C106 Series

Sensitive Gate Silicon Controlled Rectifiers

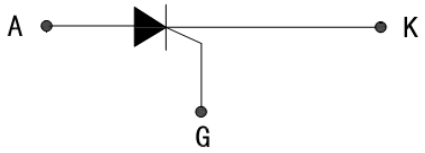
Reverse Blocking Thyristors

MT Semiconductor®

http://www.mtsemi.com

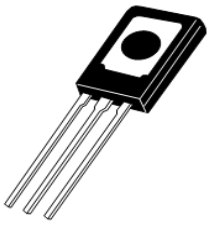
Glassivated PNPN devices designed for high volume consumer applications such as temperature, light, and speed control; process and remote control, and warning systems where reliability of operation is important.

Simplified Schematic



SCRs
4 A RMS, 200 − 600 Volts

MARKING DIAGRAM & PIN ASSIGNMENT



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Features

- Glassivated Surface for Reliability and Uniformity
- Power Rated at Economical Prices
- Practical Level Triggering and Holding Characteristics
- Flat, Rugged, Thermopad Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Sensitive Gate Triggering
- Pb−Free Packages are Available

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Max	Unit
Peak Repetitive Off−State Voltage (Note 1) (Sine Wave, 50−60 Hz, R_{GK} = 1 kΩ, T_C = −40° to 110°C)	V_{DRM}, V_{RRM}		V
C106B		200	
C106D, C106D1*		400	
C106M, C106M1*		600	
On-State RMS Current (180° Conduction Angles, T_C = 80°C)	$I_{T(RMS)}$	4.0	A
Average On−State Current (180° Conduction Angles, T_C = 80°C)	$I_{T(AV)}$	2.55	A
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_J = +110°C)	I_{TSM}	20	A
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	1.65	A^2s
Forward Peak Gate Power (Pulse Width ≤ 1.0 μsec, T_C = 80°C)	P_{GM}	0.5	W
Forward Average Gate Power (Pulse Width ≤ 1.0 μsec, T_C = 80°C)	$P_{G(AV)}$	0.1	W
Forward Peak Gate Current (Pulse Width ≤ 1.0 μsec, T_C = 80°C)	I_{GM}	0.2	A
Operating Junction Temperature Range	T_J	−40 to +110	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C
Mounting Torque (Note 2)	–	6.0	in. lb.

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
2. Torque rating applies with use of compression washer (B52200F006). Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common.

THERMAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	3.0	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	75	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8 in. from Case for 10 Seconds	T_L	260	°C

ORDERING INFORMATION

Device	Package	Shipping†
C106B	TO−225AA	500 Units / Box
C106BG	TO−225AA (Pb−Free)	500 Units / Box
C106D	TO−225AA	500 Units / Box
C106DG	TO−225AA (Pb−Free)	500 Units / Box
C106D1*	TO−225AA	500 Units / Box
C106D1G*	TO−225AA (Pb−Free)	500 Units / Box
C106M	TO−225AA	500 Units / Box
C106MG	TO−225AA (Pb−Free)	500 Units / Box
C106M1*	TO−225AA	500 Units / Box
C106M1G*	TO−225AA (Pb−Free)	500 Units / Box

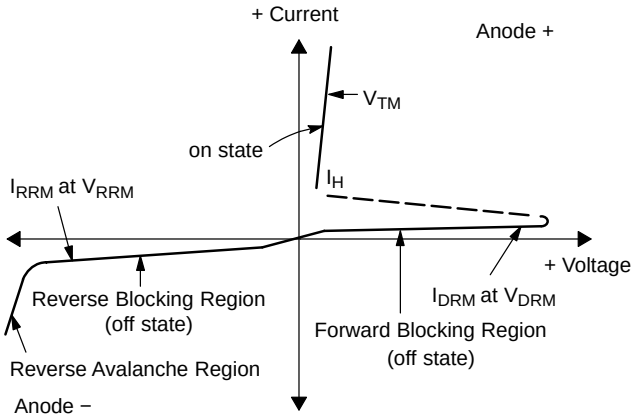
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Forward or Reverse Blocking Current (V_{AK} = Rated V_{DRM} or V_{RRM}, R_{GK} = 1000 Ohms)	T_J = 25°C	I_{DRM}, I_{RRM}	–	–	10	μA
	T_J = 110°C		–	–	100	μA
ON CHARACTERISTICS						
Peak Forward On−State Voltage (Note 3) (I_{TM} = 4 A)		V_{TM}	–	–	2.2	V
Gate Trigger Current (Continuous dc) (Note 4)		I_{GT}				μA
(V_{AK} = 6 Vdc, R_L = 100 Ohms)	T_J = 25°C		–	15	200	
	T_J = −40°C		–	35	500	
Peak Reverse Gate Voltage (I_{GR} = 10 μA)		V_{GRM}	–	–	6.0	V
Gate Trigger Voltage (Continuous dc) (Note 4)		V_{GT}				V
(V_{AK} = 6 Vdc, R_L = 100 Ohms)	T_J = 25°C		0.4	0.60	0.8	
	T_J = −40°C		0.5	0.75	1.0	
Gate Non−Trigger Voltage (Continuous dc) (Note 4) (V_{AK} = 12 V, R_L = 100 Ohms, T_J = 110°C)		V_{GD}	0.2	–	–	V
Latching Current		I_L				mA
(V_{AK} = 12 V, I_G = 20 mA)	T_J = 25°C		–	0.20	5.0	
	T_J = −40°C		–	0.35	7.0	
Holding Current (V_D = 12 Vdc)		I_H				mA
(Initiating Current = 20 mA, Gate Open)	T_J = 25°C		–	0.19	3.0	
	T_J = −40°C		–	0.33	6.0	
	T_J = +110°C		–	0.07	2.0	
DYNAMIC CHARACTERISTICS						
Critical Rate−of−Rise of Off−State Voltage (V_{AK} = Rated V_{DRM}, Exponential Waveform, R_{GK} = 1000 Ohms, T_J = 110°C)		dv/dt	–	8.0	–	V/μs

3. Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2%.
4. R_{GK} is not included in measurement.

Voltage Current Characteristic of SCR

Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak On State Voltage
I_H	Holding Current



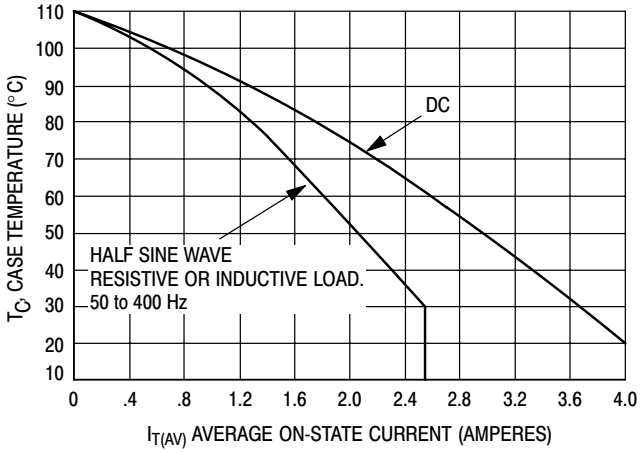


Figure 1. Average Current Derating

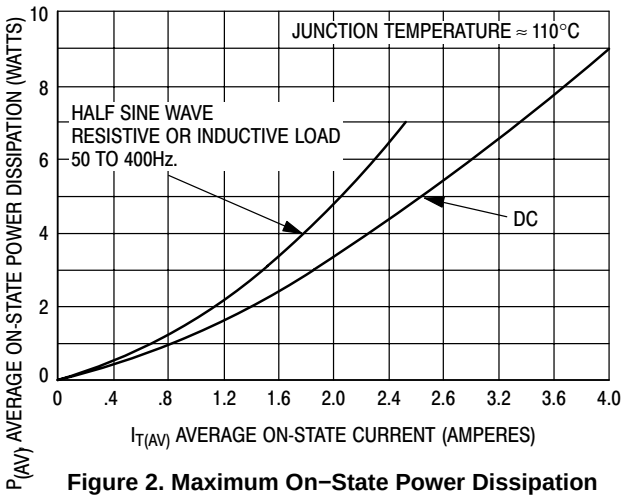


Figure 2. Maximum On−State Power Dissipation

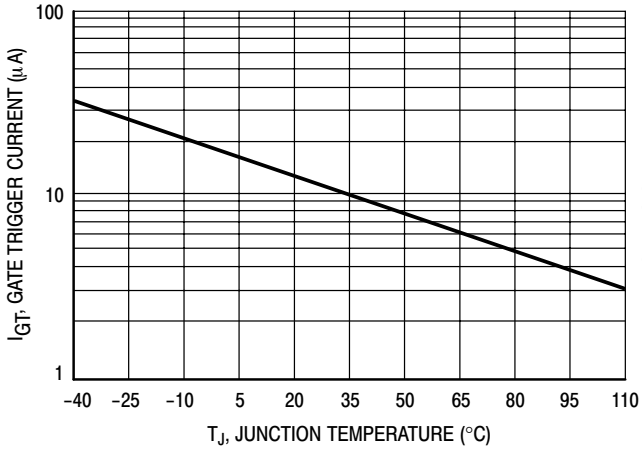


Figure 3. Typical Gate Trigger Current versus Junction Temperature

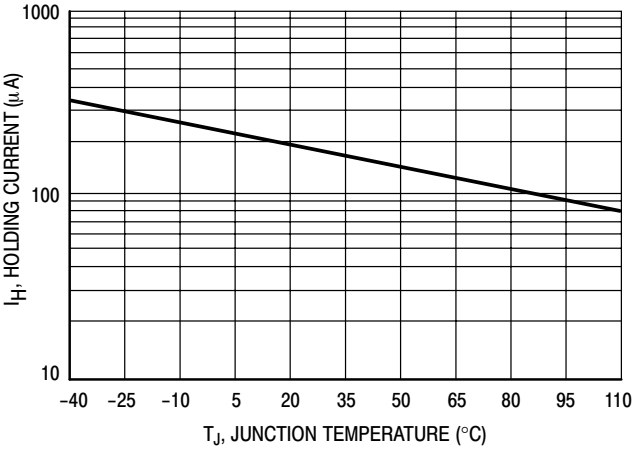


Figure 4. Typical Holding Current versus Junction Temperature

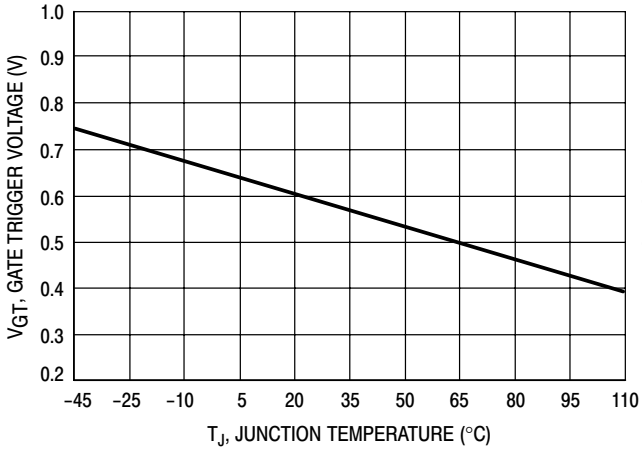


Figure 5. Typical Gate Trigger Voltage versus Junction Temperature

