2N6383 2N6648	2N6384 2N6649	2N6385 2N6650	Unit
V_{CBO}	Collector-Base Voltage	40	60	80	V
V_{CEO}	Collector-Emitter Voltage	40	60	80	V
V_{EBO}	Emitter-Base Voltage	5			V
I_C	Collector Current (Continuous)	10			A
	Collector Current (Peak)	15			
I_B	Base Current	0.25			A
P_D	Total Power Dissipation at T_C=25°C	100			W
	Derate above T_A=25°C	0.571			W/°C
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.75			°C /W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-65 to +200			°C

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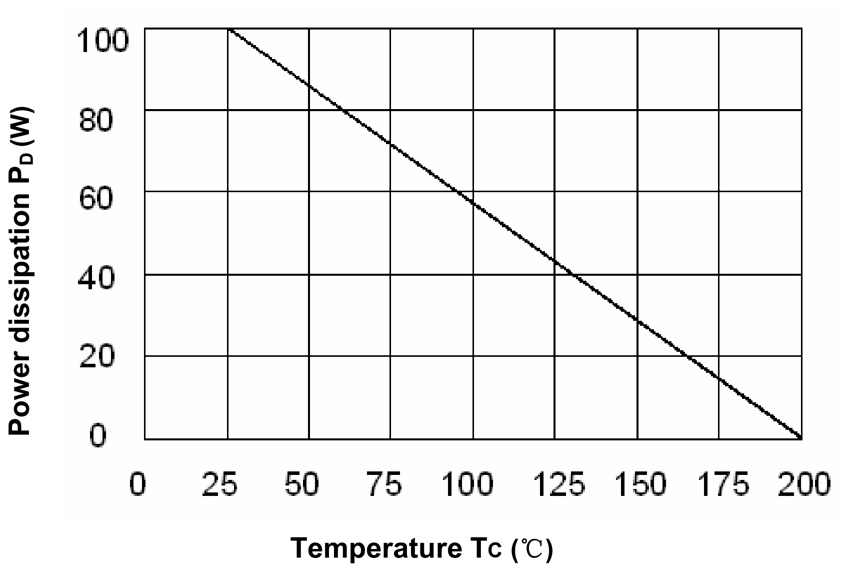
Electrical Characteristics *(T_C=25ºC unless noted otherwise)*

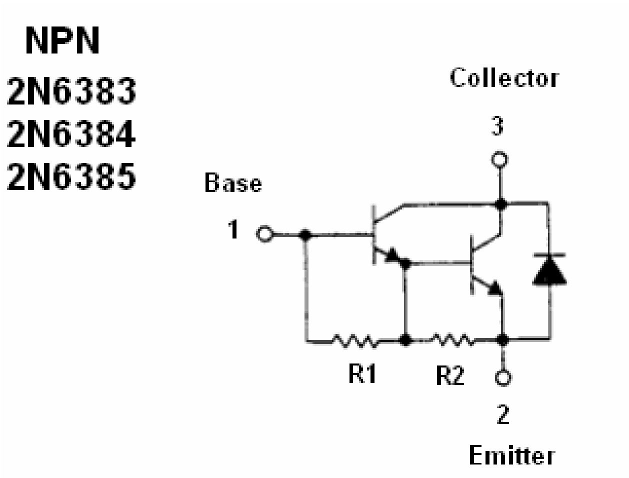
Symbol	Description		Min.	Max.	Unit	Conditions
$V_{CEO(sus)}$ *	Collector-Emitter Sustaining Voltage	2N6383, 2N6648	40	-	V	I_C=200mA, I_B=0
		2N6384, 2N6649	60	-		
		2N6385, 2N6650	80	-		
I_{CEO}	Collector Cut-off Current	2N6383, 2N6648	-	1.0	mA	V_{CE}=40V, I_B=0
		2N6384, 2N6649	-	1.0	mA	V_{CE}=60V, I_B=0
		2N6385, 2N6650	-	1.0	mA	V_{CE}=80V, I_B=0
I_{CEX}	Collector Cut-off Current	2N6383, 2N6648	-	0.3	mA	V_{CE}=40V, $V_{BE(off)}$=1.5V
			-	3.0	mA	V_{CE}=40V, $V_{BE(off)}$=1.5V, T_C=125°C
		2N6384, 2N6649	-	0.3	mA	V_{CE}=60V, $V_{BE(off)}$=1.5V
			-	3.0	mA	V_{CE}=60V, $V_{BE(off)}$=1.5V, T_C=125°C
		2N6385, 2N6650	-	0.3	mA	V_{CE}=80V, $V_{BE(off)}$=1.5V
			-	3.0	mA	V_{CE}=80V, $V_{BE(off)}$=1.5V, T_C=125°C
I_{EBO}	Emitter Cut-off Current		-	10	mA	V_{EB}=5.0V, I_C=0
hFE*	D.C. Current Gain		1000	20000	-	V_{CE}=3.0V, I_C=5.0A
			100	-		V_{CE}=3.0V, I_C=10A
$V_{CE(sat)}$ *	Collector-Emitter Saturation Voltage		-	2.0	V	I_C=5.0A, I_B=10mA
			-	3.0	V	I_C=10A, I_B=100mA
$V_{BE(on)}$ *	Base-Emitter On Voltage		-	2.8	V	V_{CE}=3.0V, I_C=5.0A
				4.5	V	V_{CE}=3.0V, I_C=10A
h_{fe}	Small Signal Current Gain		1000	-	-	V_{CE}=5.0V, I_C=1.0A, f=1KHz
C_{ob}	Output Capacitance		-	200	pF	V_{CB}=10V, I_E=0, f=1MHz

