

# C106 Series

Preferred Devices

## Sensitive Gate Silicon Controlled Rectifiers

### Reverse Blocking Thyristors

Glassivated PNP 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\*

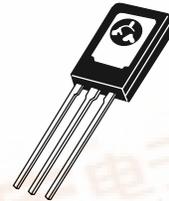


ON Semiconductor®

<http://onsemi.com>

#### SCRs

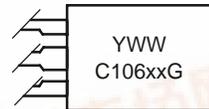
4 A RMS, 200 – 600 Volts



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.

pdf.dzsc.com

## C106 Series

### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Max	Unit
Peak Repetitive Off-State Voltage (Note 1) (Sine Wave, 50–60 Hz, $R_{GK} = 1\text{ k}\Omega$ , $T_C = -40^\circ$ to $110^\circ\text{C}$ )	$V_{DRM}$ , $V_{RRM}$	200 400 600	V
On-State RMS Current ( $180^\circ$ Conduction Angles, $T_C = 80^\circ\text{C}$ )	$I_{T(RMS)}$	4.0	A
Average On-State Current ( $180^\circ$ Conduction Angles, $T_C = 80^\circ\text{C}$ )	$I_{T(AV)}$	2.55	A
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_J = +110^\circ\text{C}$ )	$I_{TSM}$	20	A
Circuit Fusing Considerations ( $t = 8.3\text{ ms}$ )	$I^2t$	1.65	$\text{A}^2\text{s}$
Forward Peak Gate Power (Pulse Width $\leq 1.0\ \mu\text{sec}$ , $T_C = 80^\circ\text{C}$ )	$P_{GM}$	0.5	W
Forward Average Gate Power (Pulse Width $\leq 1.0\ \mu\text{sec}$ , $T_C = 80^\circ\text{C}$ )	$P_{G(AV)}$	0.1	W
Forward Peak Gate Current (Pulse Width $\leq 1.0\ \mu\text{sec}$ , $T_C = 80^\circ\text{C}$ )	$I_{GM}$	0.2	A
Operating Junction Temperature Range	$T_J$	-40 to +110	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to +150	$^\circ\text{C}$
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.

- $V_{DRM}$  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.
- 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 ( $T_C = 25^\circ\text{C}$ unless otherwise noted.)

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

### 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.

## C106 Series

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current (V <sub>AK</sub> = Rated V <sub>DRM</sub> or V <sub>RDM</sub> , R <sub>GK</sub> = 1000 Ohms)	T <sub>J</sub> = 25°C T <sub>J</sub> = 110°C	I <sub>DRM</sub> , I <sub>RDM</sub>	-	-	10 100	μA μA
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#### ON CHARACTERISTICS

Peak Forward On-State Voltage (Note 3) (I <sub>TM</sub> = 4 A)		V <sub>TM</sub>	-	-	2.2	V
Gate Trigger Current (Continuous dc) (Note 4) (V <sub>AK</sub> = 6 Vdc, R <sub>L</sub> = 100 Ohms)	T <sub>J</sub> = 25°C T <sub>J</sub> = -40°C	I <sub>GT</sub>	-	15 35	200 500	μA
Peak Reverse Gate Voltage (I <sub>GR</sub> = 10 μA)		V <sub>GRM</sub>	-	-	6.0	V
Gate Trigger Voltage (Continuous dc) (Note 4) (V <sub>AK</sub> = 6 Vdc, R <sub>L</sub> = 100 Ohms)	T <sub>J</sub> = 25°C T <sub>J</sub> = -40°C	V <sub>GT</sub>	0.4 0.5	0.60 0.75	0.8 1.0	V
Gate Non-Trigger Voltage (Continuous dc) (Note 4) (V <sub>AK</sub> = 12 V, R <sub>L</sub> = 100 Ohms, T <sub>J</sub> = 110°C)		V <sub>GD</sub>	0.2	-	-	V
Latching Current (V <sub>AK</sub> = 12 V, I <sub>G</sub> = 20 mA)	T <sub>J</sub> = 25°C T <sub>J</sub> = -40°C	I <sub>L</sub>	-	0.20 0.35	5.0 7.0	mA
Holding Current (V <sub>D</sub> = 12 Vdc) (Initiating Current = 20 mA, Gate Open)	T <sub>J</sub> = 25°C T <sub>J</sub> = -40°C T <sub>J</sub> = +110°C	I <sub>H</sub>	-	0.19 0.33 0.07	3.0 6.0 2.0	mA

