

DIGITRON SEMICONDUCTORS

MCR649AP SERIES

SILICON CONTROLLED RECTIFIER

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
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 ² s
Peak surge current (Half cycle, 60Hz, $T_J = -65^\circ$ to $+125^\circ\text{C}$)	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 ($T_C = 25^\circ\text{C}$ unless otherwise noted)

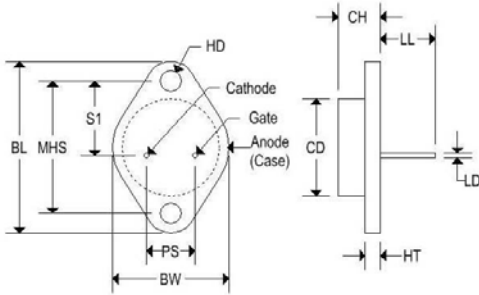
Characteristic	Symbol	Min	Typ	Max	Unit
Peak forward or reverse blocking current (Rated V_{DRM} or V_{RRM} , gate open) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ$	I_{DRM}, I_{RRM}	- -	- 0.6	10 5	μA mA
Gate trigger current (continuous dc) ($V_D = 7\text{V}$, $R_L = 100\Omega$)	I_{GT}	-	-	40	mA
Gate trigger voltage (continuous dc) ($V_D = 7\text{V}$, $R_L = 100\Omega$) ($V_D = \text{rated } V_{DRM}$, $R_L = 100\Omega$, $T_J = 125^\circ\text{C}$)	V_{GT}	- 0.3	0.7 -	3.5 -	Volts
Forward on voltage ($I_{TM} = 20\text{A}$)	V_{TM}	-	1.1	1.4	Volts
Holding current ($V_D = 7\text{V}$, gate open)	I_H	-	10	-	mA
Turn-on time ($t_d + t_r$) ($I_{GT} = 50\text{mA}$, $I_T = 10\text{A}$, $V_D = \text{rated } V_{DRM}$)	t_{gt}	-	1	-	μs
Turn-off time $I_T = 10\text{A}$, $I_R = 10\text{A}$, $dv/dt = 20\text{V}/\mu\text{s}$, $T_J = 125^\circ\text{C}$ ($V_D = \text{rated voltage } V_{DRM}$)	t_q	-	30	-	μs
Forward voltage application rate (exponential) (Gate open, $T_J = 125^\circ\text{C}$, $V_D = \text{rated } V_{DRM}$)	dv/dt	-	30	-	$\text{V}/\mu\text{s}$

