

MJ10021

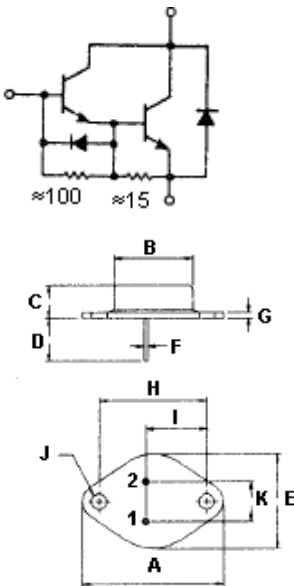
Darlington Power Transistor



NPN silicon power darlington transistors with Base-Emitter speedup diode are designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line operated switchmode applications.

Features:

- Continuous Collector Current - $I_C = 60A$.
- Switching regulators.
- Inverters.
- Solenoid and relay drivers.
- AC and DC Motor controls.



Pin 1. Base
2. Emitter
Collector(Case)

Dimensions	Minimum	Maximum
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

Dimensions : Millimetres

NPN
MJ10021

60 Ampere
Power Darlington
Transistors
250 Volts
250 Watts



TO-3

Maximum Ratings

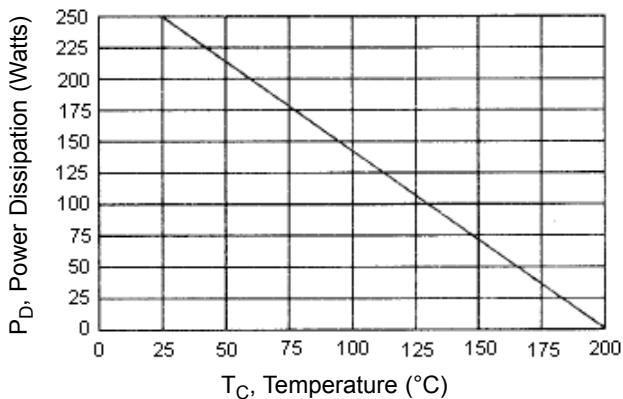
Characteristic	Symbol	MJ10021	Unit
Collector-Emitter Voltage	V_{CEV}	250	V
Collector-Emitter Voltage	$V_{CEO(sus)}$	350	
Emitter-Base Voltage	V_{EBO}	8.0	
Collector Current-Continuous -Peak	I_C I_{CM}	60 100	A
Base Current	I_B	20	
Total Power Dissipation at $T_C = 25^\circ C$ $T_C = 100^\circ C$ Derate above $25^\circ C$	P_D	250 143 1.43	W W W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +200	$^\circ C$



Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	0.7	$^{\circ}\text{C}/\text{W}$