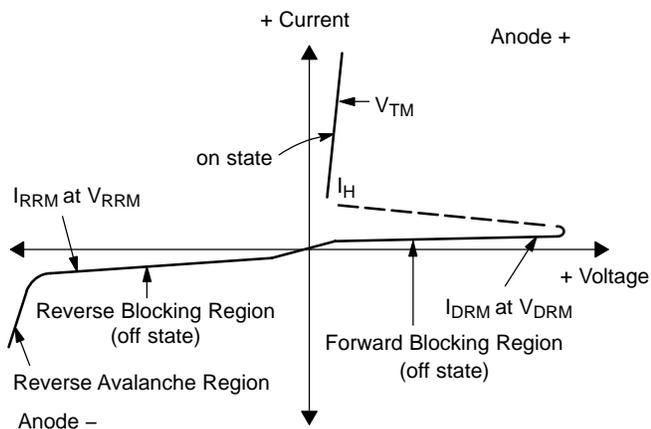
#### DYNAMIC CHARACTERISTICS

Critical Rate-of-Rise of Off-State Voltage (V <sub>AK</sub> = Rated V <sub>DRM</sub> , Exponential Waveform, R <sub>GK</sub> = 1000 Ohms, T <sub>J</sub> = 110°C)	dv/dt	-	8.0	-	V/μs
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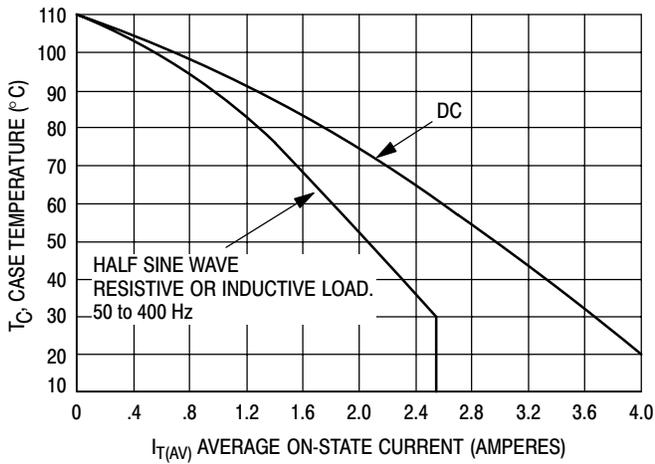
3. Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2%.
4. R<sub>GK</sub> is not included in measurement.

### Voltage Current Characteristic of SCR

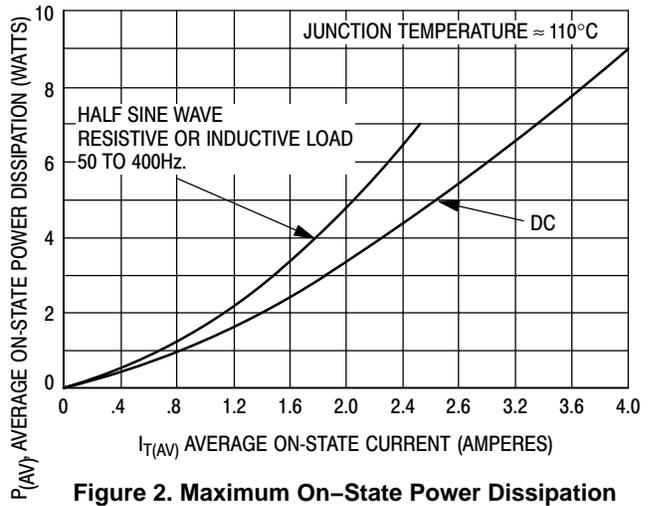
Symbol	Parameter
V <sub>DRM</sub>	Peak Repetitive Off State Forward Voltage
I <sub>DRM</sub>	Peak Forward Blocking Current
V <sub>RDM</sub>	Peak Repetitive Off State Reverse Voltage
I <sub>RDM</sub>	Peak Reverse Blocking Current
V <sub>TM</sub>	Peak On State Voltage
I <sub>H</sub>	Holding Current



