

Darlington Transistor TO-3



Description:

Darlington complementary silicon power transistors. Designed for general-purpose amplifier and low frequency switching applications.

Features:

- High DC current gain - $h_{FE} = 3,500$ (typical) at $I_C = 5A$ DC
- Collector-emitter sustaining voltage - at 100mA
 $V_{CEO} (sus) = 80V$ DC (min.) - 2N6058
- Monolithic construction with built-in-base-emitter shunt resistors

Maximum Ratings

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	V DC
Collector-Base Voltage	V_{CB}		
Emitter-Base Voltage	V_{EB}		
Collector Current -Continuous -Peak	I_C	12 20	A DC
Base Current	I_B	0.2	
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	150 0.857	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{Stg}	-65 $^\circ C$ to +200 $^\circ C$	$^\circ C$

Thermal Characteristics

Characteristic	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.17	$^\circ C/W$

(1) Indicates JEDEC Registered Data.

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T0-3



Electrical Characteristics (TC = 25°C unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Unit
Off Characteristics				
Collector-Emitter Sustaining Voltage (2) ($I_C = 100\text{mA DC}$, $I_B = 0$)	$V_{CEO(sus)}$	80	-	V DC
Collector Cut off Current ($V_{CE} = 40\text{V DC}$, $I_B = 0$)	I_{CEO}	-	1	mA DC
Collector Cut off Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE(off)} = 1.5\text{V DC}$) ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE(off)} = 1.5\text{V DC}$, $T_C = 150^\circ\text{C}$)	I_{CEX}	-	0.5 5	
Emitter Cut off Current ($V_{BE} = 5\text{V DC}$, $I_C = 0$)	I_{EBO}	-	2	

On Characteristics (2)

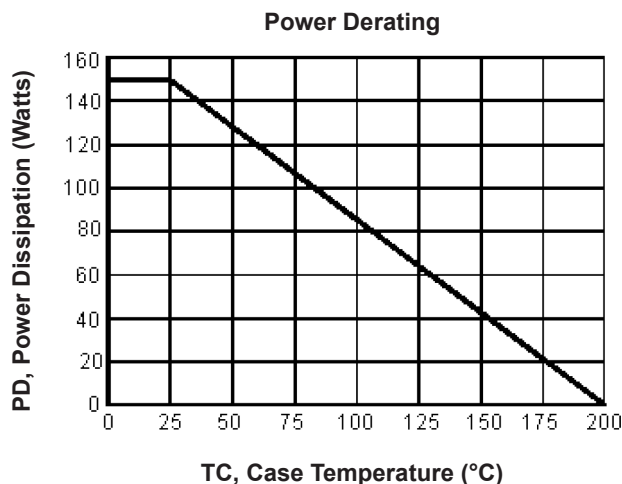
DC Current Gain ($I_C = 6\text{A DC}$, $V_{CE} = 3\text{V DC}$) ($I_C = 12\text{A DC}$, $V_{CE} = 3\text{V DC}$)	h_{FE}	750 100	18,000 -	-
Collector-Emitter Saturation Voltage ($I_C = 6\text{A DC}$, $I_B = 24\text{mA DC}$) ($I_C = 12\text{A DC}$, $I_B = 120\text{mA DC}$)	$V_{CE(sat)}$	- -	2 3	V DC
Base-Emitter Saturation Voltage ($I_C = 12\text{A DC}$, $I_B = 120\text{mA DC}$)	$V_{BE(sat)}$	-	4	
Base-Emitter On Voltage ($I_C = 6\text{A DC}$, $V_{CE} = 3\text{V DC}$)	$V_{BE(on)}$	-	2.8	

Dynamic Characteristics

Magnitude of Common-Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio ($I_C = 5\text{A DC}$, $V_{CE} = 3\text{V DC}$, $f = 1\text{MHz}$)	$ h_{fe} $	4	-	MHz
Output Capacitance ($V_{CB} = 10\text{V DC}$, $I_E = 0$, $f = 0.1\text{MHz}$)	C_{ob}	-	500 300	pF
Small-Signal Current Gain ($I_C = 5\text{A DC}$, $V_{CE} = 3\text{V DC}$, $f = 1\text{kHz}$)	h_{fe}	300	-	-

Indicates JEDEC Registered Data.

