

# DIGITRON SEMICONDUCTORS

## SC149 SERIES

## BIDIRECTIONAL TRIODE THYRISTORS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
<b>Repetitive peak off-stage voltage, gate open</b> SC149B SC149D SC149E SC149M	$V_{DRM}$	200 400 500 600	Volts
<b>RMS on-state current</b> ( $T_C = 80^\circ\text{C}$ )	$I_{T(RMS)}$	12	Amps
<b>Peak non-repetitive surge current</b> (One Cycle, 60Hz)	$I_{TSM}$	120	Amps
<b>Circuit fusing considerations</b> ( $t = 1.0\text{ms}$ )	$I^2t$	25	$\text{A}^2\text{s}$
<b>Critical rate of rise of on-state current</b>	$di/dt$	10	$\text{A}/\mu\text{s}$
<b>Peak gate power</b> (pulse width = $10\mu\text{s}$ )	$P_{GM}$	10	Watts
<b>Average gate power</b> ( $T_C = 80^\circ\text{C}$ , $t = 8.3\text{ms}$ )	$P_{G(AV)}$	0.5	Watts
<b>Peak gate current</b> (pulse width = $10\mu\text{s}$ )	$I_{GM}$	3.5	Amps
<b>Operating junction temperature range</b>	$T_J$	-40 to +100	$^\circ\text{C}$
<b>Storage temperature range</b>	$T_{stg}$	-40 to +125	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
<b>Thermal resistance, junction to case</b>	$R_{\theta JC}$	2.2	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>Peak off state current</b> <sup>(1)</sup> ( $V_D = V_{DRM}$ , gate open) $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	$I_{DRM}$	- -	- -	0.1 0.5	mA
<b>Peak on-state voltage</b> <sup>(1)</sup> ( $I_{TM} = 11\text{A}$ peak, pulse width $\leq 1\text{ms}$ , duty cycle $\leq 2\%$ ) ( $I_{TM} = 17\text{A}$ peak, pulse width $\leq 1\text{ms}$ , duty cycle $\leq 2\%$ )	$V_{TM}$	- -	- -	1.55 1.65	Volts
<b>Critical rate of rise of off-state voltage</b> <sup>(1)</sup> ( $V_D = \text{Rated } V_{DRM}$ , gate open, exponential waveform, $T_C = 100^\circ\text{C}$ )	$dv/dt$	-	200	-	$\text{V}/\mu\text{s}$
<b>Critical rate of rise of commutating voltage</b> <sup>(1)</sup> ( $I_{T(RMS)} = \text{Rated RMS on state current}$ , $V_{DRM} = \text{Rated peak off state voltage}$ , gate open, commutating $di/dt = 6.5\text{A}/\text{ms}$ , $T_C = 80^\circ\text{C}$ )	$dv/dt(c)$	4	-	-	$\text{V}/\mu\text{s}$
<b>DC gate trigger current</b> (continuous dc) <sup>(2)</sup> ( $V_D = 12\text{V}$ , trigger mode) MT2(+), G(+), $R_L = 100\Omega$ MT2(-), G(-), $R_L = 100\Omega$ MT2(+), G(-), $R_L = 50\Omega$ MT2(+), G(+), $R_L = 50\Omega$ , $T_C = -40^\circ\text{C}$ MT2(-), G(-), $R_L = 50\Omega$ , $T_C = -40^\circ\text{C}$ MT2(+), G(-), $R_L = 25\Omega$ , $T_C = -40^\circ\text{C}$	$I_{GT}$	- - - - - -	- - - - - -	50 50 50 80 80 80	mA

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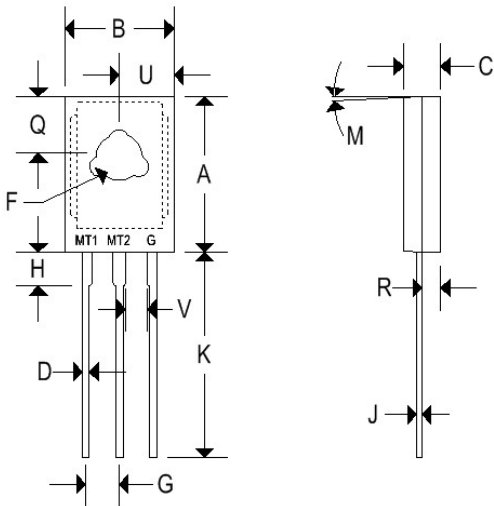
## BIDIRECTIONAL TRIODE THYRISTORS

Characteristic	Symbol	Min	Typ	Max	Unit
<b>DC gate trigger voltage</b> (continuous dc) <sup>(2)</sup> ( $V_D = 12V$ , trigger mode) MT2(+), G(+), $R_L = 100\Omega$ MT2(-), G(-), $R_L = 100\Omega$ MT2(+), G(-), $R_L = 50\Omega$ MT2(+), G(+), $R_L = 50\Omega$ , $T_C = -40^\circ C$ MT2(-), G(-), $R_L = 50\Omega$ , $T_C = -40^\circ C$ MT2(+), G(-), $R_L = 25\Omega$ , $T_C = -40^\circ C$ MT2(+), G(+), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ <sup>(3)</sup> MT2(-), G(-), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ <sup>(3)</sup> MT2(+), G(-), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ <sup>(3)</sup> MT2(-), G(+), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ <sup>(3)</sup>	$V_{GT}$	-	-	2.5	Volts
<b>Holding current</b> <sup>(1)</sup> (main terminal voltage = 24V, peak initiating current = 0.5A, pulse width = 1ms, duty cycle $\leq 2\%$ , gate trigger source = 7V, 20 $\Omega$ , $T_C = 25^\circ C$ ) (main terminal voltage = 24V, peak initiating current = 0.5A, pulse width = 1ms, duty cycle $\leq 2\%$ , gate trigger source = 7V, 20 $\Omega$ , $T_C = -40^\circ C$ )	$I_H$	-	-	50	mA
<b>Latching current</b> <sup>(2)</sup> (main terminal voltage = 24V, gate trigger source = 15V, 100 $\Omega$ , trigger mode) MT2(+), G(+) MT2(-), G(-) MT2(+), G(-) MT2(+), G(+), $T_C = -40^\circ C$ MT2(-), G(-), $T_C = -40^\circ C$ MT2(+), G(-), $T_C = -40^\circ C$	$I_L$	-	-	100	mA

Note 1: Values apply for either polarity of Main Terminal 2 characteristics referenced to Main Terminal 1.  
 Note 2: Main Terminal 1 is the reference terminal.  
 Note 3: With  $V_D$  equal to rated off-state voltage.

### MECHANICAL CHARACTERISTICS

<b>Case</b>	TO-220AB
<b>Marking</b>	Alpha-numeric
<b>Polarity</b>	Cathode is stud



	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030