

C106 Series

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
- These are Pb-Free Devices

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 = +25°C) | I _{TSM} | 20 | A |
| Circuit Fusing Considerations (t = 8.3 ms) | I ² t | 1.65 | A ² s |
| 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. |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

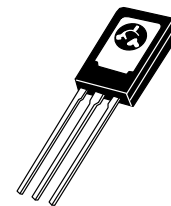
1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that 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.



ON Semiconductor®

<http://onsemi.com>

SCRs
4 A RMS, 200 – 600 Volts



TO-225AA
CASE 077
STYLE 2

MARKING DIAGRAM & PIN ASSIGNMENT



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 5 of this data sheet.

C106 Series

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

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|--------------------|---|---|--------------------------|---------------|
| Peak Repetitive Forward or Reverse Blocking Current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}, R_{GK} = 1 \text{ k}\Omega$) | I_{DRM}, I_{RRM} | - | - | 10 | μA |
| | | | | $T_J = 25^\circ\text{C}$ | 100 |
| | | - | - | | |
| | | - | - | | |

ON CHARACTERISTICS

| | | | | | | |
|---|-----------|-----|---------------------------|------|---------------|--|
| Peak Forward On-State Voltage (Note 3) ($I_{TM} = 4 \text{ A}$) | V_{TM} | - | - | 2.2 | V | |
| Gate Trigger Current (Continuous dc) (Note 4) ($V_{AK} = 6 \text{ Vdc}, R_L = 100 \Omega$) | I_{GT} | - | 15 | 200 | μA | |
| | | | $T_J = 25^\circ\text{C}$ | 35 | 500 | |
| | | - | - | | | |
| Peak Reverse Gate Voltage ($I_{GR} = 10 \mu\text{A}$) | V_{GRM} | - | - | 6.0 | V | |
| Gate Trigger Voltage (Continuous dc) (Note 4) ($V_{AK} = 6 \text{ Vdc}, R_L = 100 \Omega$) | V_{GT} | 0.4 | 0.60 | 0.8 | V | |
| | | | $T_J = 25^\circ\text{C}$ | 0.5 | 1.0 | |
| | | - | - | | | |
| Gate Non-Trigger Voltage (Continuous dc) (Note 4) ($V_{AK} = 12 \text{ V}, R_L = 100 \Omega, T_J = 110^\circ\text{C}$) | V_{GD} | 0.2 | - | - | V | |
| Latching Current ($V_{AK} = 12 \text{ V}, I_G = 20 \text{ mA}, R_{GK} = 1 \text{ k}\Omega$) | I_L | - | 0.20 | 5.0 | mA | |
| | | | $T_J = 25^\circ\text{C}$ | 0.35 | 7.0 | |
| | | - | - | | | |
| Holding Current ($V_D = 12 \text{ Vdc}$) (Initiating Current = 20 mA, $R_{GK} = 1 \text{ k}\Omega$) | I_H | - | 0.19 | 3.0 | mA | |
| | | | $T_J = 25^\circ\text{C}$ | 0.33 | 6.0 | |
| | | | $T_J = -40^\circ\text{C}$ | 0.07 | 2.0 | |
| | | - | - | | | |

DYNAMIC CHARACTERISTICS

| | | | | | |
|---|---------|---|-----|---|------------------------|
| Critical Rate-of-Rise of Off-State Voltage ($V_{AK} = \text{Rated } V_{DRM}, \text{ Exponential Waveform}, R_{GK} = 1 \text{ k}\Omega, T_J = 110^\circ\text{C}$) | dv/dt | - | 8.0 | - | $\text{V}/\mu\text{s}$ |
|---|---------|---|-----|---|------------------------|

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

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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 |