Figure-1 Power Derating



Electrical Characteristics ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

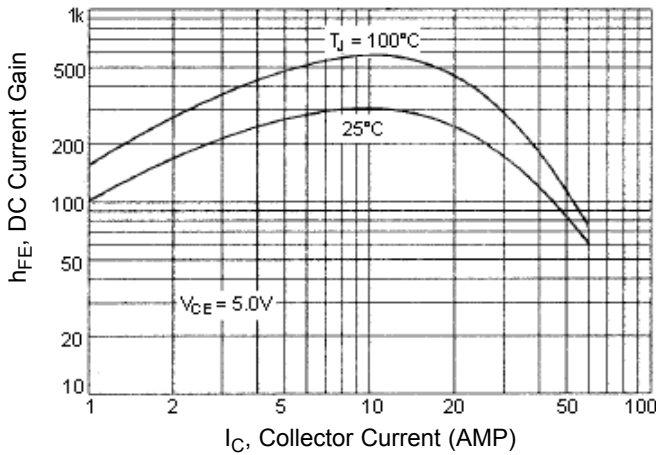
Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector-Emitter Sustaining Voltage (1) ($I_C = 100\text{mA}$, $I_B = 0$)	$V_{\text{CEO(sus)}}$	250	-	V
Collector Cut off Current ($V_{\text{CEV}} = \text{Rated Value}$, $V_{\text{BE(OFF)}} = 1.5\text{V}$) ($V_{\text{CEV}} = \text{Rated Value}$, $V_{\text{BE(OFF)}} = 1.5\text{V}$, $T_C = 150^{\circ}\text{C}$)	I_{CEV}	-	0.25 5.0	mA
Collector Cut off Current ($V_{\text{CE}} = \text{Rated } V_{\text{CEV}}$, $R_{\text{BE}} = 50\Omega$, $T_C = 100^{\circ}\text{C}$)	I_{CER}	-	5.0	
Emitter Cut off Current ($V_{\text{EB}} = 2.0\text{V}$, $I_C = 0$)	I_{EBO}	-	175	
ON Characteristics (1)				
DC Current Gain ($I_C = 15\text{A}$, $V_{\text{CE}} = 5.0\text{V}$)	h_{FE}	75	1000	-
Collector-Emitter Saturation Voltage ($I_C = 30\text{A}$, $I_B = 1.2\text{A}$) ($I_C = 60\text{A}$, $I_B = 4.0\text{A}$) ($I_C = 30\text{A}$, $I_B = 1.2\text{A}$, $T_C = 100^{\circ}\text{C}$)	$V_{\text{CE(sat)}}$	-	2.2 4.0 2.4	V
Base-Emitter Saturation Voltage ($I_C = 30\text{A}$, $I_B = 1.2\text{A}$) ($I_C = 30\text{A}$, $I_B = 1.2\text{A}$, $T_C = 100^{\circ}\text{C}$)	$V_{\text{BE(sat)}}$	-	3.0 3.5	
Diode Forward Voltage ($I_F = 30\text{A}$)	V_F	-	5.0	
Dynamic Characteristics				
Output Capacitance ($V_{\text{CB}} = 10\text{V}$, $I_E = 0$, $f = 1.0\text{kHz}$)	C_{ob}	160	750	pF

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

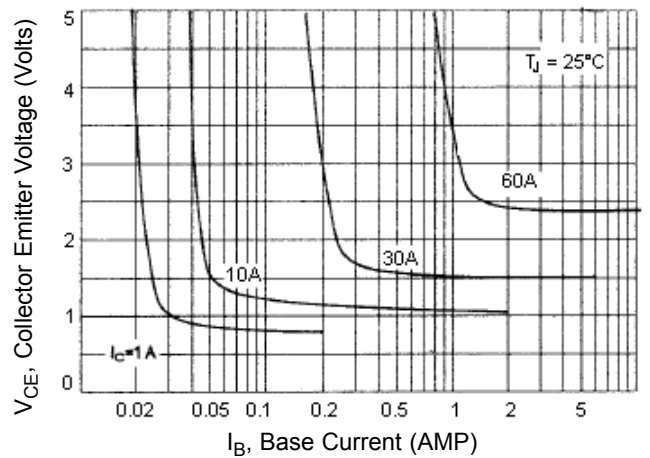
Characteristic	Symbol	Minimum	Maximum	Units
Switching Characteristics				
Delay Time	t_d	-	0.2	μs
Rise time	t_r	-	1.0	
Storage Time	t_s	-	3.5	
Fall Time	t_f	-	0.8	
		$V_{CC} = 175\text{V}, I_C = 30\text{A}$ $I_{B1} = 1.2\text{A}, V_{BE(OFF)} = 5.0\text{V}$ $t_p = 25\mu\text{s}, \text{Duty Cycle} \leq 2\%$		