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MECHANICAL CHARACTERISTICS

Case	TO-3
Marking	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

FIGURE 1 – CURRENT DERATING

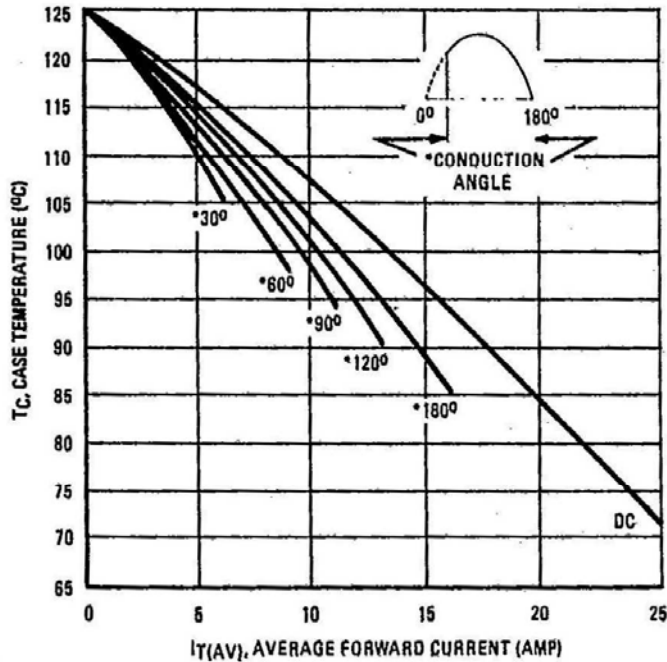
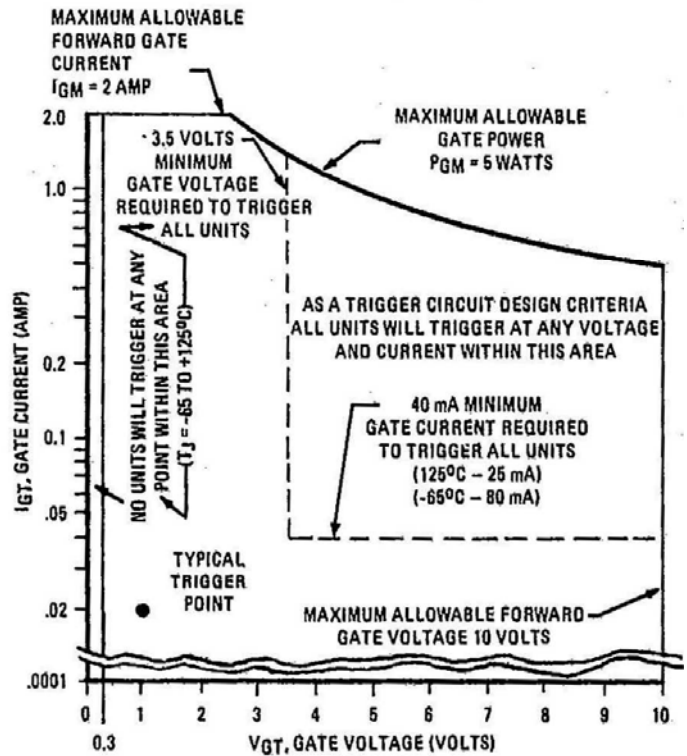


FIGURE 2 – GATE TRIGGER CHARACTERISTICS



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FIGURE 3 – ON-STATE CHARACTERISTICS

