C106 Series

Preferred Devices

Sensitive Gate Silicon Controlled Rectifiers

Reverse Blocking Thyristors

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.

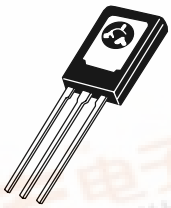
Features

- 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*

ON Semiconductor®

http://onsemi.com

SCRs
4 A RMS, 200 − 600 Volts



TO−225AA
CASE 077
STYLE 2

MARKING DIAGRAM & PIN ASSIGNMENT

1. Cathode
2. Anode
3. Gate

Y	= Year
WW	= Work Week
C106xx	= Device Code
xx	= B, D, D1, M, M1
G	= Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

Publication Order Number:

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) C106B C106D, C106D1* C106M, C106M1*	V_{DRM}, V_{RRM}	 200 400 600	V
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

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*D1 signifies European equivalent for D suffix and M1 signifies European equivalent for M suffix.

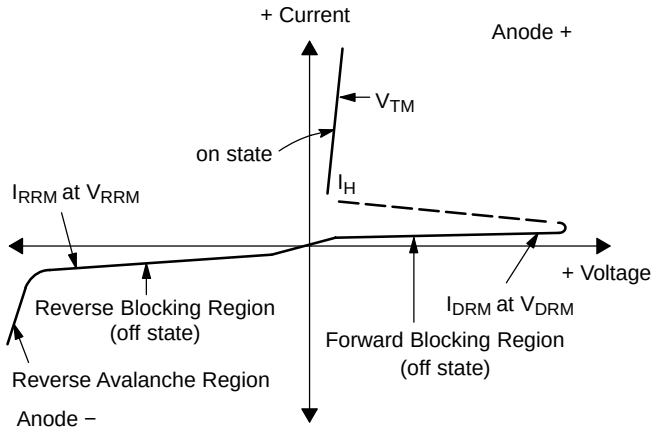
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

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) (V_{AK} = 6 Vdc, R_L = 100 Ohms)	T_J = 25°C	I_{GT}	−	15	200	μA
	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_{AK} = 6 Vdc, R_L = 100 Ohms)	T_J = 25°C	V_{GT}	0.4	0.60	0.8	V
	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 (V_{AK} = 12 V, I_G = 20 mA)	T_J = 25°C	I_L	−	0.20	5.0	mA
	T_J = −40°C		−	0.35	7.0	
Holding Current (V_D = 12 Vdc) (Initiating Current = 20 mA, Gate Open)	T_J = 25°C	I_H	−	0.19	3.0	mA
	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