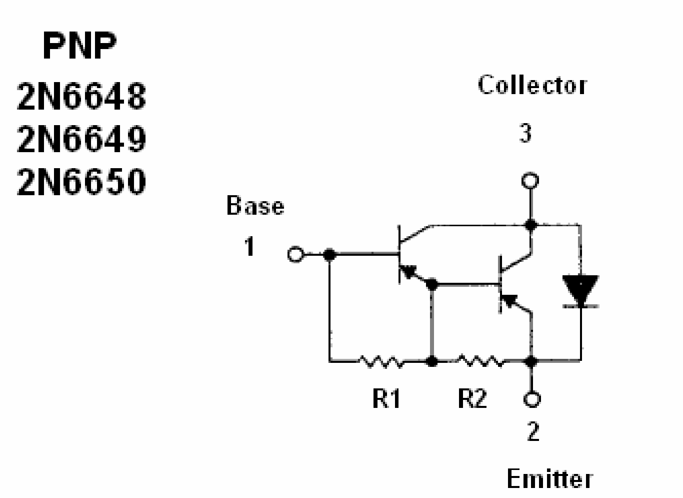
*Pulse Test: Pulse Width =300μs, Duty Cycle ≤2%

Power Derating Curve



Equivalent Circuit





Typical Characteristics Curves

Fig.1- DC Current Gain

