

SCRs

0.5 Amp, Planar

2N3027-2N3032



SOLID STATE INC.

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FEATURES

- Low On-State Voltage and Fast Switching at High Current Levels
- Typical Turn-On Time: $0.12\mu\text{s}$
- Typical Recovery Time: $0.7\mu\text{s}$
- Pulse Currents: to 30A

DESCRIPTION

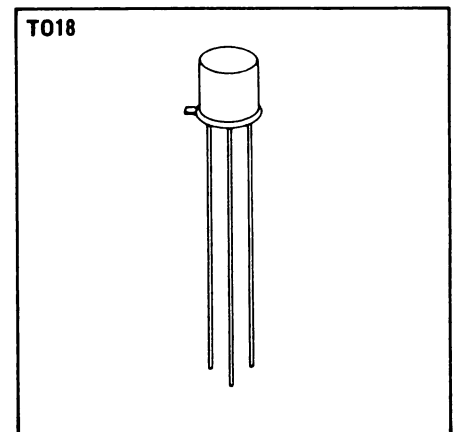
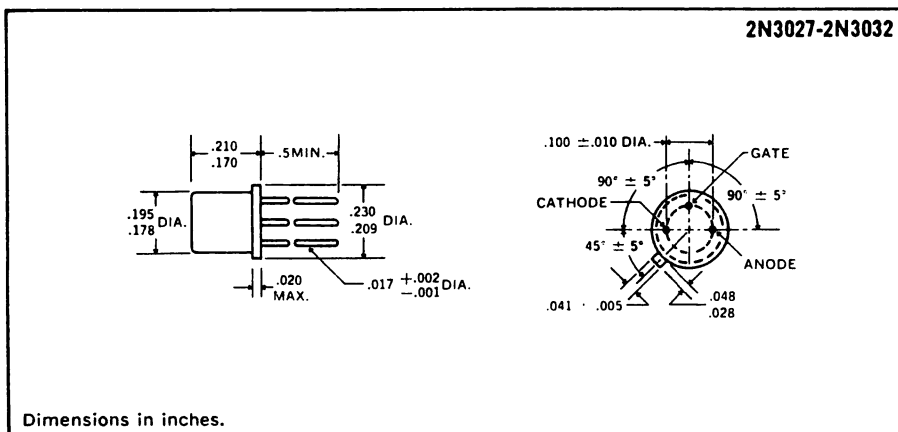
The 2N3027 series of planar SCRs (controlled switches)

ABSOLUTE MAXIMUM RATINGS

| | 2N3027 2N3030 | 2N3028 2N3031 | 2N3029 2N3032 |
|--|------------------|------------------|------------------|
| Repetitive Peak Off-State Voltage, V_{DRM} | 30V | 60V | 100V |
| Repetitive Peak Reverse Voltage, V_{RRM} | 30V | 60V | 100V |
| D.C. On-State Current, I_T | | | |
| 100°C Case | | 500mA | |
| 75°C Ambient | | 250mA | |
| Repetitive Peak On-State Current, I_{TRM} | | 30A | |
| Surge (Non-Rep.) On-State Current, I_{TSM} | | | |
| 50ms | | 5A | |
| 8ms | | 8A | |
| Peak Gate Current, I_{GM} | | 250mA | |
| Average Gate Current, $I_{G(AV)}$ | | 25mA | |
| Reverse Gate Voltage | | 5V | |
| Reverse Gate Current | | 3mA | |
| Storage Temperature Range | | -65°C to +200°C | |
| Operating Temperature Range | | -65°C to +150°C | |

Note: Blocking voltage ratings apply over the operating temperature range, provided the gate is connected to the cathode through an appropriate resistor, or adequate gate bias is used. (See section on bias stabilization.)

MECHANICAL SPECIFICATIONS



ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

2N3027 — 2N3028 — 2N3029

| Parameter | Symbol | Min. | Typical | Max. | Units | Test Conditions |
|---|--------------|------|---------|------|------------|--|
| (25°C Tests) | | | | | | |
| Off-State Current | I_{DRM} | — | .002 | 0.1 | μA | $R_{GK} = 1K, V_{DRM} = \text{Rating}$ |
| Reverse Current | I_{RRM} | — | .002 | 0.1 | μA | $R_{GK} = 1K, V_{RRM} = \text{Rating}$ |
| Reverse Gate Voltage | V_{GR} | 5 | 8 | — | V | $I_{GR} = 0.1mA$ |
| Gate Trigger Current | I_{GT} | —5 | 8 | 20 | μA | $R_{GS} = 10K, V_D = 5V$ |
| Gate Trigger Voltage | V_{GT} | .44 | .52 | .60 | V | $R_{GS} = 100\Omega, V_D = 5V$ |
| On-State Voltage | V_T | 0.8 | 1.2 | 1.5 | V | $i_T = 1A$ (pulse test) |
| Holding Current | I_H | 0.3 | 0.7 | 4.0 | mA | $R_{GK} = 1K, V_D = 5V$ |
| (25°C Tests) | | | | | | |
| Off-State Voltage — Critical Rate of Rise | dv_c/dt | 30 | 60 | — | V/ μs | $R_{GK} = 1K, V_D = 30V$ |
| Gate Trigger—on Pulse Width | $t_{pg(on)}$ | — | .05 | 0.1 | μs | $I_G = 10mA, I_T = 1A, V_{DM} = 30V$ |
| Delay Time | t_d | — | .08 | — | μs | $I_G = 10mA, I_T = 1A, V_D = 30V$ |
| Rise Time | t_r | — | .04 | — | μs | $I_G = 10mA, I_T = 1A, V_D = 30V$ |
| Circuit Commutated Turn-off Time | t_q | — | 0.7 | 2.0 | μs | $I_T = 1A, i_R = 1A, R_{GK} = 1K$ |

