DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

SC250, SC250()3, SC251 SERIES

BIDIRECTIONAL TRIODE THYRISTORS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage			
SC250B, SC251B, S250B3	V_{DRM}	200	Volts
SC250D, SC251D, S250D3		400	
SC250E, SC251E, S250E3		500	
SC250M, SC251M, S250M3		600	
Forward on-state current RMS	$I_{T(RMS)}$	15	Amps
Peak forward surge current (one cycle, sine wave, 60Hz)	I_{TSM}	100	Amps
Circuit fusing considerations			
(t = 1ms)	I^2t	20	A^2s
(t = 8.3ms)		41.5	
Peak gate power	P_{GM}	10	Watts
Average gate power	$P_{G(AV)}$	0.5	Watts
Peak gate power (pulse width = 10µs)	I_{GM}	2	Amps
Operating junction temperature range	T_J	-40 to +115	°C
Storage temperature range	T_{stg}	-40 to +125	°C
Stud torque		30	In. lb.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case			
SC250, SC251	$R_{\Theta JC}$	2.0	°C/W
SC250()3		2.3	

ELECTRICAL CHARACTERISTICS (T_C = 25°C and either polarity of MT2 to MT1 voltage, unless otherwise noted)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Peak forward blocking current (V_D = rated V_{DRM}, gate open)	I_{DRM}				mA
T_C = 25°C		-	-	0.1	
T_C = 115°C		-	-	0.5	
Peak on-state voltage (I_{TM} = 21A peak, pulse width = 1ms, duty cycle ≤ 2%)	V_T	-	-	1.65	Volts
Critical rate of rise of off-state voltage (Rated V_{DRM}, gate open, exponential waveform, T_C = 115°C)	dv/dt	100	-	-	V/µs
Critical rate of rise of commutating off-state voltage [1] ($I_{T(RMS)}$ = Rated RMS on state current, V_D = V_{DRM}, gate open, commutating di/dt = 8A/ms)	dv/dt(c)				V/µs
SC250, SC251: T_C = 84°C		4	-	-	
SC250()3: T_C = 78°C		4	-	-	

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Gate trigger current (V_D = 12V) MT2(+), G(+); MT2(-), G(-); R_L = 100Ω) MT2(+), G(-);R_L = 50Ω)	I_{GT}	 - -	 - -	 50 50	mA
Gate trigger current (V_D = 12V, T_C = -40°C) MT2(+), G(+); MT2(-), G(-); R_L = 50Ω) MT2(+), G(-);R_L = 25Ω)	I_{GT}	 - -	 - -	 80 80	mA
Gate trigger voltage (V_D = 12V) MT2(+), G(+); MT2(-), G(-); R_L = 100Ω) MT2(+), G(-);R_L = 50Ω)	V_{GT}	 - -	 - -	 2.5 2.5	Volts
Gate trigger voltage (V_D = 12V, T_C = -40°C) MT2(+), G(+); MT2(-), G(-); R_L = 50Ω) MT2(+), G(-);R_L = 25Ω)	V_{GT}	 - -	 - -	 3.5 3.5	Volts
DC gate non-trigger voltage (all trigger modes) (V_D = Rated V_{DRM}, R_L = 1kΩ, T_C = 115°C)	V_{GD}	 0.20	 -	 -	Volts
Holding current (V_D = 24V, peak initiating current = 0.5A, pulse width = 0.1 to 10ms, gate trigger source = 7V, 20Ω) T_C = 25°C T_C = -40°C	I_H	 - -	 - -	 50 100	mA
Latching current (V_D = 24V, gate trigger source = 15V, pulse width = 50µs, maximum rise and fall times) MT2(+), G(+); MT2(-), G(-) MT2(+), G(-), T_C = 25°C MT2(+), G(+); MT2(-), G(-) MT2(+), G(-), T_C = -40°C	I_L	 - -	 - -	 100 200	mA

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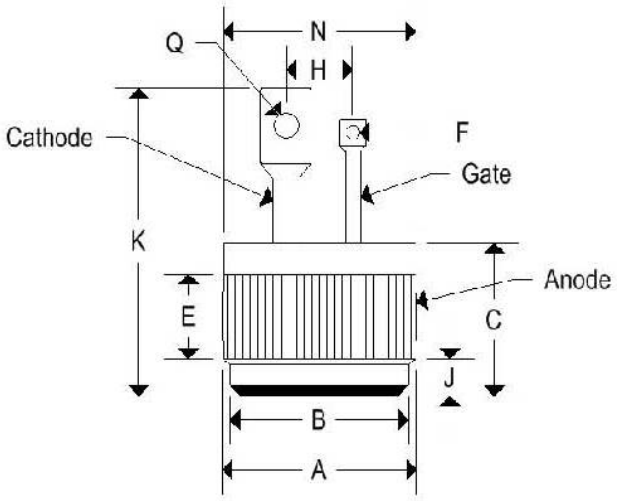
MECHANICAL CHARACTERISTICS

