

# New Jersey Semi-Conductor Products, Inc.

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**MJ10042**  
**MJ10045**  
**MJ10048**

**25, 50, and 100 AMPERE  
NPN SILICON  
POWER DARLINGTON  
TRANSISTOR**  
250, 450 and 850 VOLTS  
250 WATTS

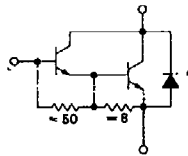
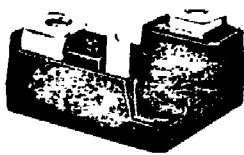
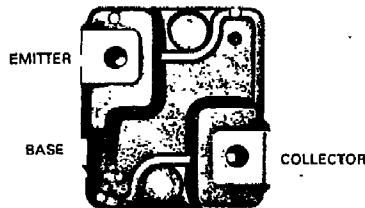
**Designer's Data for  
"Worst-Case" Conditions**

The Designer's Data Sheet permits the design of most circuits entirely from the information presented. Limit data—representing device characteristics boundaries—are given to facilitate "worst-case" design.

## 25 KVA ENERGY MANAGEMENT SERIES SWITCHMODE DARLINGTON TRANSISTORS

25, 50 and 100 Ampere Operating Current

These Darlington transistors are designed for industrial service under practical operating environments found in switching high power inductive loads off 120, 230 and 460 Volt lines.



\*Emitter-Collector Diode is a high power diode.

### MAXIMUM RATINGS

Mechanical Ratings		
Rating	Value	Unit
Mounting Torque (To heat sink with 6-32 Screw) (Note 1)	8.0	in.-lb
Lead Torque (Lead to bus with 5 mm Screw) (Note 2)	20	in.-lb
Per Unit Weight	41	grams

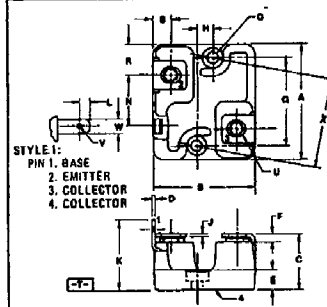
### THERMAL CHARACTERISTICS

Thermal Resistance, Junction to Case, $R_{\theta JC}$	0.5	$^{\circ}C/W$
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Mica Insulators available as separate items.  
0.003" thick, Motorola Part Number 14CSB12387B003.

#### Notes:

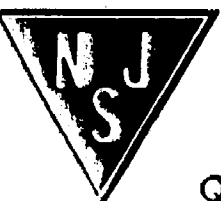
- A Belleville washer of 0.281" O.D., 0.138" I.D., 0.013" thick and 43 pounds flat is recommended.
- The maximum penetration of the screw should be limited to 0.50".
- To adapt the collector and emitter terminals to quick connect terminals, AMP 250 Series Faston tab P/N 61498-1 is suggested.
- The mounting holes of this package are compatible with TO-204 (formerly TO-3) mounting holes.



STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR  
4. COLLECTOR

- NOTES:
- DIMENSIONS A AND B ARE DATUMS AND T IS BOTH A DATUM SURFACE AND SEATING PLANE.
  - POSITIONAL TOLERANCE FOR MOUNTING HOLES:  
 $\pm 0.25 (0.010) \text{ M T A } \text{ B } \text{ C}$
  - DIMENSIONING AND TOLERANCING PER ANSI Y14.5, 1982.
  - CONTROLLING DIMENSION: INCH EXCEPT FOR METRICALLY THREADED INSERTS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	39.11	40.13	1.540	1.580
B	33.93	34.95	1.336	1.376
C	—	20.32	—	0.800
D	0.69	0.83	0.027	0.033
E	8.30	8.81	0.327	0.347
F	—	4.44	—	0.175
G	29.67 BSC	—	1.168 BSC	—
H	6.08 BSC	—	0.240 BSC	—
J	0.93	1.09	0.037	0.043
K	—	75.40	—	1.900
L	2.92	3.30	0.116	0.130
M	17.40	17.99	0.675	0.695
N	3.72	3.88	0.147	0.153
R	10.41	10.79	0.410	0.426
S	5.64	6.35	0.220	0.250
U	M5 H (METRIC THRD)			
V	1.27	1.52	0.050	0.060
W	4.69	4.96	0.185	0.195
X	30.15 BSC	—	1.187 BSC	—



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**

**MJ10042, MJ10045, MJ10048**

**MAXIMUM RATINGS** (Continued) ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

Rating	Symbol	MJ10042	MJ10045	MJ10048	Unit
Collector-Emitter Voltage ( $I_B = 0$ )	$V_{CEO}$	850	450	250	Vdc
Collector-Emitter Voltage ( $R_{BE} = 10$ Ohms)	$V_{CER}$	900	500	300	Vdc
Collector-Base Voltage	$V_{CB}$	900	500	300	Vdc
Emitter-Base Voltage	$V_{EB}$	8.0			Vdc
Collector Current — Operating ( $T_C = 115^\circ\text{C}$ ) ( $T_C = 85^\circ\text{C}$ ) ( $T_C = 65^\circ\text{C}$ )	$I_{C(op)}$	25 — —	— 50 —	— — 100*	A
Collector Current — Continuous — Peak Repetitive — Peak Nonrepetitive	$I_C$	37.5 75 125	75 150 250	100 300 500	A
Base Current — Continuous — Peak Nonrepetitive	$I_B$	25 50			A
Total Device Dissipation Derate above $T_C = 25^\circ\text{C}$ For 1-minute overload	$P_D$	250 2.0 333			Watts W/ $^\circ\text{C}$ Watts
Operating Junction and Storage Temperature Range For 1-minute overload	$T_J, T_{stg}$	-55 to +150 -55 to 200			$^\circ\text{C}$

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Sustaining Voltage (1) ( $I_C = 125$ mA)	MJ10042 MJ10045 MJ10048	$V_{CEO(sus)}$	850 450 250	— — — Vdc
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CB}, V_{BE(off)} = 1.5$ Vdc) ( $V_{CE} = \text{Rated } V_{CB}, V_{BE(off)} = 1.5$ Vdc, $T_C = 150^\circ\text{C}$ )		$I_{CEV}$	— —	2.0 10 mA
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CER}, R_{BE} = 10 \Omega, T_C = 100^\circ\text{C}$ )		$I_{CER}$	—	10 mA
Emitter Cutoff Current ( $V_{EB} = 4.0$ Vdc, $I_C = 0$ )		$I_{EBO}$	—	350 mA
<b>SAFE OPERATING AREA</b>				
Second Breakdown Collector Current with Base Forward-Biased	FBSOA	See Figures 32, 34 & 36		
Clamped Inductive SOA with Base Reverse-Biased	RBSOA	See Figures 33, 35 & 37		
Overload Safe Operating Area	OLSOA	See Figures 38, 39, 40, 41, 42 & 43		
<b>DYNAMIC CHARACTERISTICS</b>				
Output Capacitance ( $V_{CB} = 10$ Vdc, $I_E = 0, f_{test} = 1.0$ kHz)	$C_{ob}$	—	2000	pF

(1) Pulse Test. Pulse width of 300  $\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

\* This rating is with a 50% duty cycle, and is limited by power dissipation. Higher operating currents are allowable at lower duty cycles.