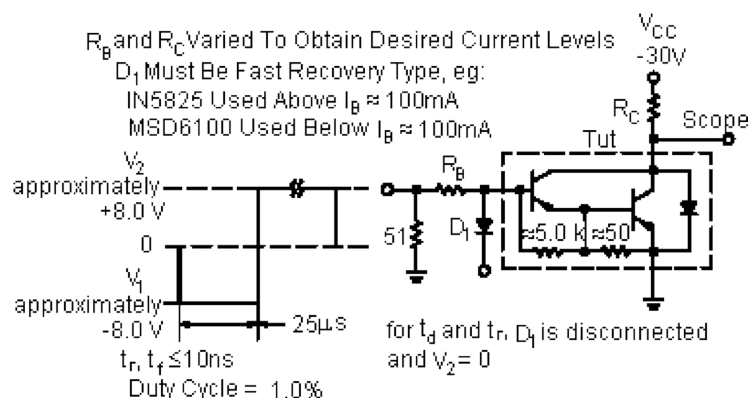
(2) Pulse test: Pulse Width = 300 μs , Duty Cycle = 2%.



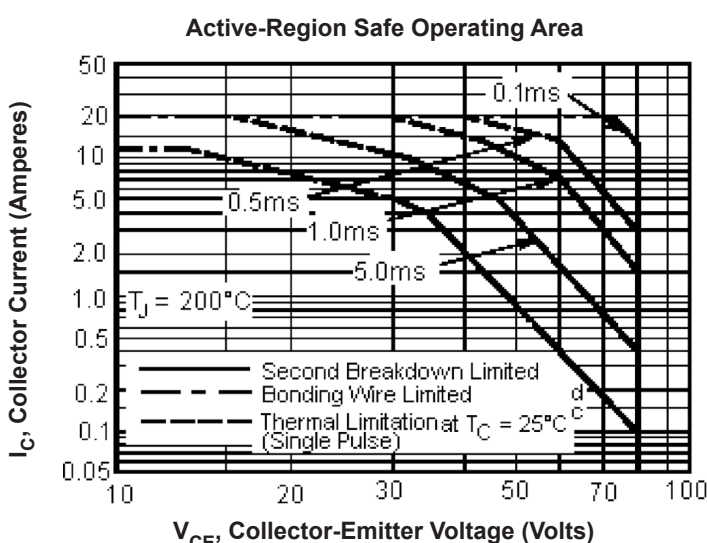
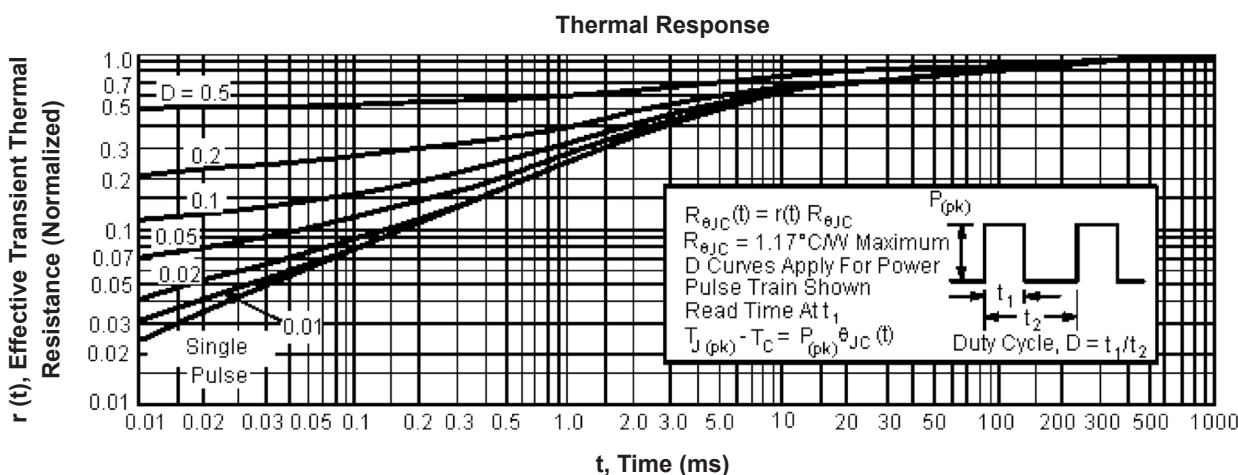
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Switching Times Test Circuit