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

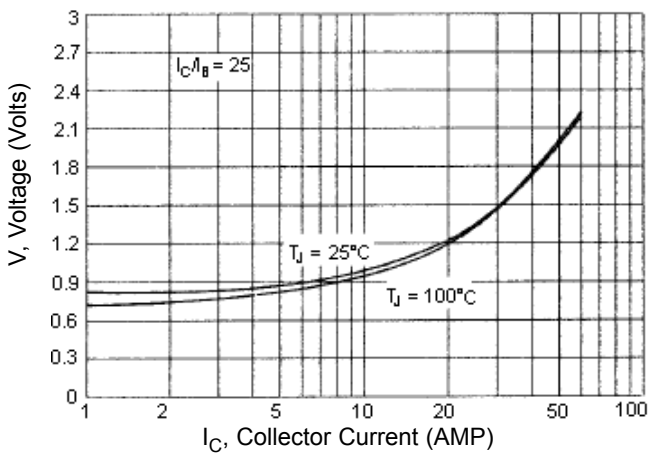
DC Current Gain



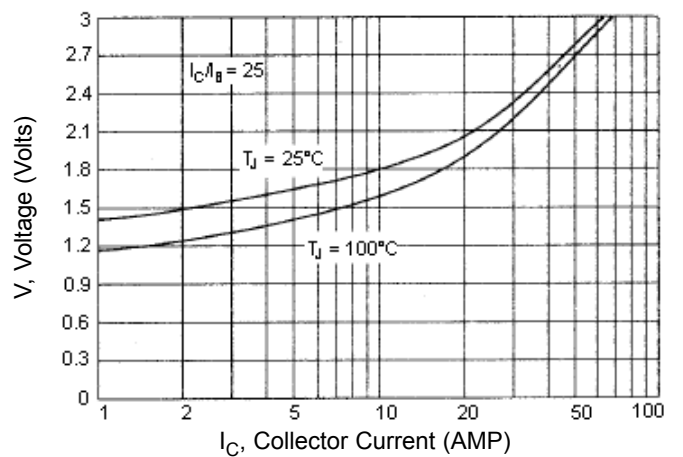
Collector Saturation Region



Collector Emitter Saturation Voltage



Base-Emitter Voltage

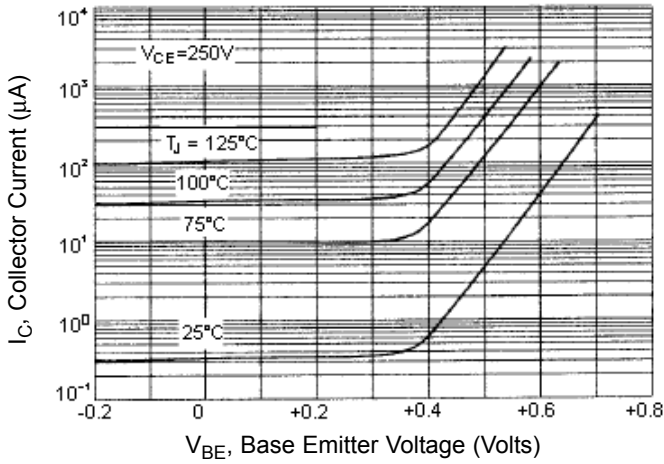


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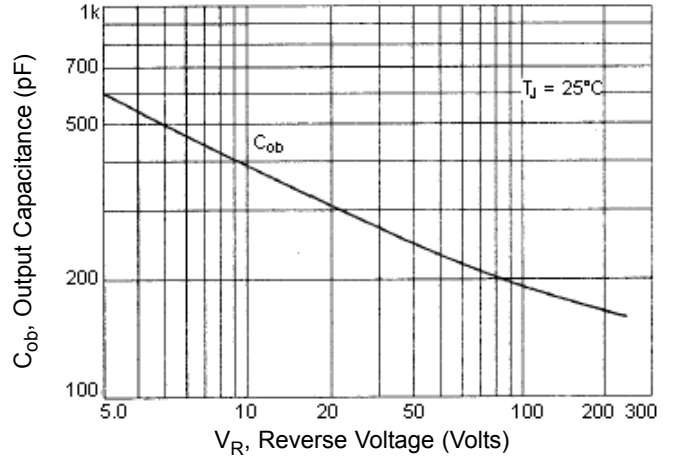
Darlington Power Transistor



