2N6139 thru 2N6144 (SILICON)
2N6148 thru 2N6150

TRIACS
(THYRISTORS)

10 AMPERES RMS

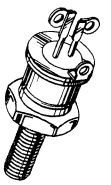
SILICON BIDIRECTIONAL THYRISTORS

. . . designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering.

- Economical for a Wide Range of Uses
- High Surge Current — I_{TSM} = 100 Amp
- Low Forward "On" Voltage — 1.4 V typ @ I_{TM} = 14 A
- All Diffused and Passivated Junctions for Greater Stability
- Rugged Construction in Either 3 Lead, Stud or Isolated Stud Package
- Gate Triggering Guaranteed in Four Modes

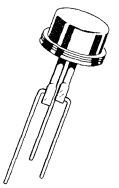
2N6139
2N6140
2N6141

CASE 86



2N6142
2N6143
2N6144

CASE 250



2N6148
2N6149
2N6150

CASE 87L

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
*Repetitive Peak Off-State Voltage, Note 1 (T_J = -65 to +100°C, ½ Sine Wave 50 to 60 Hz, Gate Open)	V_{DRM}		Volts
*Peak Principle Voltage 2N6139, 2N6142, 2N6148 2N6140, 2N6143, 2N6149 2N6141, 2N6144, 2N6150		 200 400 600	
*Peak Gate Voltage	V_{GM}	10	Volts
*On-State Current RMS (-65 to +75°C) (Full Cycle Sine Wave, 50 to 60 Hz) (+90°C)	$I_{T(RMS)}$	10 5.0	Amp
*Peak Surge Current (One Full Cycle, 60 Hz, T_J = +75°C, preceded and followed by 10 A current)	I_{TSM}	100	Amp
Circuit Fusing Considerations (T_J = -65 to +100°C, t = 1.0 to 8.3 ms)	I^2t	40	A^2s
*Peak Gate Power (T_J = +75°C, Pulse Width = 2.0 μ)	P_{GM}	20	Watts
*Average Gate Power (T_J = +75°C, t = 8.3 ms)	$P_{G(AV)}$	0.5	Watt
*Peak Gate Current	I_{GM}	2.0	Amp
*Operating Junction Temperature Range	T_J	-65 to +100	°C
*Storage Temperature Range	T_{stg}	-65 to +150	°C
*Stud Torque 2N6139 thru 2N6144	—	15	in. lb.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
*Thermal Resistance, Junction to Case	$R\theta_{JC}$	2.0	°C/W
Thermal Resistance, Case to Ambient	$R\theta_{CA}$	50	°C/W

*Indicates JEDEC Registered Data

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
*Peak Blocking Current (Either Direction) Rated V_{DRM} @ T_J = 100°C, Gate Open	I_{DRM}	–	–	2.0	mA
*On-State Voltage (Either Direction) I_{TM} = 14 A Peak, Pulse Width = 1.0 to 2.0 ms, Duty Cycle ≤2.0 %	V_{TM}	–	1.4	1.8	Volts
Gate Trigger Current, Continuous dc Main Terminal Voltage = 12 Vdc, R_L = 50 Ohms, Minimum Gate Pulse Width = 2.0 μs	I_{GT}				mA
MT2 (+), G(+)		–	6.0	50	
MT2 (+), G(–)		–	6.0	75	
MT2 (–), G(–)		–	10	50	
MT2 (–), G(+)		–	25	75	
*MT2 (+), G(+); MT2 (–), G(–) T_C = -65°C		–	–	125	
*MT2 (+), G(–); MT2 (–), G(+) T_C = -65°C		–	–	150	
Gate Trigger Voltage, Continuous dc Main Terminal Voltage = 12 Vdc, R_L = 50 Ohms, Minimum Gate Pulse Width = 2.0 μs	V_{GT}				Volts
MT2 (+), G(+)		–	0.9	2.0	
MT2 (+), G(–)		–	0.9	2.5	
MT2 (–), G(–)		–	1.1	2.0	
MT2 (–), G(+)		–	1.4	2.5	
*MT2 (+), G(+); MT2 (–), G(–) T_C = -65°C		–	–	2.5	
*MT2 (+), G(–); MT2 (–), G(+) T_C = -65°C		–	–	3.0	
*Main Terminal Voltage = Rated V_{DRM}, R_L = 10 k ohms, T_J = 100°C		0.2	–	–	
Holding Current (Either Direction) Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 300 mA — T_C = 25°C	I_H	–	6.0	40	mA
— T_C = -65°C		–	–	150*	
*Turn-On Time Main Terminal Voltage = Rated V_{DRM}, I_{TM} = 14 A, Gate Source Voltage = 12 V, R_S = 50 Ohms, Rise Time = 0.1 μs, Pulse Width = 2.0 μs	tgt	–	1.5	2.0	μs
Blocking Voltage Application Rate at Commutation, f=60 Hz, T_C=75°C On-State Conditions: I_{TM} = 14 A, Pulse Width = 4.0 ms, di/dt=5.3 A/ms Off-State Conditions: Main Terminal Voltage = Rated V_{DRM} (200 μs min), Gate Source Voltage = 0 V, R_S = 100 Ω	dv/dt	–	5.0	–	V/μs