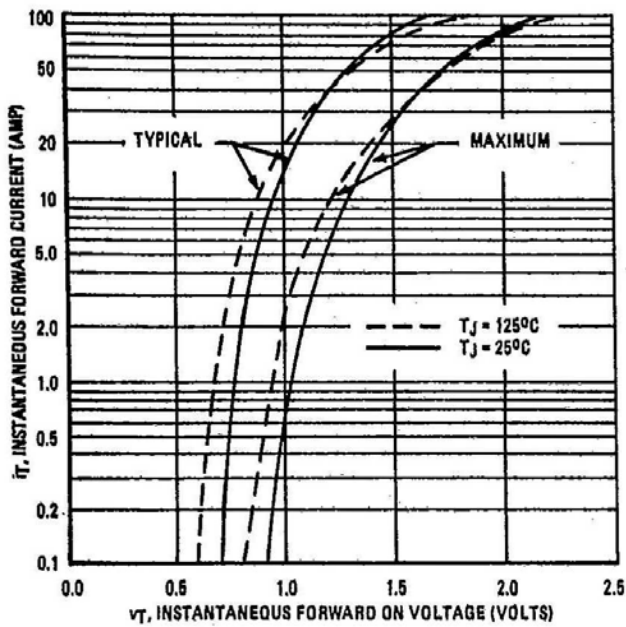


FIGURE 4 – MAXIMUM ALLOWABLE NON-RECURRENT SURGE CURRENT

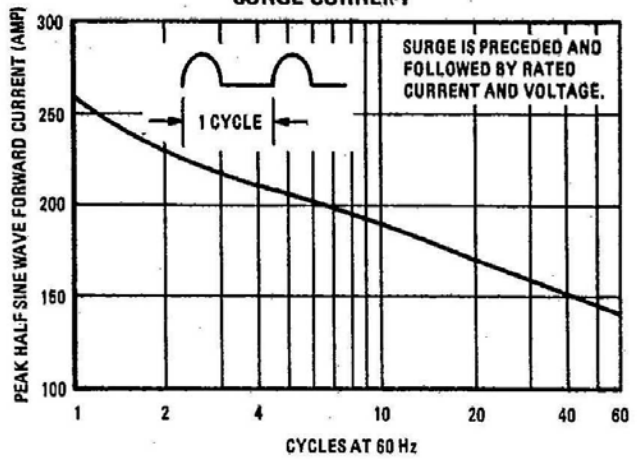


FIGURE 5 – EFFECT OF TEMPERATURE ON TYPICAL HOLDING CURRENT

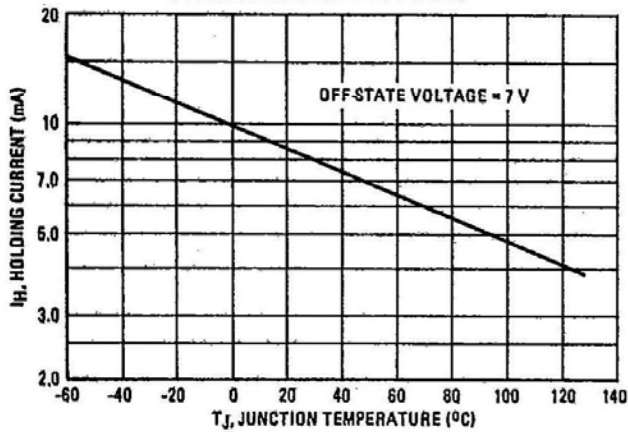


FIGURE 6 – EFFECT OF TEMPERATURE ON TYPICAL GATE CURRENT

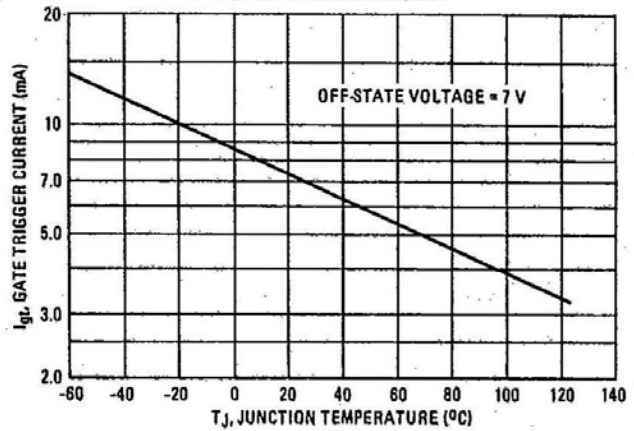


FIGURE 7 – EFFECT OF TEMPERATURE ON TYPICAL GATE VOLTAGE

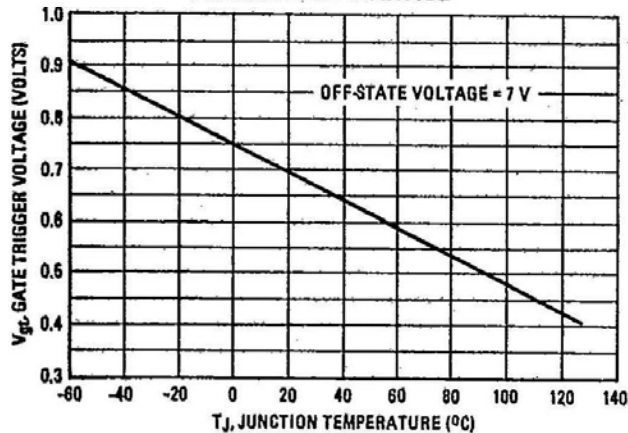


FIGURE 8 – MAXIMUM TRANSIENT THERMAL RESISTANCE JUNCTION TO CASE