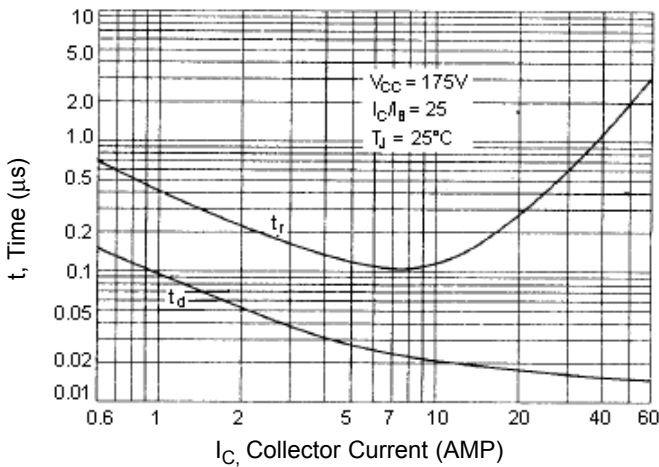
Collector Cut-Off Region



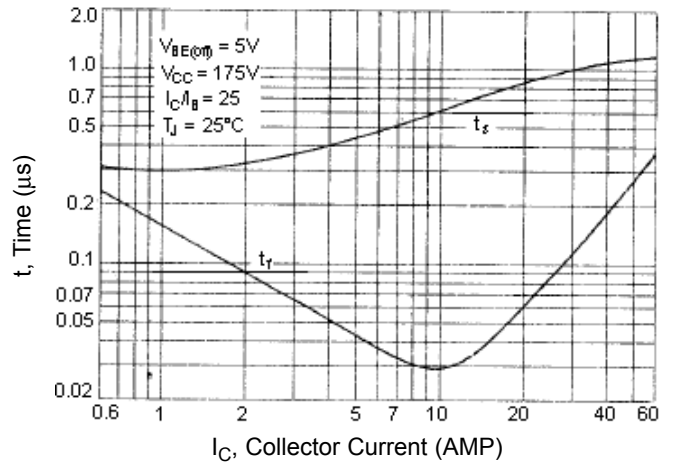
Output Capacitances



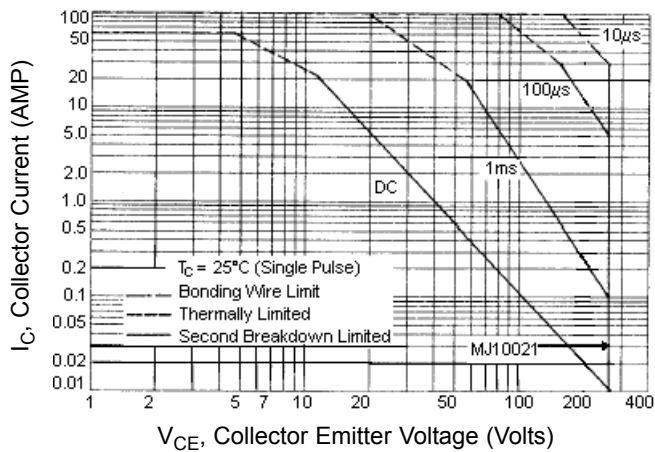
Turn-On Time



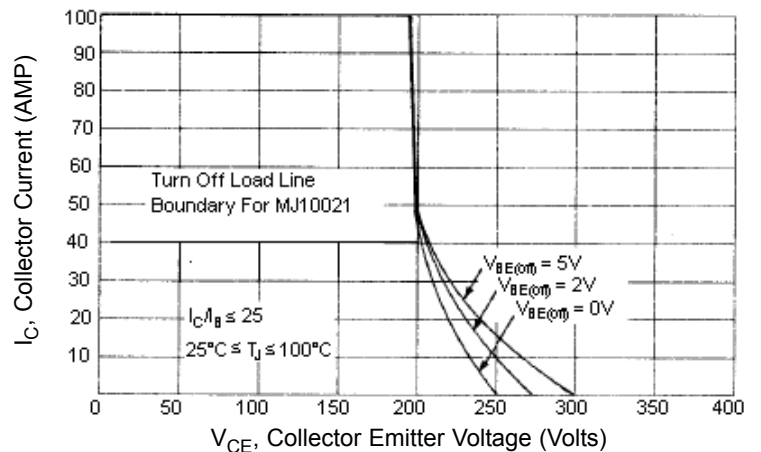
Turn-Off Time



Active Region Safe Operating Area



Reverse Base Switching Safe Operating Area



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Darlington Power Transistor



Specifications

$I_{C(av)}$ maximum (A)	V_{CEO} maximum (V)	h_{FE} minimum at $I_C = 15A$	P_{tot} at 25°C (W)	Package	Type	Part Number
60	350	75	250	TO-3	NPN	MJ10021

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