DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MCR649AP SERIES

SILICON CONTROLLED RECTIFIERS

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 forward and reverse blocking voltage (1) MCR649AP-1 MCR649AP-2 MCR649AP-3 MCR649AP-4 MCR649AP-6 MCR649AP-8 MCR649AP-9 MCR649AP-10	V_{DRM} or V_{RRM}	 25 50 100 200 400 600 700 800	Volts
On-state current	$I_{T(RMS)}$	20	Amps
Circuit fusing (8.3ms)	I^2t	235	A^2s
Peak surge current (Half cycle, 60Hz, T_J = -65° to +125°C)	I_{TSM}	235	Amps
Peak gate power – forward	P_{GM}	5	Watts
Average gate power – forward	$P_{G(AVG)}$	0.5	Watts
Peak gate current – forward	I_{GM}	2	Amps
Peak gate voltage Forward Reverse	 V_{GFM} V_{GRM}	 10 5	Volts
Operating junction temperature range	T_J	-65 to +125	°C
Storage temperature range	T_{stg}	-65 to +150	°C
Thermal resistance, junction to case	$R_{\Theta JC}$	1.5	°C/W

Note 1: V_{DRM} and V_{RRM} for all types can be applied on a continuous basis without incurring damage. Ratings apply for zero or negative gate voltage.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Peak forward or reverse blocking current (Rated V_{DRM} or V_{RRM}, gate open) T_J = 25°C T_J = 125°	I_{DRM}, I_{RRM}	 - -	 - 0.6	 10 5	 µA mA
Gate trigger current (continuous dc) (V_D = 7V, R_L = 100Ω)	I_{GT}	-	-	40	mA
Gate trigger voltage (continuous dc) (V_D = 7V, R_L = 100Ω) (V_D = rated V_{DRM}, R_L = 100Ω, T_J = 125°C)	V_{GT}	 - 0.3	 0.7 -	 3.5 -	Volts
Forward on voltage (I_{TM} = 20A)	V_{TM}	-	1.1	1.4	Volts
Holding current (V_D = 7V, gate open)	I_H	-	10	-	mA

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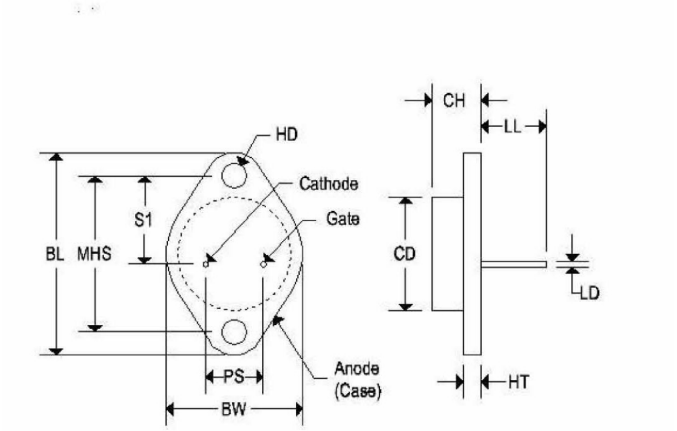
Turn-on time ($t_d + t_r$) (I_{GT} = 50mA, I_T = 10A, V_D = rated V_{DRM})	t_{gt}	-	1	-	µs
Turn-off time I_T = 10A, I_R = 10A, dv/dt = 20V/µs, T_J = 125°C) (V_D = rated voltage V_{DRM})	t_q	-	30	-	µs
Forward voltage application rate (exponential) (Gate open, T_J = 125°C, V_D = rated V_{DRM})	dv/dt	-	30	-	V/µs

MECHANICAL CHARACTERISTICS

Case:	TO-3
Marking:	Body painted, alpha-numeric
Pin out:	See below



	TO-3			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.875	-	22.220
CH	0.250	0.380	6.860	9.650
HT	0.060	0.135	1.520	3.430
BW	-	1.050	-	26.670
HD	0.131	0.188	3.330	4.780
LD	0.038	0.043	0.970	1.090
LL	0.312	0.500	7.920	12.700
BL	1.550 REF		39.370 REF	
MHS	1.177	1.197	29.900	30.400
PS	0.420	0.440	10.670	11.180
S1	0.655	0.675	16.640	17.150

