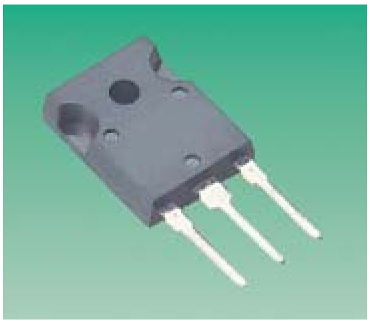
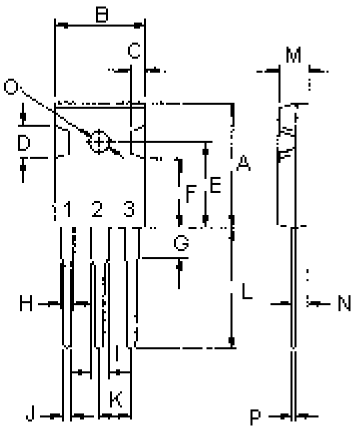
Darlington Power Transistor



NPN Silicon Power Darlington Transistors are designed for use in automotive ignition, switching and motor control applications

Features:

- Collector-Emitter Sustaining Voltage - $V_{CEO\ (sus)}$ = 380 V (Minimum)
- Collector-Emitter Saturation Voltage $V_{CE\ (sat)}$ = 2.9 V (Maximum) at I_C = 10 A
- 10 A Rated continuous collector current



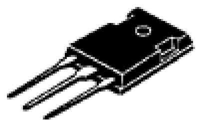
Pin 1. Base
2. Collector
3. Emitter

Dimensions	Minimum	Maximum
A	20.63	22.38
B	15.38	16.2
C	1.9	2.7
D	5.1	6.1
E	14.81	15.22
F	11.72	12.84
G	4.2	4.5
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.5	21.5
M	4.68	5.36
N	2.4	2.8
O	3.25	3.65
P	0.55	0.7

Dimensions : Millimetres

NPN
TIP162

10 A
Darlington
Power Transistor
380 V
125 W



TO-247

Maximum Ratings

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CEO}	380	V
Collector-Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}	5	
Collector Current -Continuous -Peak	I_C I_{CM}	10 15	A
Base Current	I_B	1	
Total Power Dissipation at T_C = 25°C Derate Above 25°C	P_D	125 1	W W / °C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	°C

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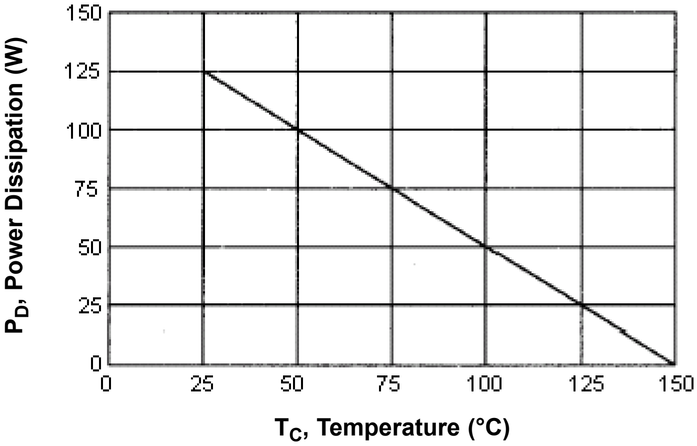
Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	Rθjc	1	°C / W

Figure - 1 Power Derating



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

Characteristic		Symbol	Minimum	Maximum	Unit
Off Characteristics					
Collector Cut off Current (V_{CE} = 380 V, I_B = 0)		I_{CEO}	-	1	mA
Emitter Cut off Current (V_{EB} = 5 V, I_C = 0)		I_{EBO}	-	100	
On Characteristics (1)					
DC Current Gain (I_C= 4 A, V_{CE} = 2.2 V)		h_{FE}	200	-	-
Collector-Emitter Saturation Voltage (I_C = 6.5 A, I_B = 0.1 A) (I_C = 10 A, I_B = 1 A)		$V_{CE\ (sat)}$	-	2.8 2.9	V
Base-Emitter Saturation Voltage (I_C = 6.5 A, I_B = 0.1 A)		$V_{BE\ (sat)}$	-	2.2	
Diode Forward Voltage (I_F = 10 A)		V_F	-	3.5	
Switching Characteristics					
Delay Time	V_{CC} = 33 V, I_C = 6.5 A I_{B1} = -I_{B2} = 100 mA, t_p = 20 µs, duty cycle 2%	t_d	0.3 (Typical)	-	µs
Rise Time		t_r	1.5 (Typical)	-	
Storage Time		t_s	2.3 (Typical)	-	
Fall Time		t_f	2.8 (Typical)	-	