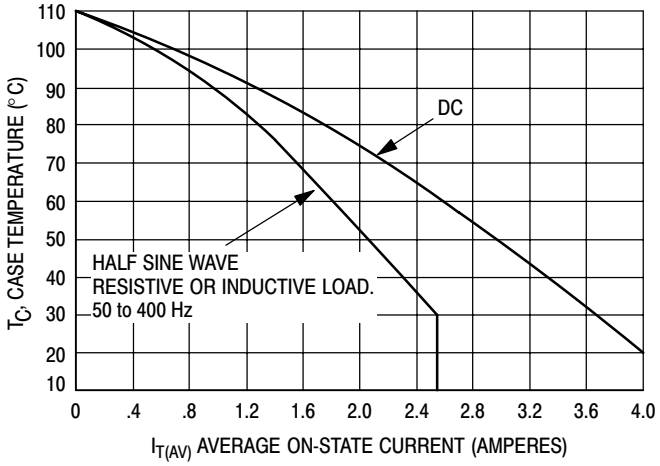


Figure 1. Average Current Derating

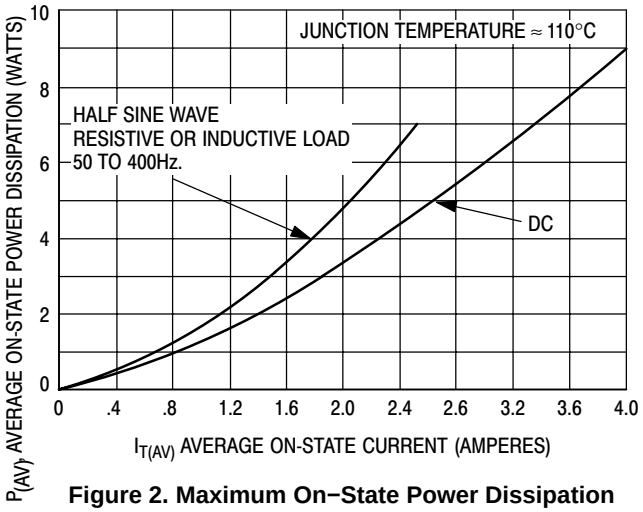


Figure 2. Maximum On−State Power Dissipation

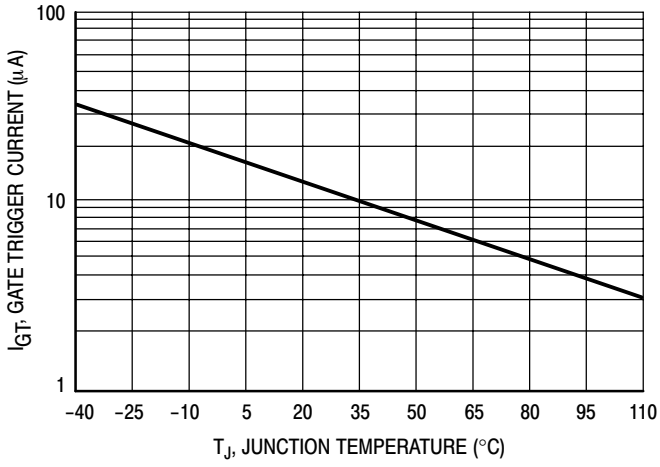


Figure 3. Typical Gate Trigger Current versus Junction Temperature

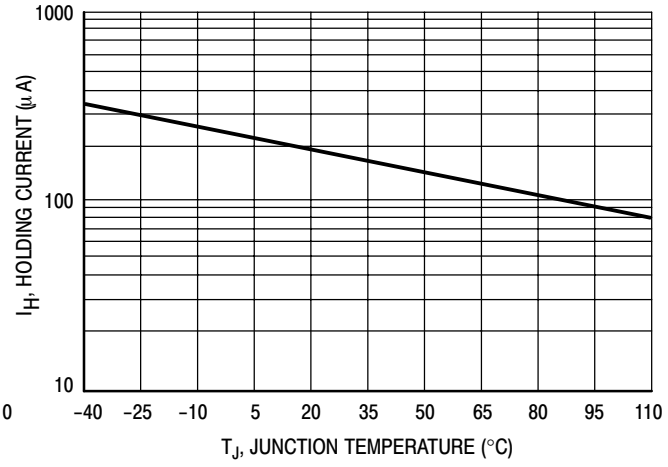


Figure 4. Typical Holding Current versus Junction Temperature

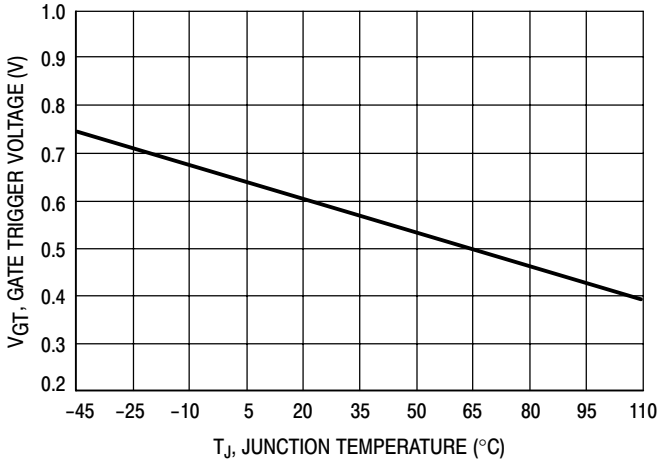


Figure 5. Typical Gate Trigger Voltage versus Junction Temperature

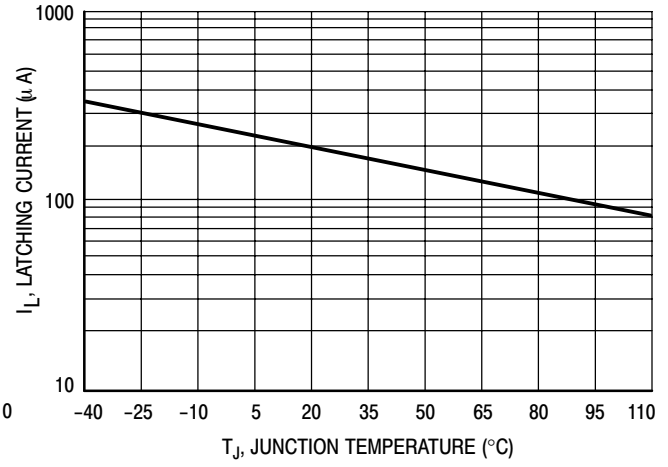
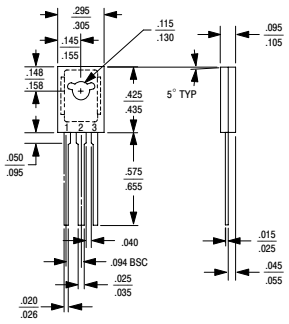


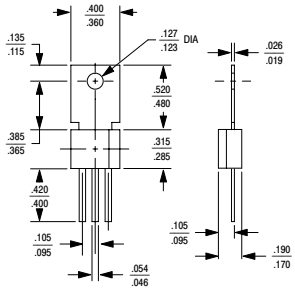
Figure 6. Typical Latching Current versus Junction Temperature

PACKAGE INTERCHANGEABILITY

The dimensional diagrams below compare the critical dimensions of the ON Semiconductor C-106 package with competitive devices. It has been demonstrated that the smaller dimensions of the ON Semiconductor package make it compatible in most lead-mount and chassis-mount applications. The user is advised to compare all critical dimensions for mounting compatibility.



ON Semiconductor C-106 Package

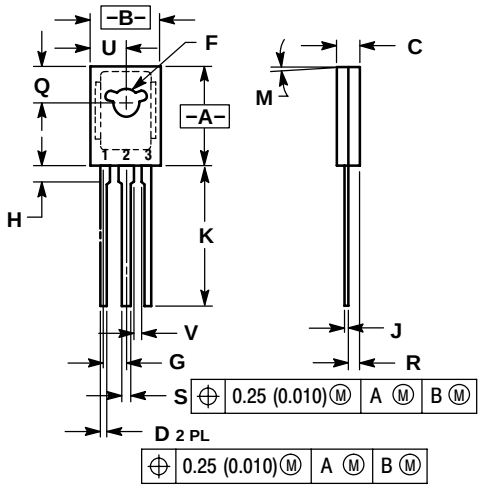


Competitive C-106 Package

C106 Series

PACKAGE DIMENSIONS

TO−225
CASE 77−09
ISSUE Z



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077−01 THRU −08 OBSOLETE, NEW STANDARD 077−09.

	INCHES		MILLIMETERS	
DIM	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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.