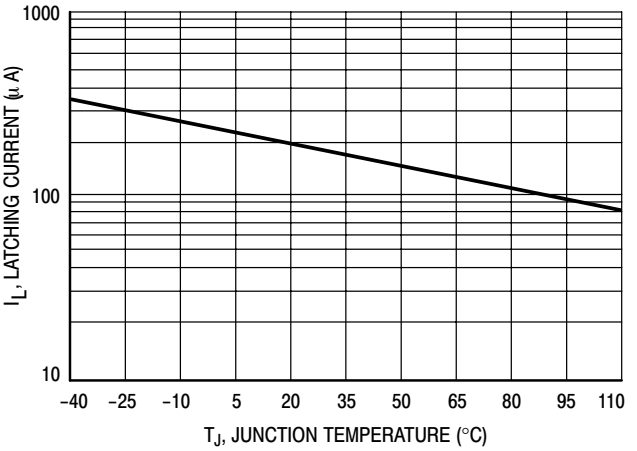


Figure 6. Typical Latching Current versus Junction Temperature

PACKAGE DIMENSIONS

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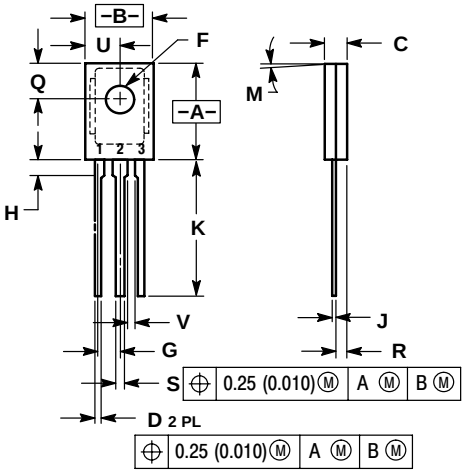

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.425	0.435	10.80	11.04
B	0.295	0.305	7.50	7.74
C	0.095	0.105	2.42	2.66
D	0.020	0.026	0.51	0.66
F	0.115	0.130	2.93	3.30
G	0.094 BSC		2.39 BSC	
H	0.050	0.095	1.27	2.41
J	0.015	0.025	0.39	0.63
K	0.575	0.655	14.61	16.63
M	5° TYP		5° TYP	
Q	0.148	0.158	3.76	4.01
R	0.045	0.065	1.15	1.65
S	0.025	0.035	0.64	0.88
U	0.145	0.155	3.69	3.93
V	0.040	---	1.02	---

STYLE 2:
PIN 1. CATHODE
2. ANODE
3. GATE

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