

TIP150

SILICON DARLINGTON POWER TRANSISTORS

NPN epitaxial-base transistors in a monolithic Darlington circuit and housed in a TO-220 envelope.

High voltage, high forward and reverse energy designed for industrial and consumer applications.

Compliance to RoHS.

ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value	Unit
V_{CBO}	Collector-Base Voltage		300	V
V_{CEO}	Collector-Emitter Voltage		300	V
V_{EBO}	Emitter-Base Voltage		8	V
I_C	Collector Current		7	A
I_{CM}	Collector Peak Current (1)		10	A
I_B	Base Current		1.5	A
P_T	Power Dissipation at Case Temperature (2)	@ $T_{mb} < 25^\circ$	80	Watts
	Power Dissipation at free Air Temperature (3)		2	
t_J	Junction Temperature		-65 to +150	°C
t_s	Storage Temperature range		-65 to +150	
t_L	Lead Temperature 3.2 mm from case for 10 seconde		260	

1. This value applies for $t_p < 5ms$, duty cycle $< 10\%$.
2. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.
3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
R_{thJC}	From Junction to Case Thermal Resistance	2.5	°C/W
R_{thJA}	From Junction to Free-Air Thermal Resistance	62.5	

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit
V_{CBO}	Collector-Base Breakdown Voltage	$I_C = 1 \text{ mA}, I_E = 0$	300	-	-	V
V_{CEO}	Collector-Emitter Breakdown Voltage (4)	$I_C = 10 \text{ mA}, I_B = 0$	300	-	-	V
I_{CEO}	Collector-Emitter Cutoff Current	$I_B = 0, V_{CE} = 300 \text{ V}$	-	-	250	μA
$I_{CEOX(sus)}$	Collector-Emitter sustaining Current	$I_E = 0, V_{CLAMP} = V_{CEO}$	7	-	-	A
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 8 \text{ V}, I_C = 0$	-	-	15	mA
$V_{CE(SAT)}$	Collector-Emitter saturation Voltage (4-5)	$I_C = 1 \text{ A}, I_B = 10 \text{ mA}$	-	-	1.5	V
		$I_C = 2 \text{ A}, I_B = 100 \text{ mA}$	-	-	1.5	
		$I_C = 5 \text{ A}, I_B = 250 \text{ mA}$	-	-	2	
$V_{BE(SAT)}$	Base-Emitter Saturation Voltage (4-5)	$I_C = 2 \text{ A}, I_B = 100 \text{ mA}$	-	-	2.2	V
		$I_C = 5 \text{ A}, I_B = 250 \text{ mA}$	-	-	2.3	
h_{FE}	Forward Current transfer ratio (4-5)	$V_{CE} = 5.0 \text{ V}, I_C = 2.5 \text{ A}$	150	-	-	-
		$V_{CE} = 5.0 \text{ V}, I_C = 5 \text{ A}$	50	-	-	
		$V_{CE} = 5.0 \text{ V}, I_C = 7 \text{ A}$	15	-	-	
h_{fe}	Small Signal Forward Current transfer ratio	$V_{CE} = 5.0 \text{ V}, I_C = 0.5 \text{ A}$ $f = 1 \text{ kHz}$	200	-	-	-
V_F	Diode forward Voltage	$I_F = 7 \text{ A}$	-	-	3.5	V
C_{OB}	Output Capacitance	$I_E = 0; V_{CB} = 10 \text{ V}$ $f = 1 \text{ MHz}$	-	-	150	pF

SWITCHING TIMES.

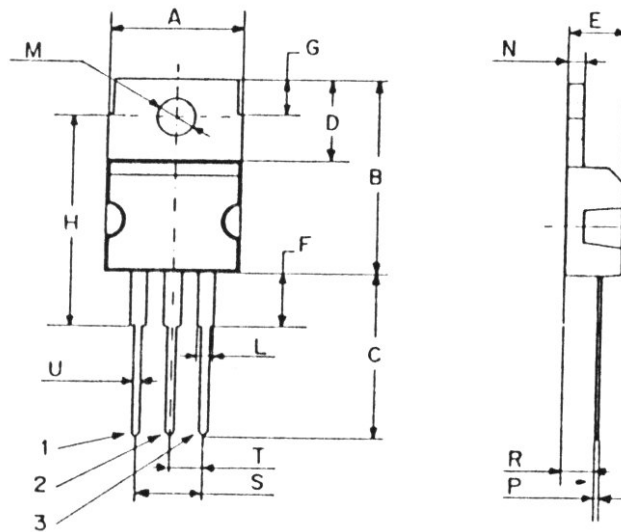
Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit
t_d	Delay Time	$V_{CC} = 250 \text{ V}; I_C = 5 \text{ A}$ $I_{B1} = -I_{B2} = 250 \text{ mA}$ $t_p = 20 \mu\text{s}, \text{ duty cycle } < 2\%$	-	0.03	-	μs
t_r	Rise time		-	0.18	-	
t_s	Storage Time		-	3.5	-	
t_f	Fall Time		-	1.6	-	

- These parameters must be measured using pulse techniques, t_p 300 μs , Duty Cycle $< 2.0\%$
- These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

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MECHANICAL DATA CASE TO-220

DIMENSIONS (mm)		
	Min.	Max.
A	9,90	10,30
B	15,65	15,90
C	13,20	13,40
D	6,45	6,65
E	4,30	4,50
F	2,70	3,15
G	2,60	3,00
H	15,75	17,15
L	1,15	1,40
M	3,50	3,70
N	-	1,37
P	0,46	0,55
R	2,50	2,70
S	4,98	5,08
T	2,49	2,54
U	0,70	0,90



Pin 1 :	Base
Pin 2 :	Collector
Pin 3 :	Emitter
Package	Collector

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