For NPN Test Circuit Reverse Diode and Voltage Polarities



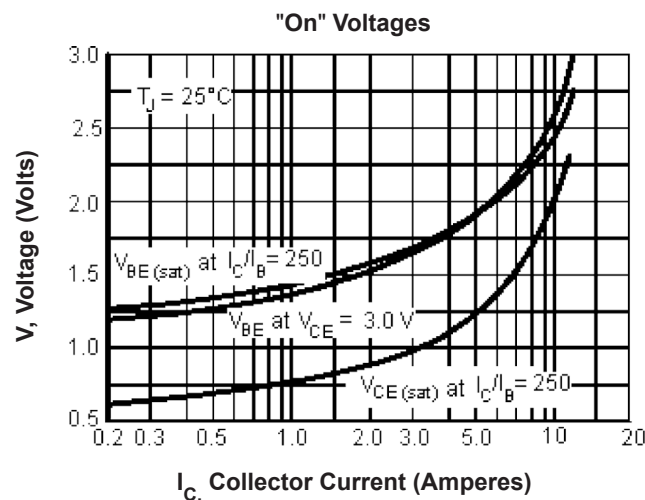
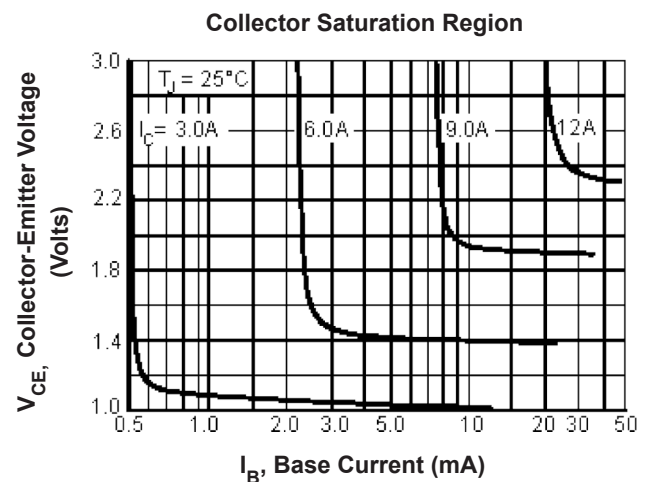
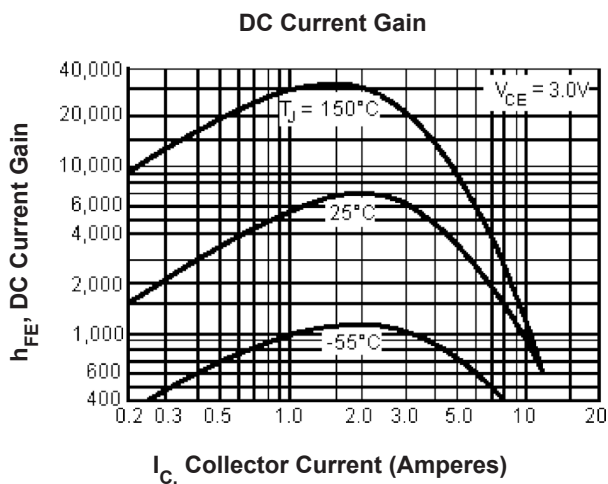
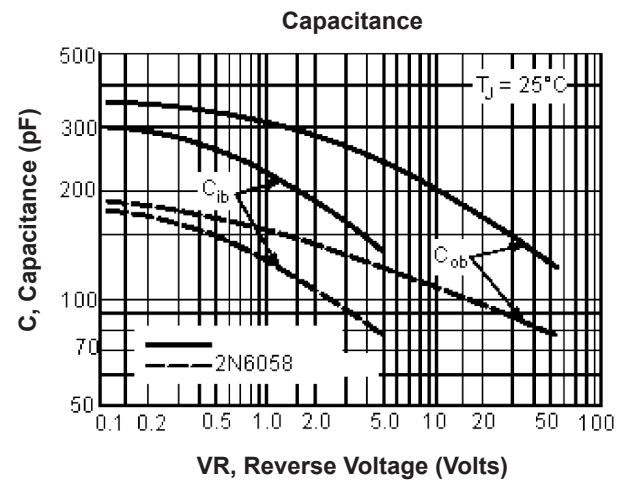
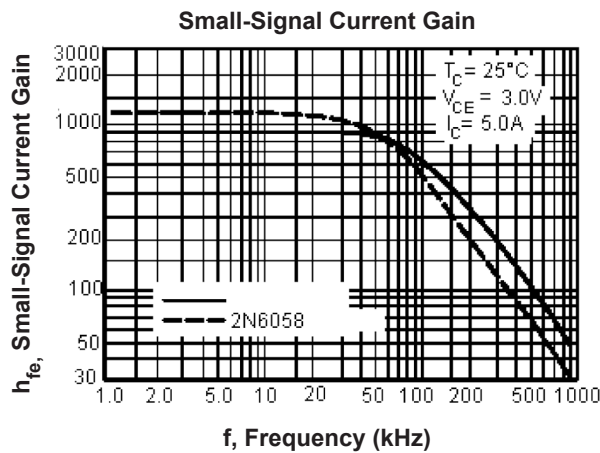
There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation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