(1) Pulse Test : Pulse width = 300 µs, duty cycle ≤2%

Figure - 2 DC Current Gain

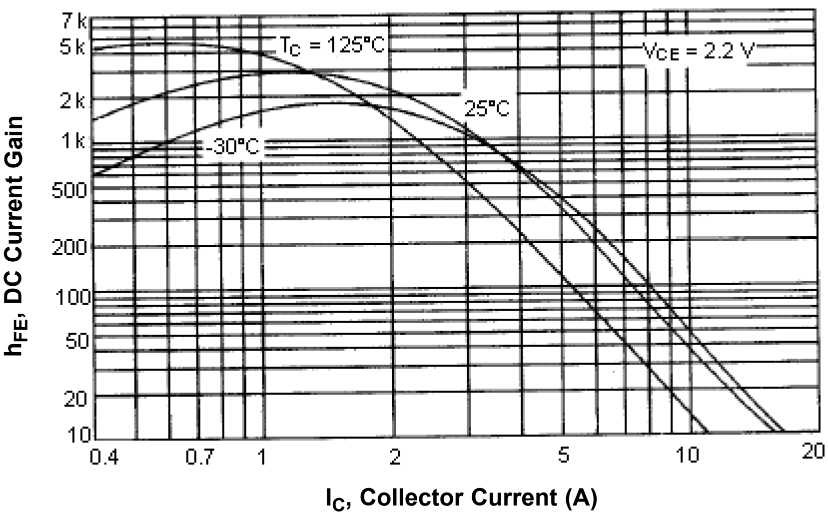


Figure - 3 Base-Emitter Voltage

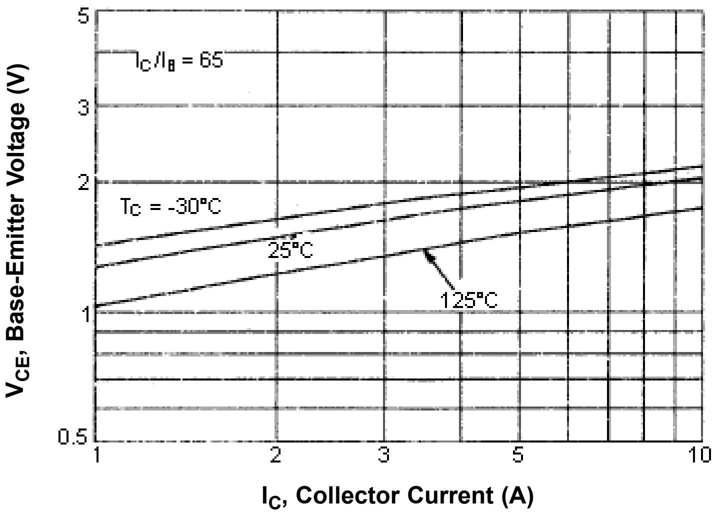
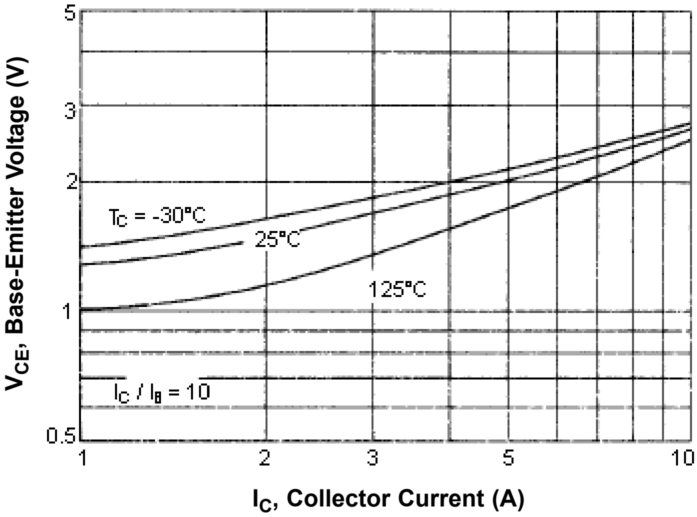


