

# New Jersey Semi-Conductor Products, Inc.

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## COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

..designed for use as general purpose amplifiers, low frequency switching and motor control applications.

### FEATURES:

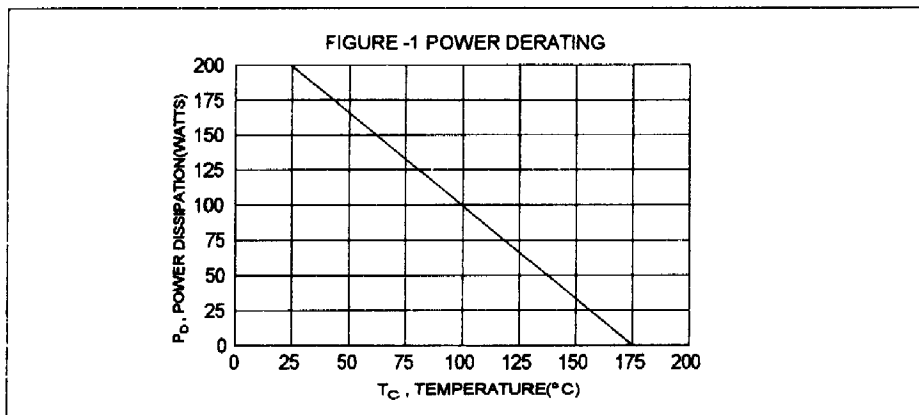
- \* High Gain Darlington Performance
- \* High DC Current Gain  $h_{FE} = 400(\text{Min}) @ I_C = 10 \text{ A}$
- \* Monolithic Construction

### MAXIMUM RATINGS

Characteristic	Symbol	MJ11017 MJ11018	MJ11019 MJ11020	MJ11021 MJ11022	Unit
Collector-Emitter Voltage	$V_{CEO}$	150	200	250	V
Collector-Base Voltage	$V_{CBO}$	150	200	250	V
Emitter-Base Voltage	$V_{EBO}$	5.0			V
Collector Current-Continuous -Peak	$I_C$ $I_{CM}$	15 30			A
Base Current	$I_B$	0.5			A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	175 1.16			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +175			$^\circ\text{C}$

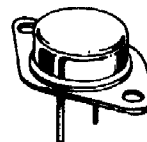
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	0.86	$^\circ\text{C/W}$

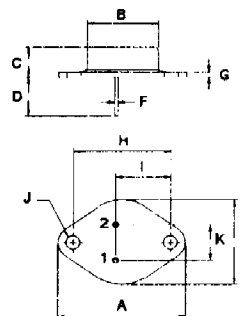


PNP	NPN
MJ11017	MJ11018
MJ11019	MJ11020
MJ11021	MJ11022

15 AMPERE  
COMPLEMENTARY  
SILICON POWER  
DARLINGTON TRANSISTOR  
150-250 VOLTS  
175 WATTS

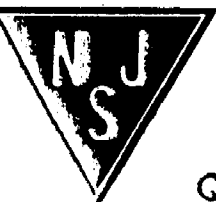


TO-3



PIN 1. BASE  
2. EMITTER  
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
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



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Quality Semi-Conductors

**MJ11017, MJ11019, MJ11021 PNP / MJ11018, MJ11020, MJ11022 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 Sustaining Voltage (1) ( $I_C = 100\text{ mA}, I_B = 0$ ) MJ11017,MJ11018 MJ11019,MJ11020 MJ11021,MJ11022	$V_{CE(sus)}$	150 200 250		V
Collector Cutoff Current ( $V_{CE} = 75\text{ V}, I_B = 0$ ) ( $V_{CE} = 100\text{ V}, I_B = 0$ ) ( $V_{CE} = 125\text{ V}, I_B = 0$ )	$I_{CEO}$		1.0 1.0 1.0	mA
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CB}, V_{BE(on)} = 1.5\text{ V}$ ) ( $V_{CE} = \text{Rated } V_{CB}, V_{BE(on)} = 1.5\text{ V}, T_J = 150^\circ\text{C}$ )	$I_{CEV}$		0.5 5.0	mA
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ V}, I_C = 0$ )	$I_{EBO}$		2.0	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 10\text{ A}, V_{CE} = 5.0\text{ V}$ ) ( $I_C = 15\text{ A}, V_{CE} = 5.0\text{ V}$ )	hFE	400 100	15000	
Collector-Emitter Saturation Voltage ( $I_C = 10\text{ A}, I_B = 100\text{ mA}$ ) ( $I_C = 15\text{ A}, I_B = 150\text{ mA}$ )	$V_{CE(sat)}$		2.0 3.4	V
Base-Emitter Saturation Voltage ( $I_C = 15\text{ A}, I_B = 150\text{ mA}$ )	$V_{BE(sat)}$		3.8	V
Base-Emitter On Voltage ( $I_C = 10\text{ A}, V_{CE} = 5.0\text{ V}$ )	$V_{BE(on)}$		2.8	V

**DYNAMIC CHARACTERISTICS**

Small-Signal Current Gain ( $I_C = 10\text{ A}, V_{CE} = 3.0\text{ V}, f = 1.0\text{ MHz}$ )	$ h_{fe} $	3.0		
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**SWITCHING CHARACTERISTICS**

Characteristic	Symbol	Typical		Unit	
		NPN	PNP		
Delay Time	$V_{CC} = 100\text{ V}, I_C = 10\text{ A}$ $I_{B1} = 100\text{ mA}, V_{BE(on)} = 5.0\text{ V}$ $t_p = 25\text{ us}, \text{Duty Cycle} \leq 10\%$	$t_d$	0.2	0.1	us
Rise Time		$t_r$	1.3	0.6	us
Storage Time		$t_s$	4.5	2.7	us
Fall Time		$t_f$	10	2.6	us

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

(2)  $f_T = |h_{fe}| \cdot f_{test}$