

# New Jersey Semi-Conductor Products, Inc.

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## NPN SILICON POWER DARLINGTON TRANSISTORS

...designed for use in automotive ignition, switching and motor control applications.

### FEATURES:

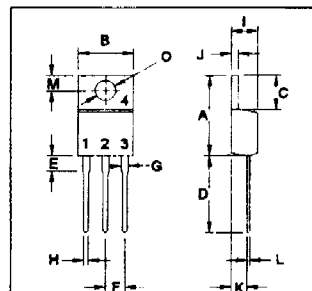
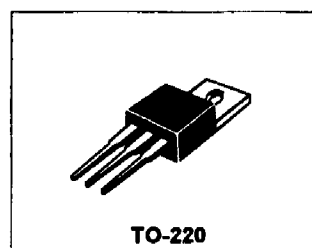
- \* Collector-Emitter Sustaining Voltage-  
 $V_{CE(SUS)}$  = 300 V (Min) - TIP150  
                   = 350 V (Min) - TIP151  
                   = 400 V (Min) - TIP152
- \* Collector-Emitter Saturation Voltage  
 $V_{CE(sat)}$  = 2.0 V (Max.) @  $I_C = 5.0 A$
- \* Reverse-Base SOA — 300 V to 400 V at 7 A

**NPN**  
**TIP150**  
**TIP151**  
**TIP152**

**7 AMPERE**  
**DARLINGTON**  
**POWER TRANSISTORS**  
**300-400 VOLTS**  
**80 WATTS**

### MAXIMUM RATINGS

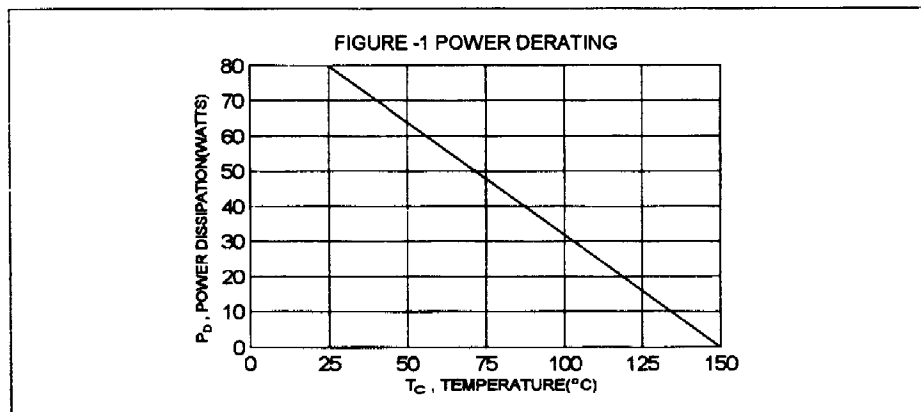
Characteristic	Symbol	TIP150	TIP151	TIP152	Unit
Collector-Emitter Voltage	$V_{CEO}$	300	350	400	V
Collector-Base Voltage	$V_{CBO}$	300	350	400	V
Emitter-Base Voltage	$V_{EBO}$	8.0			V
Collector Current-Continuous	$I_C$	7.0			A
-Peak	$I_{CM}$	10			
Base Current	$I_B$	1.5			A
Total Power Dissipation @ $T_C = 25^\circ C$	$P_D$	80			W
Derate above $25^\circ C$		0.64			W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +150			$^\circ C$



PW 1.BASE  
2.COLLECTOR  
3.EMITTER  
4.COLLECTOR(CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.56	$^\circ C/W$



DIM	MILLIMETERS	
	MIN	MAX
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

**Quality Semi-Conductors**

TIP150, TIP151, TIP152 NPN

**ELECTRICAL CHARACTERISTICS** (  $T_c = 25^\circ\text{C}$  unless otherwise noted )

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector - Emitter Breakdown Voltage (1) ( $I_C = 10\text{ mA}$ , $I_B = 0$ )	TIP150 TIP151 TIP152	$V_{(BR)CEO}$	300 350 400	V
Collector - Base Breakdown Voltage (1) ( $I_C = 1.0\text{ mA}$ , $I_B = 0$ )	TIP150 TIP151 TIP152	$V_{(BR)CBO}$	300 350 400	V
Collector Cutoff Current ( $V_{CE} = 300\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 350\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 400\text{ V}$ , $I_B = 0$ )	TIP150 TIP151 TIP152	$I_{CEO}$	250 250 250	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 8.0\text{ V}$ , $I_C = 0$ )		$I_{EBO}$	15	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 2.5\text{ A}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 5.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 7.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	$h_{FE}$	150 50 15		
Collector-Emitter Saturation Voltage ( $I_C = 1.0\text{ A}$ , $I_B = 10\text{ mA}$ ) ( $I_C = 2.0\text{ A}$ , $I_B = 100\text{ mA}$ ) ( $I_C = 5.0\text{ A}$ , $I_B = 250\text{ mA}$ )	$V_{CE(sat)}$		1.5 1.5 2.0	V
Base-Emitter Saturation Voltage ( $I_C = 2.0\text{ A}$ , $I_B = 100\text{ mA}$ ) ( $I_C = 5.0\text{ A}$ , $I_B = 250\text{ mA}$ )	$V_{BE(sat)}$		2.2 2.3	V
Diode Forward Voltage ( $I_F = 7.0\text{ A}$ )	$V_F$		3.5	V

**DYNAMIC CHARACTERISTICS**

Small-Signal Current Gain ( $I_C = 0.5\text{ A}$ , $V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ KHz}$ )	$h_{fe}$	200		
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$		150	pF

**SWITCHING CHARACTERISTICS**

Delay Time	$V_{CC} = 250\text{ V}$ , $I_C = 5.0\text{ A}$ $I_{B1} = -I_{B2} = 250\text{ mA}$ , $t_p = 20\mu\text{s}$ , Duty Cycle $\leq 2.0\%$	$t_d$	30(typ)	ns
Rise Time		$t_r$	180(typ)	ns
Storage Time		$t_s$	3.5(typ)	$\mu\text{s}$
Fall Time		$t_f$	1.6(typ)	$\mu\text{s}$

(1) Pulse Test: Pulse width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$