Figure - 4 Base-Emitter Voltage



Darlington Power Transistor

multicomp

Figure - 5 Collector-Emitter Saturation Voltage

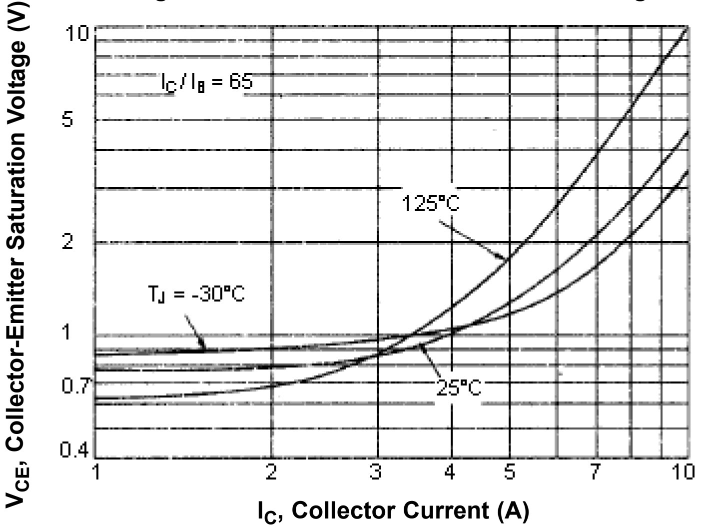


Figure - 6 Collector-Emitter Saturation Voltage

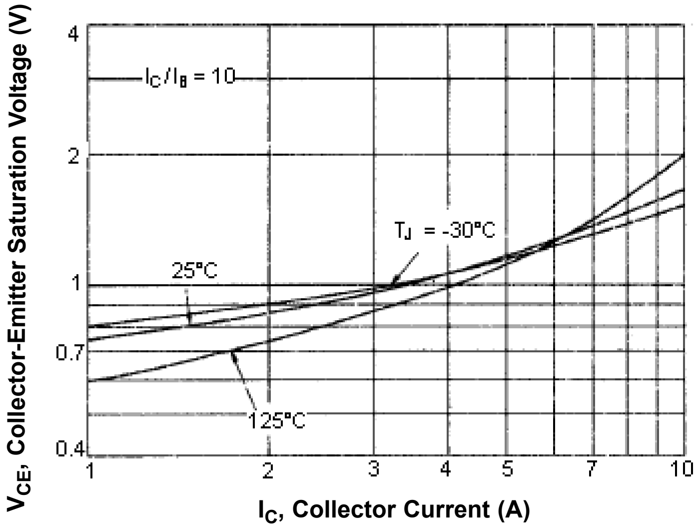
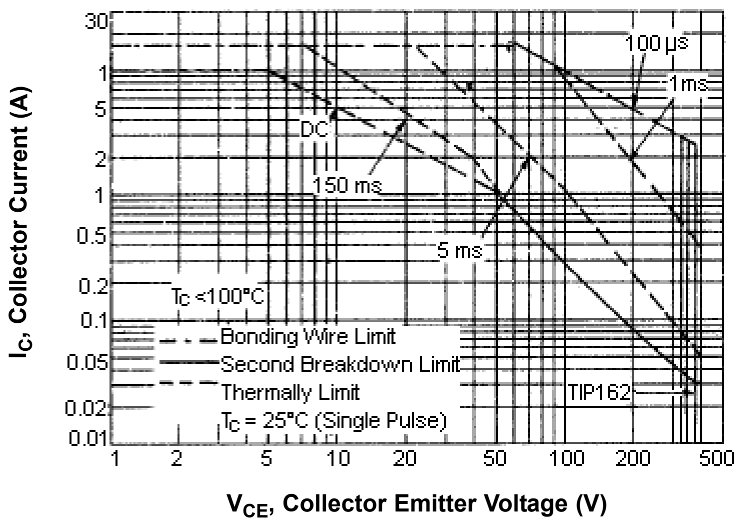


Figure - 7 Active Region Safe Operating Area



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 of Figure - 7 is based on $T_{J\ (PK)}$ = 150°C; T_C is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J\ (PK)}$ ≤150°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

Specification Table

$I_{C\ (av)}$ Maximum (A)	V_{CEO} Maximum (V)	h_{FE} Minimum	I_C (A)	P_{tot} at 25°C (W)	Package	Type	Part Number
10	380	200	4	125	TO-247	NPN	TIP162