*Indicates JEDEC Registered Data

NOTES:

1. Ratings apply for open gate conditions. Thyristor devices shall not be tested with a constant current source for blocking capability such that the voltage applied exceeds the rated blocking voltage.

Trigger devices are recommended for gating on Triacs.

Triggers Provide:

1. Consistent predictable turn-on points.
2. Simplified circuitry.
3. Fast turn-on time for cooler, more efficient and reliable operation.

Electrical Characteristics	For General Usage		For Lamp Dimmer
Symbol	MBS4991	MBS4992	MBS100
V_S =	6.0 –10 V	7.5–9.0 V	3.0–5.0 V
I_S =	350 μA Max	120 μA Max	100–400 μA
V_{S1}–V_{S2} =	0.5 V Max	0.2 V Max	0.35 V Max
Temperature Coefficient = 0.02%/°C Typ			

See AN-526 for Theory and Characteristics of Silicon Bidirectional Switches.

FIGURE 1 – AVERAGE CURRENT DERATING

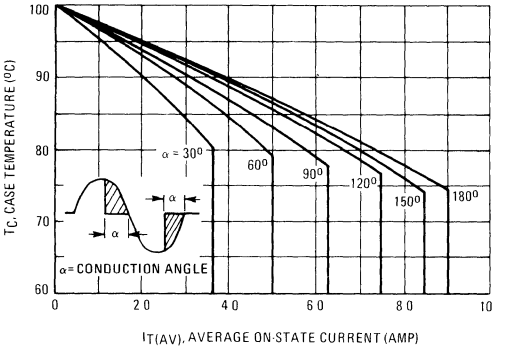


FIGURE 2 – RMS CURRENT DERATING

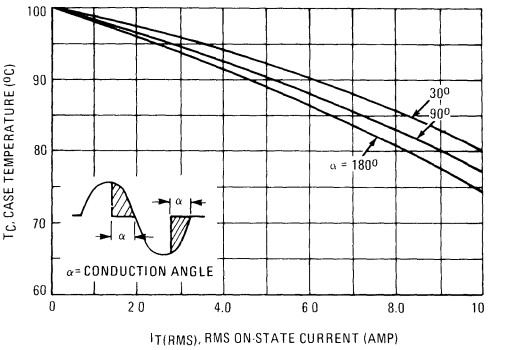


FIGURE 3 – POWER DISSIPATION