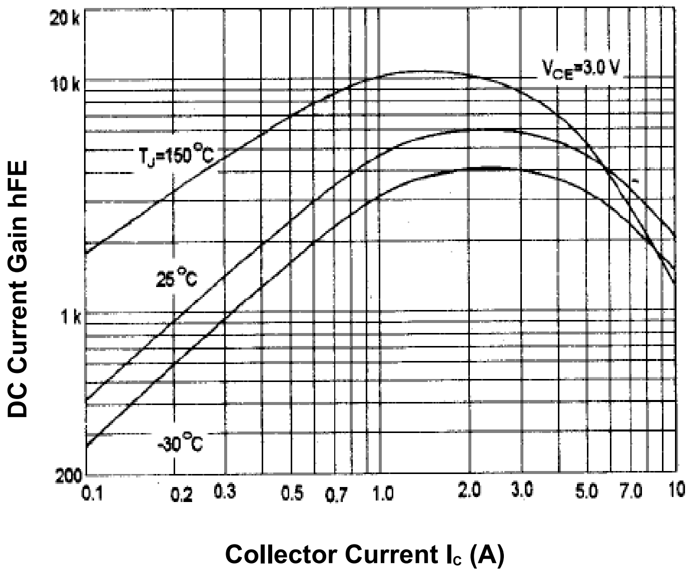


Fig.2- Collector Saturation Region

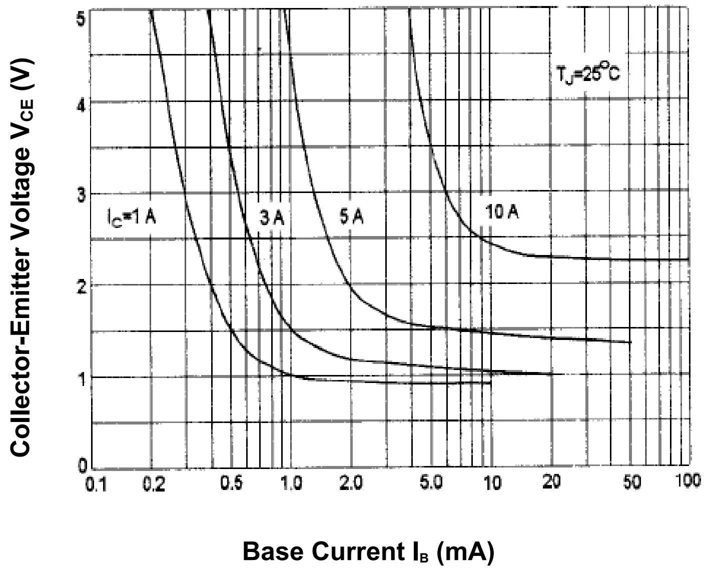


Fig.3- “On” Voltages

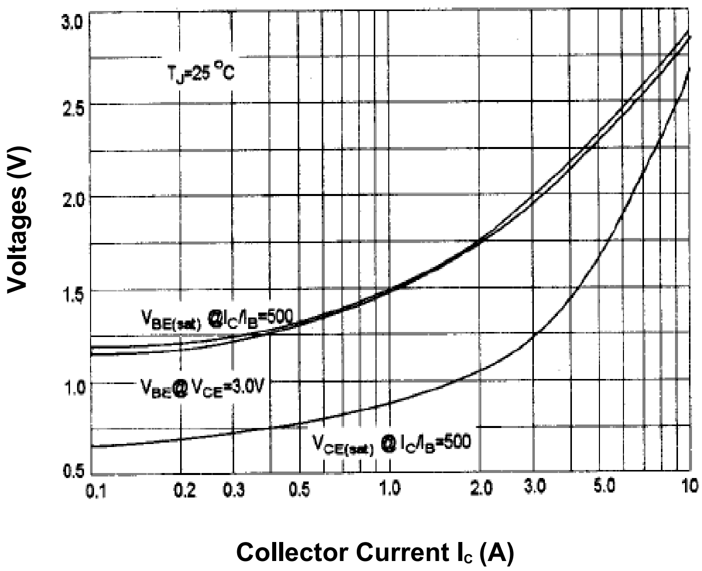
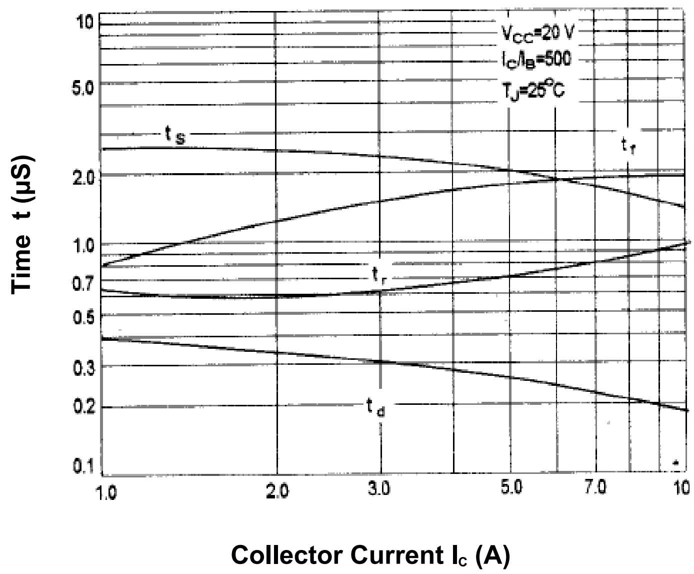