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FIGURE 1 – CURRENT DERATING

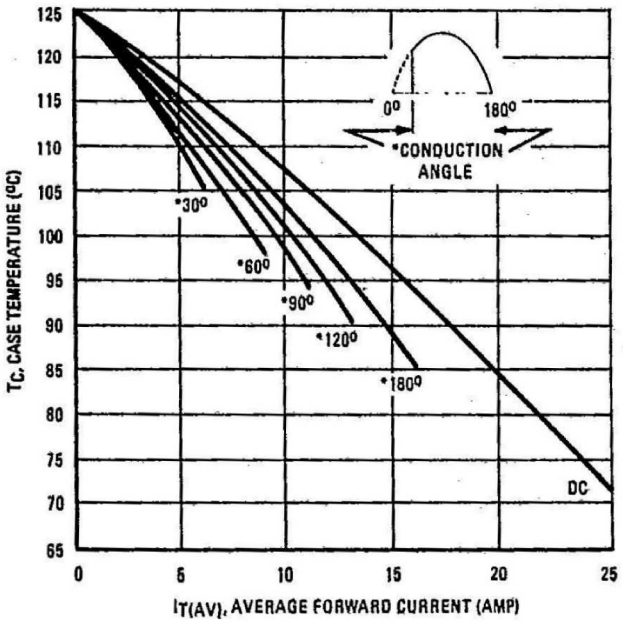

FIGURE 2 – GATE TRIGGER CHARACTERISTICS

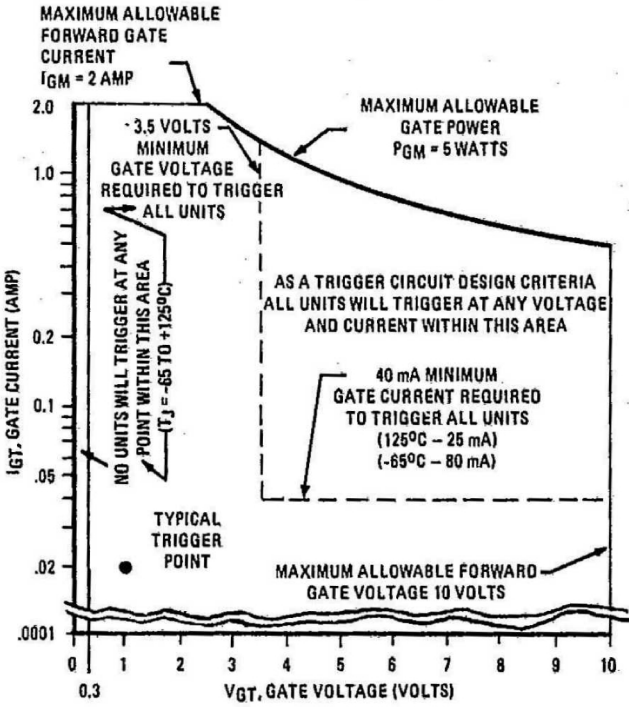

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FIGURE 3 – ON-STATE CHARACTERISTICS