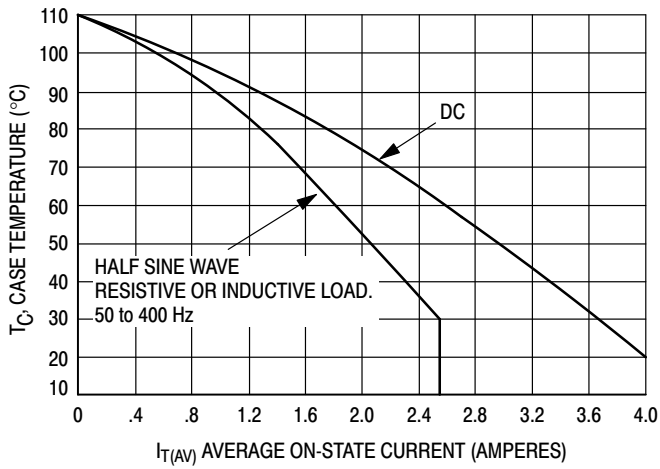
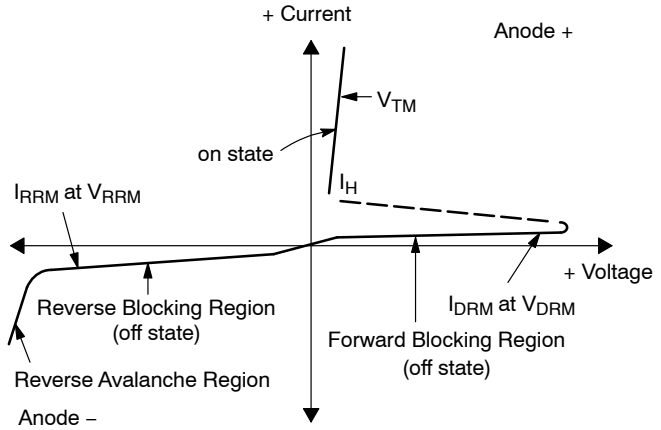


Figure 1. Average Current Derating

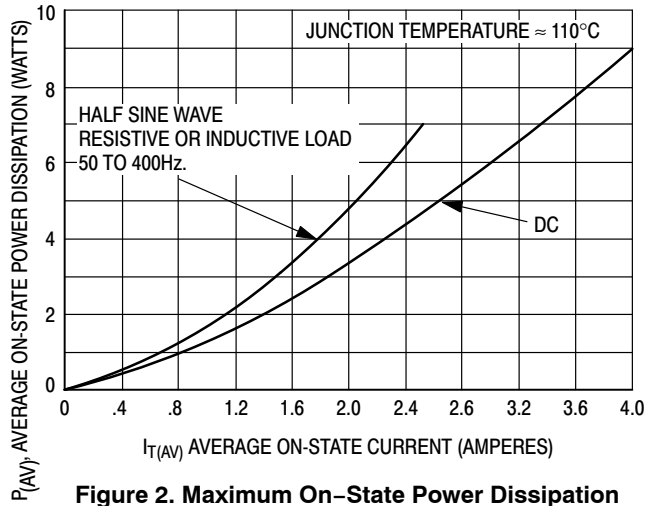


Figure 2. Maximum On-State Power Dissipation

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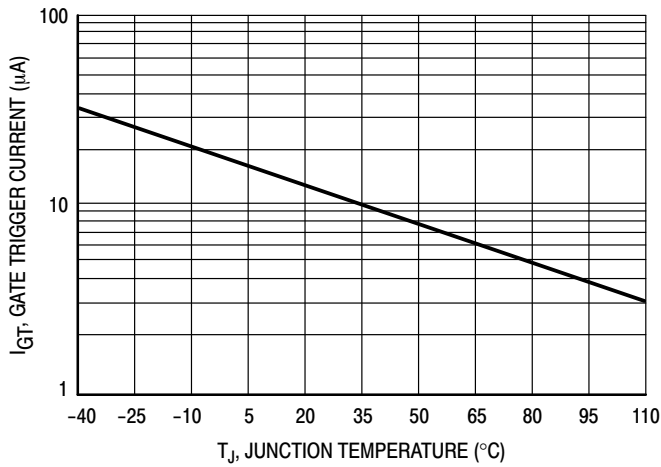