Fig.4- Switching Time

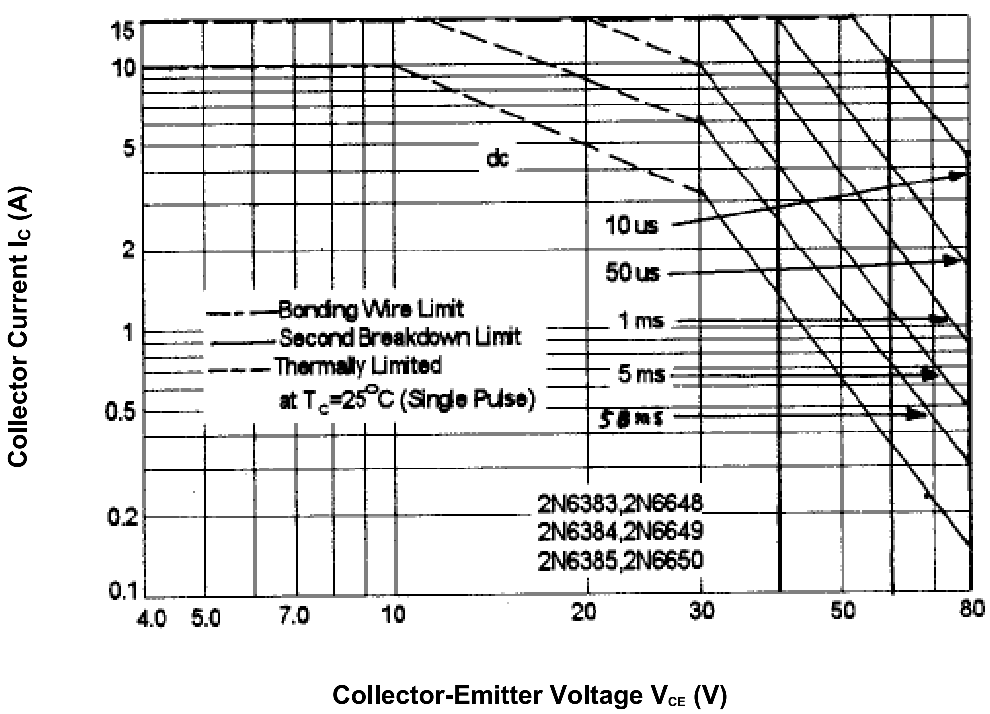


Active-Region Safe Operating Area (SOA)

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicator. 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 indicator.

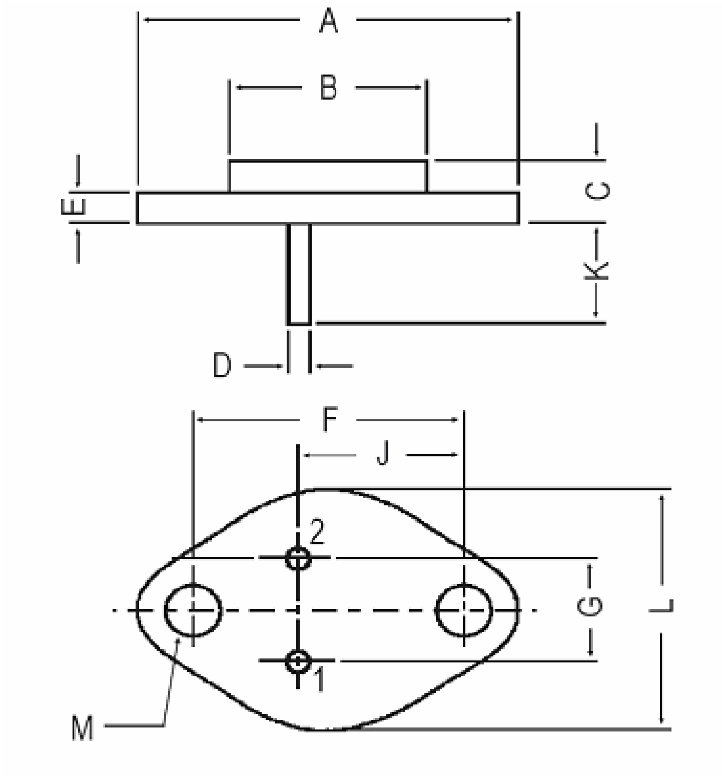
The data of SOA curve is base on $T_{J(PK)}$ =200°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leqslant$200°C. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than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

Fig.5- Active-Region SOA

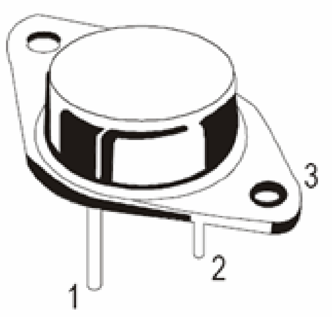


Dimensions in mm

TO-3



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



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

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