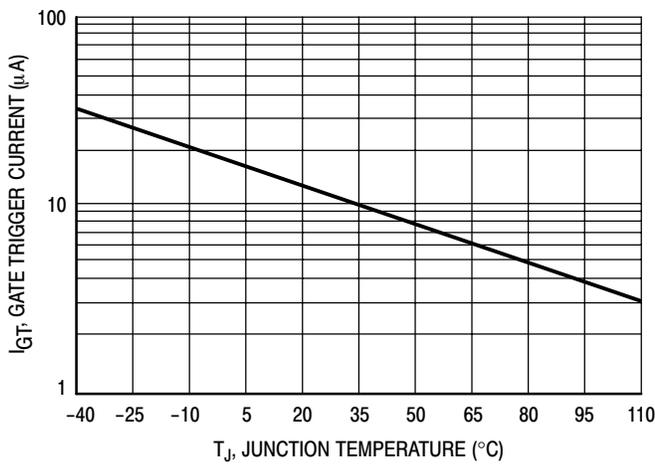
## C106 Series



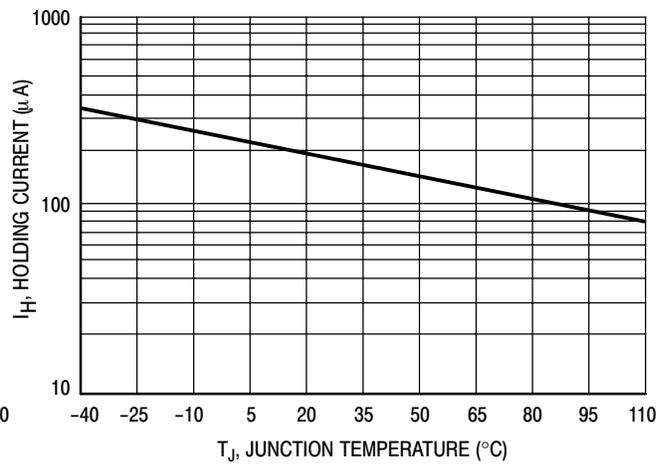
**Figure 1. Average Current Derating**



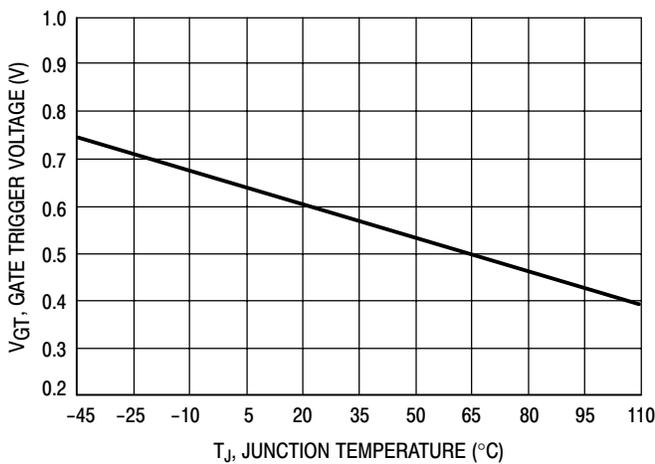
**Figure 2. Maximum On-State Power Dissipation**



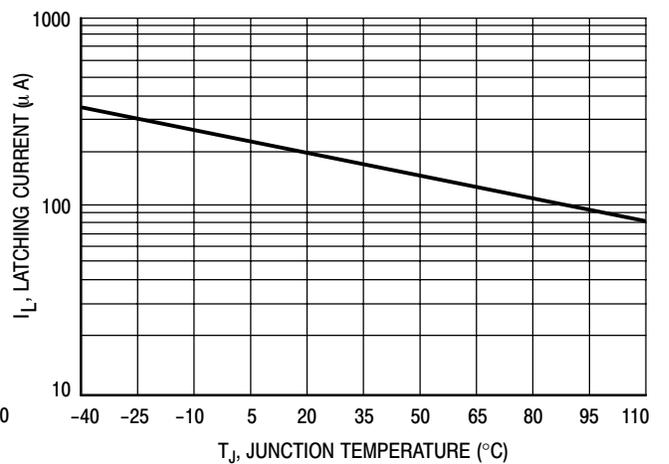
**Figure 3. Typical Gate Trigger Current versus Junction Temperature**



**Figure 4. Typical Holding Current versus Junction Temperature**



**Figure 5. Typical Gate Trigger Voltage versus Junction Temperature**

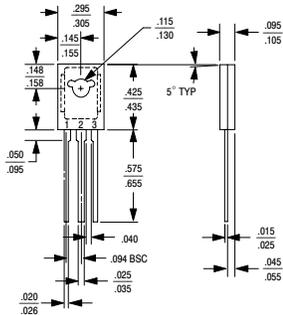


**Figure 6. Typical Latching Current versus Junction Temperature**

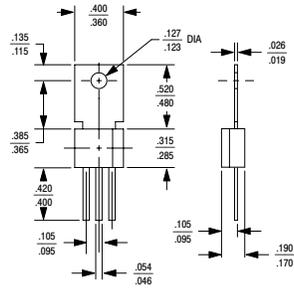
# C106 Series

## 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

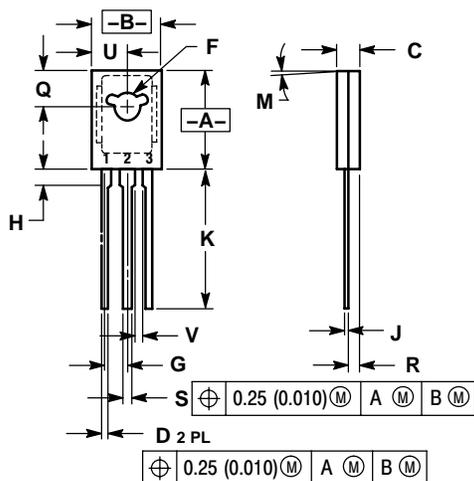


Competitive C-106 Package

# 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.

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:

1. CATHODE
2. ANODE
3. GATE

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