The data is based 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 $T_{J(pk)} \leq 200^\circ\text{C}$; $T_J(pk)$ may be calculated from the data. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.



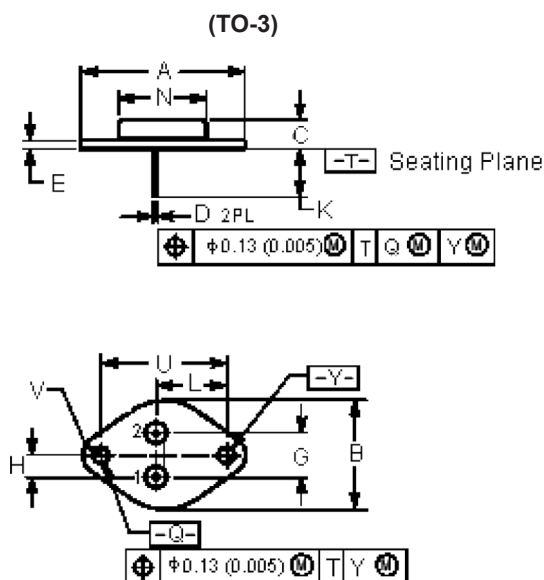
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Dimensions



Dimensions	Min.	Max.
A	1.55 (39.37)	Reference
B	-	1.05 (26.67)
C	0.25 (6.35)	0.335 (8.51)
D	0.038 (0.97)	0.043 (1.09)
E	0.055 (1.4)	0.07 (1.77)
G	0.43 (10.92)	BSC
H	0.215 (5.46)	BSC
K	0.44 (11.18)	0.48 (12.19)
L	0.665 (16.89)	BSC
N	-	0.83 (21.08)
Q	0.151 (3.84)	0.165 (4.19)
U	1.187 (30.15)	BSC
V	0.131 (3.33)	0.188 (4.77)

Pin Configuration:

- Pin 1. Base
- 2. Emitter
- Collector (Case)

Dimensions : Inches (Millimetres)

Part Number Table

Description	Part Number
Darlington Transistor, TO-3	2N6058

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