Case	Digi PF2 (SC251 Series)
Marking	Body painted, alpha-numeric
Polarity	Cathode is stud



	DIGI PF2			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.501	0.505	12.730	12.830
B	0.465	0.475	11.810	12.060
C	0.330	0.380	8.390	9.650
E	0.100	-	2.540	-
F	0.035	0.085	0.890	2.160
J	0.080	0.097	2.040	2.460
K	-	0.800	-	20.320
N	-	0.510	-	12.950
Q	0.065	0.160	1.650	4.060

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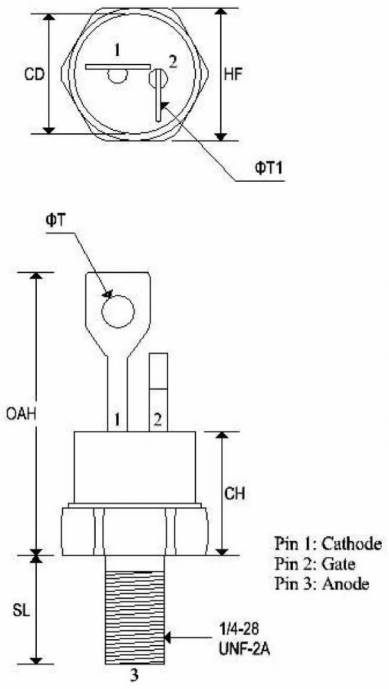
Case	TO-48 (SC250 Series)
Marking	Body painted, alpha-numeric
Polarity	Cathode is stud



	TO-48			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.543	-	13.793
CH	-	0.550	-	13.970
HF	0.544	0.563	13.817	14.301
OAH	-	1.193	-	30.303
SL	0.422	0.453	10.718	11.507
ΦT	0.125	0.165	3.175	4.191
ΦT_1	0.060	0.075	1.524	1.905

Note: Contour and angular orientation of terminals 1 and 2 with respect to hex portion and to each other are optional.

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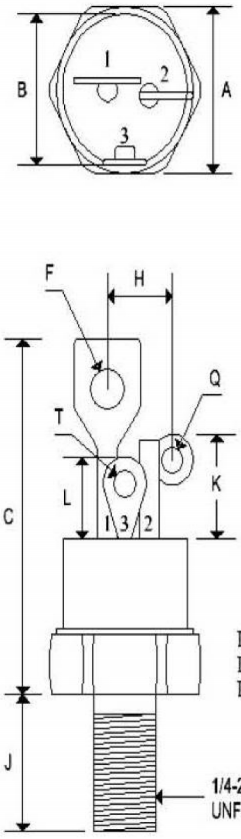
Case	TO-48 ISO (SC250()3 Series)
Marking	Body painted, alpha-numeric
Polarity	Cathode is stud



	TO-48 ISO			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.551	0.559	14.000	14.200
B	0.501	0.505	12.730	12.830
C	-	1.280	-	32.510
F	-	0.160	-	4.060
H	-	0.265	-	6.730
J	0.420	0.455	10.670	11.560
K	0.300	0.350	7.620	8.890
L	0.255	0.275	6.480	6.990
Q	0.055	0.085	1.400	2.160
T	0.135	0.150	3.430	3.810

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FIGURE 1 – CURRENT DERATING

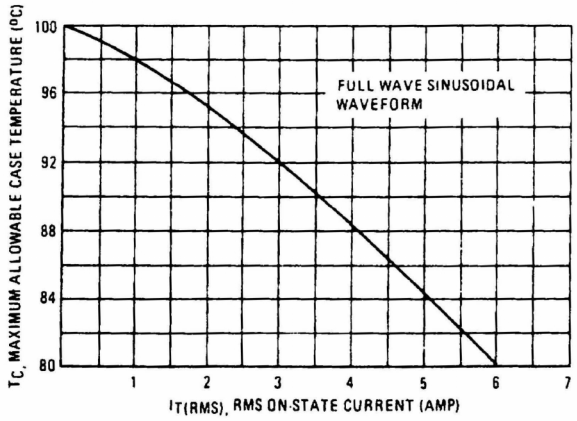

FIGURE 2 – POWER DISSIPATION