Figure 3. Typical Gate Trigger Current versus Junction Temperature

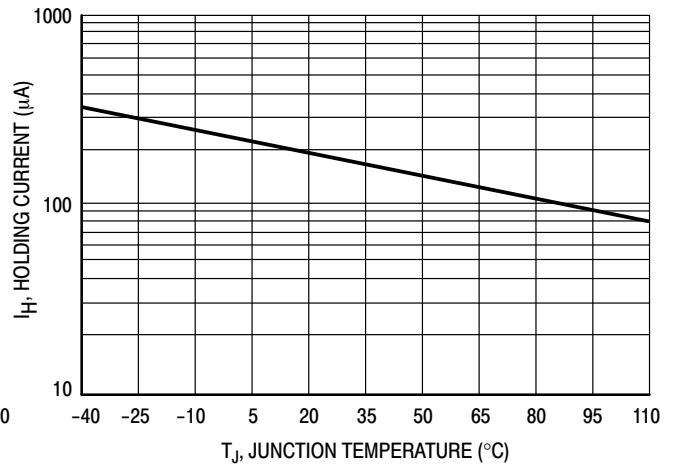


Figure 4. Typical Holding Current versus Junction Temperature

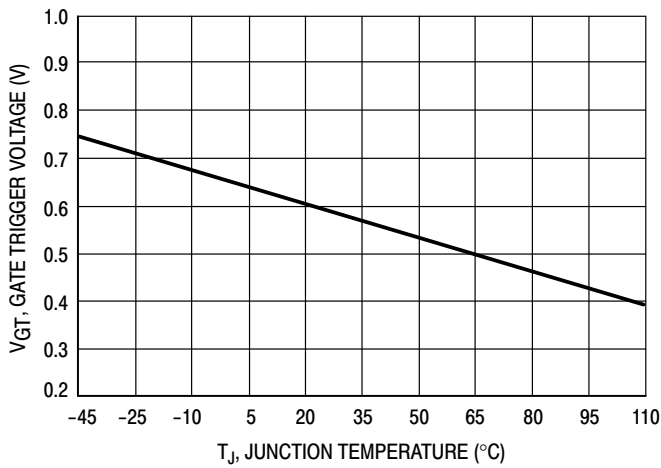


Figure 5. Typical Gate Trigger Voltage versus Junction Temperature

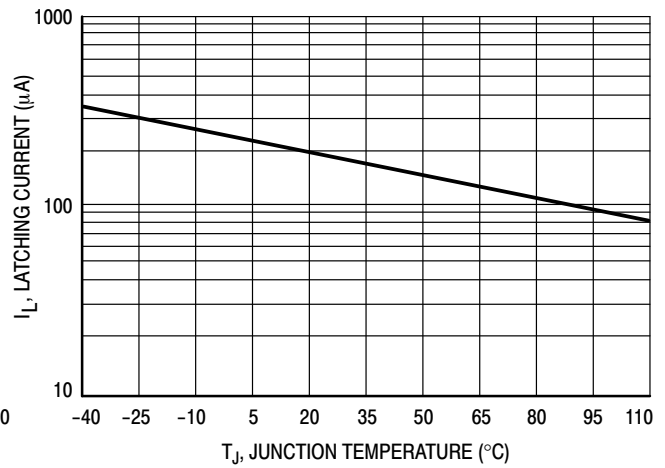
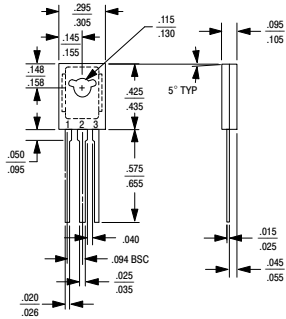


Figure 6. Typical Latching Current versus Junction Temperature

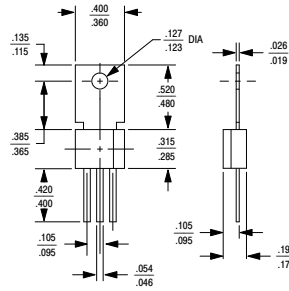
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PACKAGE INTERCHANGEABILITY

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

ORDERING INFORMATION

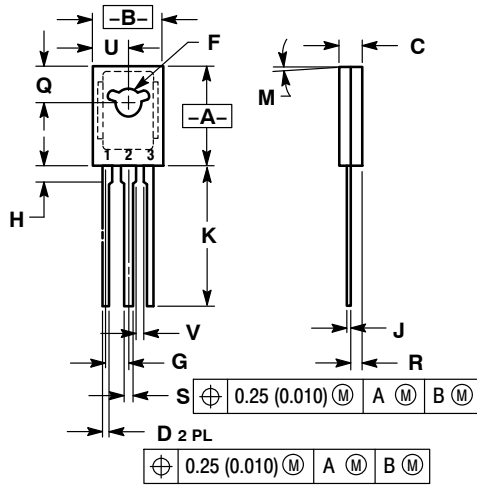
| Device | Package | Shipping† |
|----------|-----------------------|-----------------|
| C106BG | TO-225AA (Pb-Free) | 500 Units / Box |
| C106DG | TO-225AA (Pb-Free) | 500 Units / Box |
| C106D1G* | TO-225AA (Pb-Free) | 500 Units / Box |
| C106MG | TO-225AA (Pb-Free) | 500 Units / Box |
| C106M1G* | TO-225AA (Pb-Free) | 500 Units / Box |

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

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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