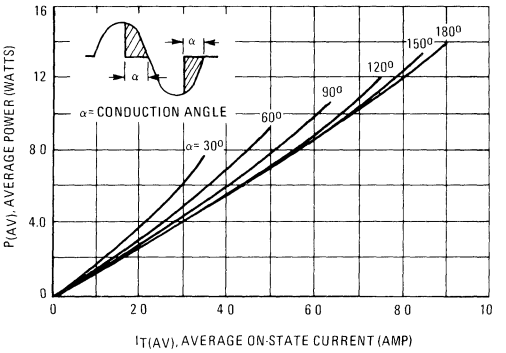


FIGURE 4 – POWER DISSIPATION

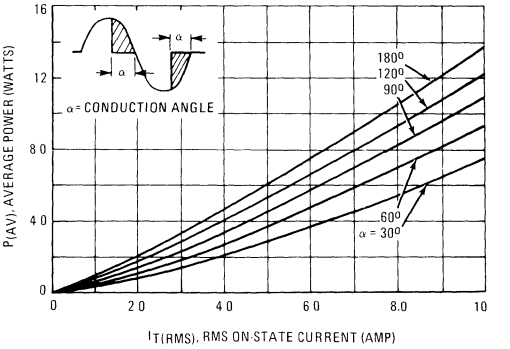


FIGURE 5 – TYPICAL GATE TRIGGER VOLTAGE

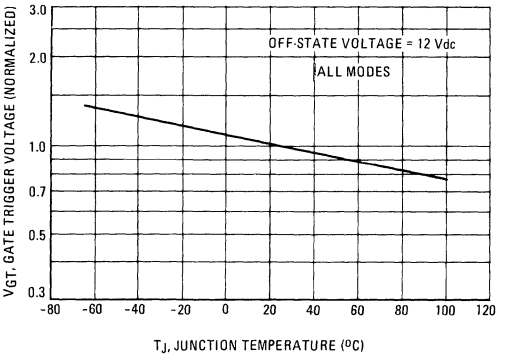


FIGURE 6 – TYPICAL GATE TRIGGER CURRENT

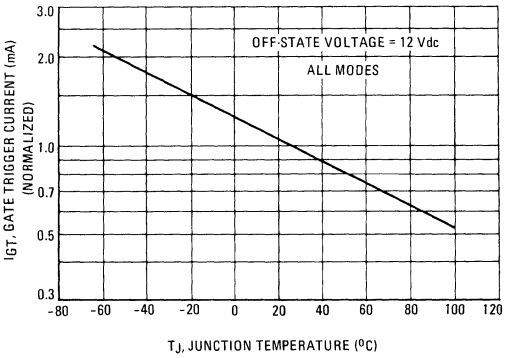


FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

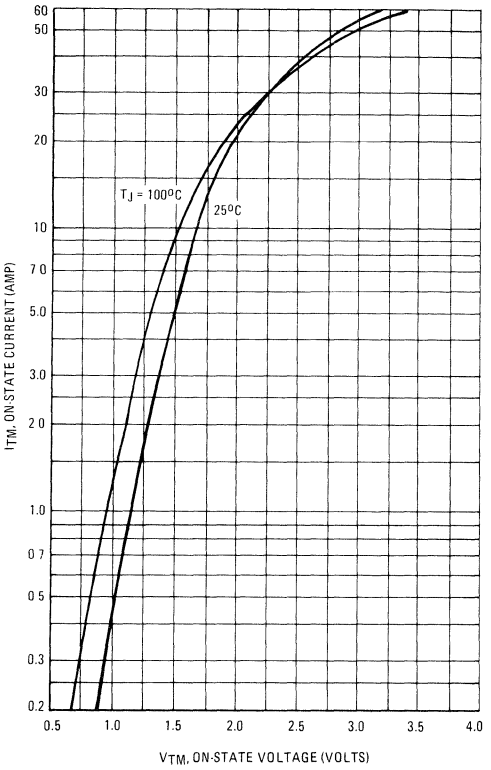


FIGURE 8 – TYPICAL HOLDING CURRENT

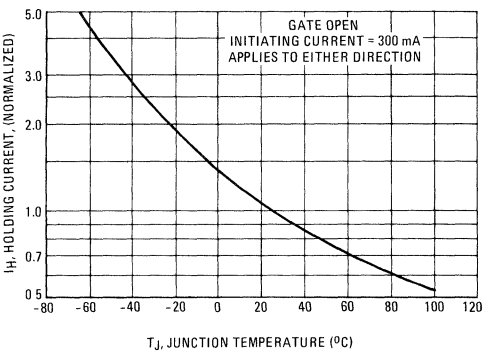


FIGURE 9 – MAXIMUM ALLOWABLE SURGE CURRENT

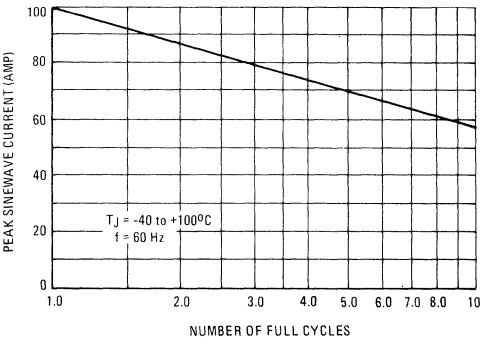
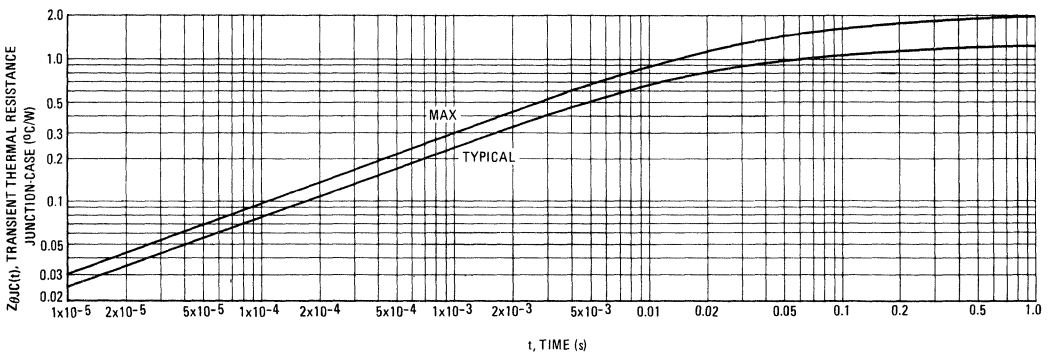
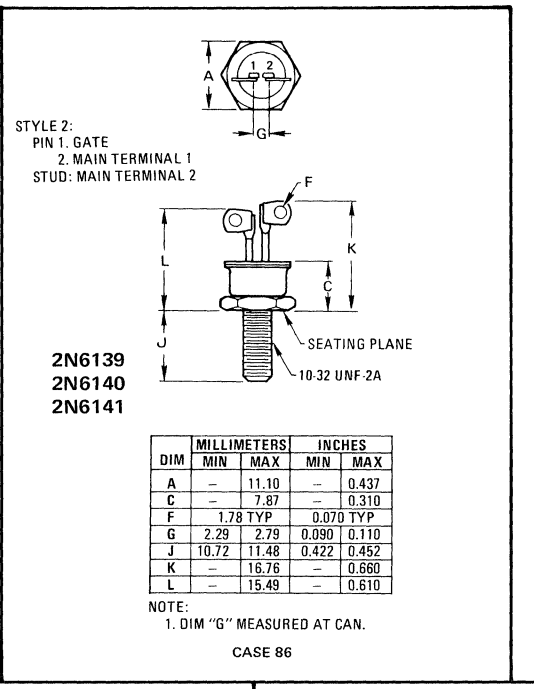


FIGURE 10 – THERMAL RESPONSE





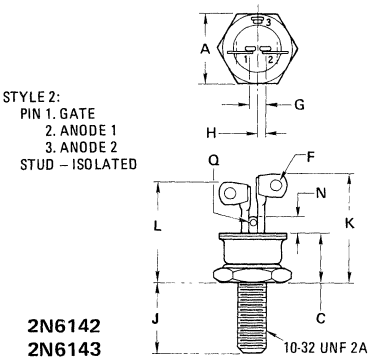
STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
STUD: MAIN TERMINAL 2

2N6139
2N6140
2N6141

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	11.10	–	0.437
C	–	7.87	–	0.310
F	1.78 TYP		0.070 TYP	
G	2.29	2.79	0.090	0.110
J	10.72	11.48	0.422	0.452
K	–	16.76	–	0.660
L	–	15.49	–	0.610

NOTE:
1. DIM "G" MEASURED AT CAN.

CASE 86

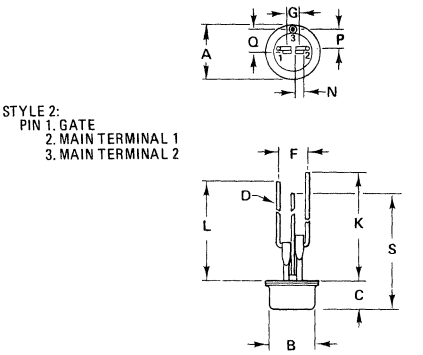


STYLE 2:
PIN 1. GATE
2. ANODE 1
3. ANODE 2
STUD – ISOLATED

2N6142
2N6143
2N6144

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	11.10	–	0.437
C	–	10.92	–	0.430
F	1.65	1.91	0.065	0.075
G	2.29	2.79	0.090	0.110
H	1.14	1.40	0.045	0.055
J	10.72	11.48	0.422	0.452
K	–	16.76	–	0.660
L	—	15.49	–	0.610
N	3.43	3.68	0.135	0.145
Q	1.65	1.91	0.065	0.075

CASE 250-01



STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
3. MAIN TERMINAL 2

2N6148
2N6149
2N6150

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.92	–	0.430
B	–	8.89	–	0.350
C	–	5.97	–	0.235
D	0.76	0.86	0.030	0.034
F	4.83	5.33	0.190	0.210
G	2.29	2.79	0.090	0.110
K	33.53	–	1.320	–
L	31.50 TYP		1.240 TYP	
N	1.65	1.91	0.065	0.075
P	3.43	3.68	0.135	0.145
Q	4.57	5.08	0.180	0.200
S	30.48	–	1.20	–

NOTES:
1. DIM. "G" MEASURED AT CAN.
2. LEAD NO. 3 $\pm 7.5^{0}$ DISPLACEMENT.

CASE 87L-01

2N6145 thru 2N6147 (SILICON)

For Specifications, See 2N5571 Data.