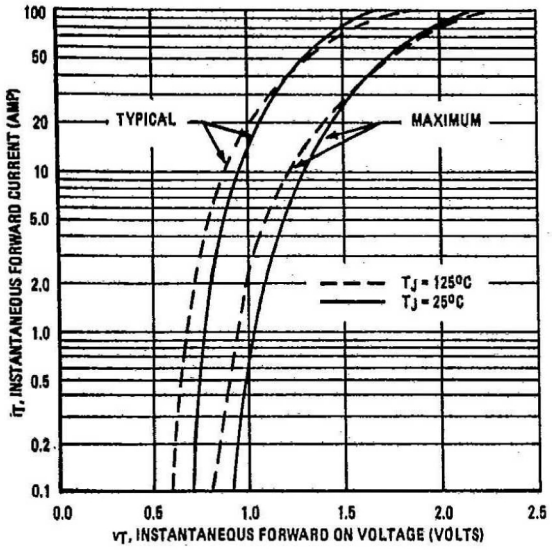

FIGURE 4 – MAXIMUM ALLOWABLE NON-RECURRENT SURGE CURRENT

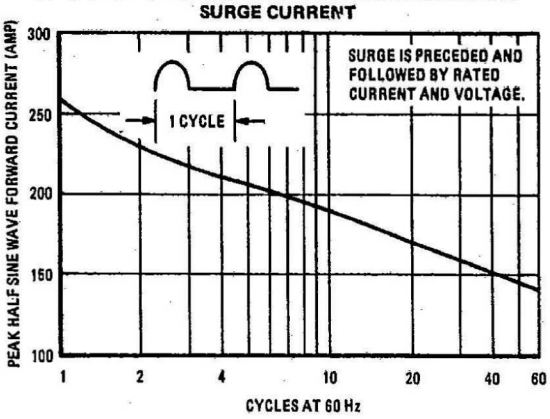

FIGURE 5 – EFFECT OF TEMPERATURE ON TYPICAL HOLDING CURRENT

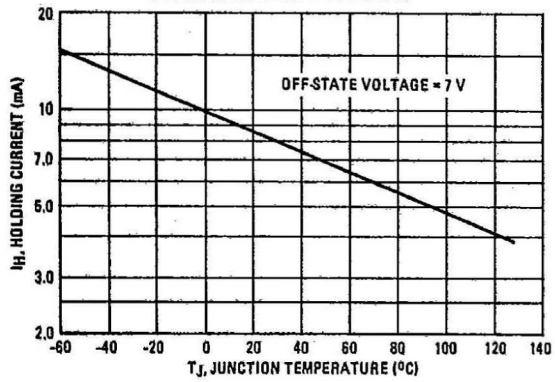

FIGURE 6 – EFFECT OF TEMPERATURE ON TYPICAL GATE CURRENT

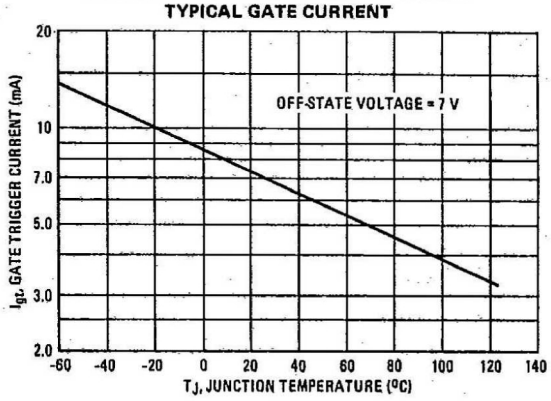

FIGURE 7 – EFFECT OF TEMPERATURE ON TYPICAL GATE VOLTAGE

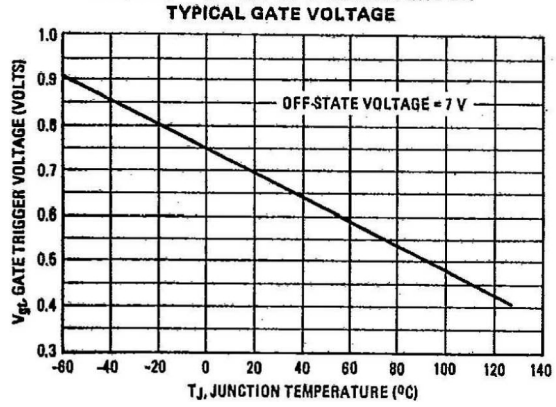

FIGURE 8 – MAXIMUM TRANSIENT THERMAL RESISTANCE JUNCTION TO CASE