

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

Triacs Silicon Bidirectional Thyristors

... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies.

- Blocking Voltage to 600 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability

MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Repetitive Peak Off-State Voltage, Gate Open	V_{DRM}	200 400 500 600	Volts	
				B
				SC143 D
				SC149 E M
Peak Gate Voltage	V_{GM}	—	Volts	
RMS On-State Current $T_C = 80^\circ C$	$I_{T(RMS)}$	8 12	Amps	
				SC143
SC149				
Peak Non-Repetitive Surge Current One Full Cycle, 60 Hz	I_{TSM}	120 120	Amps	
				SC143
SC149				
Circuit Fusing Considerations $t = 1 \text{ ms}$	I^2t	20 25	A^2s	
				SC143
SC149				
Critical Rate of Rise of On-State Current	di/dt	10	$A/\mu s$	
Peak Gate Power (Pulse Width = 10 μs)	P_{GM}	10	Watts	
Average Gate Power ($T_C = +80^\circ C, t = 8.3 \text{ ms}$)	$P_{G(AV)}$	0.5	Watt	
Peak Gate Current (Pulse Width = 10 μs)	I_{GM}	3.5	Amps	
Operating Junction Temperature Range	T_J	-40 to +100	$^\circ C$	
Storage Temperature Range	T_{stg}	-40 to +125	$^\circ C$	

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	$^\circ C/W$

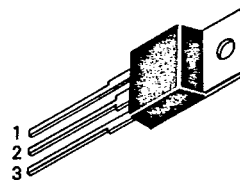
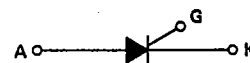
ELECTRICAL CHARACTERISTICS ($T_C = +25^\circ C$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Off-State Current (1) Rated V_{DRM} = Peak Off-State Voltage, Gate Open-Circuited $T_C = +25^\circ C$ $T_C = +100^\circ C$	I_{DRM}	—	—	0.1	mA
				0.5	
				—	
Peak On-State Voltage (1) Pulse Width = 1 ms, Duty Cycle < 2%. $I_{TM} = 11 \text{ A Peak}$ $I_{TM} = 17 \text{ A Peak}$	V_{TM}	—	—	1.55	Volts
				1.65	
				—	

NOTE 1. Values apply for either polarity of Main Terminal 2 characteristics referenced to Main Terminal 1. (cont.)
Thermowatt is a trademark of Motorola Inc.

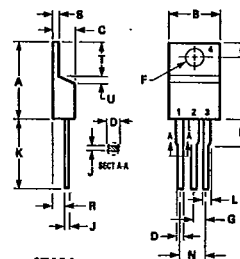
SC143 Series SC149 Series

TRIACs
8 and 12 AMPERES RMS
200 thru 600 VOLTS



CASE 221A-02
TO-220AB

OUTLINE DIMENSIONS



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.60	15.75	0.575	0.620
B	9.65	10.29	0.380	0.405
C	4.06	4.82	0.160	0.190
D	0.64	0.89	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.41	2.67	0.095	0.105
H	2.79	3.93	0.110	0.155
J	0.36	0.56	0.014	0.022
K	12.70	14.27	0.500	0.562
L	1.14	1.39	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.79	0.080	0.110
S	1.14	1.39	0.045	0.055
T	5.97	6.48	0.235	0.255
U	0.00	1.27	0.000	0.050
V	1.14	—	0.045	—
Z	—	2.03	—	0.080

CASE 221A-02
TO-220AB




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

Characteristic	Symbol	Min	Typ	Max	Unit
Critical Rate of Rise of Off-State Voltage (1) Rated V_{DRM} , Gate Open-Circuited, Exponential Waveform SC143 Series SC149 Series $T_C = +100^\circ\text{C}$	dv/dt	—	150 200	—	Volts/ μs
Critical Rate-of-Rise of Commutating Off-State Voltage (1) $I_T(\text{RMS}) = \text{Rated RMS On-State Current}$ $V_{DRM} = \text{Rated Peak Off-State Voltage, Gate Open-Circuited}$ SC143 Commutating di/dt = 4.3 A/ms SC149 Commutating di/dt = 6.5 A/ms $T_C = +80^\circ\text{C}$	dv/dt(C)	4 4	— —	— —	Volts/ μs
DC Gate Trigger Current (2) $V_D = 12 \text{ Vdc}$ Trigger Mode MT2 (+), Gate (+), $R_L = 100 \text{ Ohms}$ MT2 (-), Gate (-), $R_L = 100 \text{ Ohms}$ MT2 (+), Gate (-), $R_L = 50 \text{ Ohms}$ MT2 (+), Gate (+), $R_L = 50 \text{ Ohms, } T_C = -40^\circ\text{C}$ MT2 (-), Gate (-), $R_L = 50 \text{ Ohms, } T_C = -40^\circ\text{C}$ MT2 (+), Gate (-), $R_L = 25 \text{ Ohms, } T_C = -40^\circ\text{C}$	I_{GT}	— — — — — —	— — — — — —	50 50 50 80 80 80	mAdc
DC Gate Trigger Voltage (2) $V_D = 12 \text{ Vdc}$ Trigger Mode MT2 (+), Gate (+), $R_L = 100 \text{ Ohms}$ MT2 (-), Gate (-), $R_L = 100 \text{ Ohms}$ MT2 (+), Gate (-), $R_L = 50 \text{ Ohms}$ MT2 (+), Gate (+), $R_L = 50 \text{ Ohms, } T_C = -40^\circ\text{C}$ MT2 (-), Gate (-), $R_L = 50 \text{ Ohms, } T_C = -40^\circ\text{C}$ MT2 (+), Gate (-), $R_L = 25 \text{ Ohms, } T_C = -40^\circ\text{C}$ MT2 (+), Gate (+), $R_L = 1000 \text{ Ohms, } T_C = +100^\circ\text{C (2,3)}$ MT2 (-), Gate (-), $R_L = 1000 \text{ Ohms, } T_C = +100^\circ\text{C (2,3)}$ MT2 (+), Gate (-), $R_L = 1000 \text{ Ohms, } T_C = +100^\circ\text{C (2,3)}$ MT2 (-), Gate (+), $R_L = 1000 \text{ Ohms, } T_C = +100^\circ\text{C (2,3)}$	V_{GT}	— — — — — — 0.20 0.20 0.20 0.20	— — — — — — — — — —	2.5 2.5 2.5 3.5 3.5 3.5 — — — —	Vdc
Holding Current (1) Main Terminal Voltage = 24 Vdc, Peak Initiating Current = 0.5 A, Pulse Width = 1 ms, Duty Cycle $\leq 2\%$. Gate Trigger Source = 7 V, 20 Ohms $T_C = +25^\circ\text{C}$ $T_C = -40^\circ\text{C}$	I_H	— —	— —	50 100	mAdc
Latching Current (2) Main Terminal Source Voltage = 24 Vdc, Gate Trigger Source = 15 V, 100 Ohms, Trigger Mode MT2 (+), Gate (+) MT2 (-), Gate (-) MT2 (+), Gate (-) MT2 (+), Gate (+), $T_C = -40^\circ\text{C}$ MT2 (-), Gate (-), $T_C = -40^\circ\text{C}$ MT2 (+), Gate (-), $T_C = -40^\circ\text{C}$	I_L	— — — — — —	— — — — — —	100 100 200 200 200 400	mAdc

NOTES:

- Values apply for either polarity of Main Terminal 2 characteristics referenced to Main Terminal 1.
- Main Terminal 1 is the reference terminal.
- With V_D equal to rated off-state voltage.

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