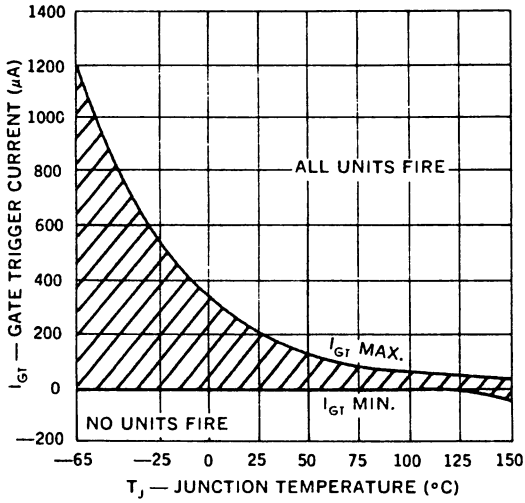
ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

2N3030 — 2N3031 — 2N3032

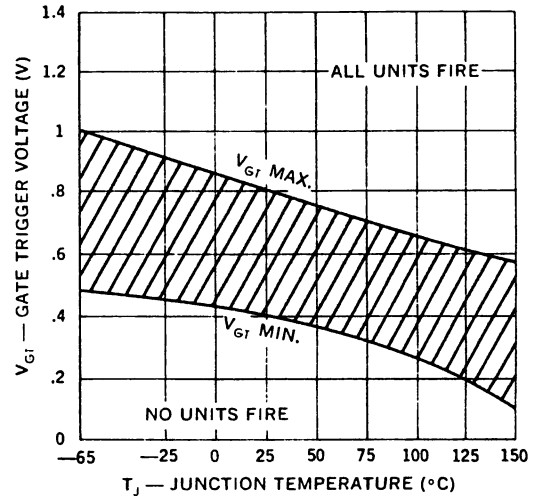
| Parameter | Symbol | Min. | Typical | Max. | Units | Test Conditions |
|---|--------------|------|---------|------|------------|--|
| (25°C Tests) | | | | | | |
| Off-State Current | I_{DRM} | — | .002 | 0.1 | μA | $R_{GK} = 1K, V_{DRM} = \text{Rating}$ |
| Reverse Current | I_{RRM} | — | .002 | 0.1 | μA | $R_{GK} = 1K, V_{RRM} = \text{Rating}$ |
| Reverse Gate Voltage | V_{GR} | 5 | 8 | — | V | $I_{GR} = 0.1mA$ |
| Gate Trigger Current | I_{GT} | —5 | 50 | 200 | μA | $R_{GS} = 10K, V_D = 5V$ |
| Gate Trigger Voltage | V_{GT} | .40 | .55 | .80 | V | $R_{GS} = 100\Omega, V_D = 5V$ |
| On-State Voltage | V_T | 0.8 | 1.2 | 1.5 | V | $i_T = 1A$ (pulse test) |
| Holding Current | I_H | 0.3 | 1.0 | 5.0 | mA | $R_{GK} = 1K, V_D = 5V$ |
| (25°C Tests) | | | | | | |
| Off-State Voltage — Critical Rate of Rise | dv_c/dt | 30 | 60 | — | V/ μs | $R_{GK} = 1K, V_D = 30V$ |
| Gate Trigger—on Pulse Width | $t_{pg(on)}$ | — | .07 | 0.2 | μs | $I_G = 10mA, I_T = 1A, V_D = 30V$ |
| Delay Time | t_d | — | 0.1 | — | μs | $I_G = 10mA, I_T = 1A, V_D = 30V$ |
| Rise Time | t_r | — | .05 | — | μs | $I_G = 10mA, I_T = 1A, V_D = 30V$ |
| Circuit Commutated Turn-off Time | t_q | — | 0.7 | 2.0 | μs | $I_T = 1A, i_R = 1A, R_{GK} = 1K$ |

TYPICAL CHARACTERISTICS
2N3027 — 2N3028 — 2N3029

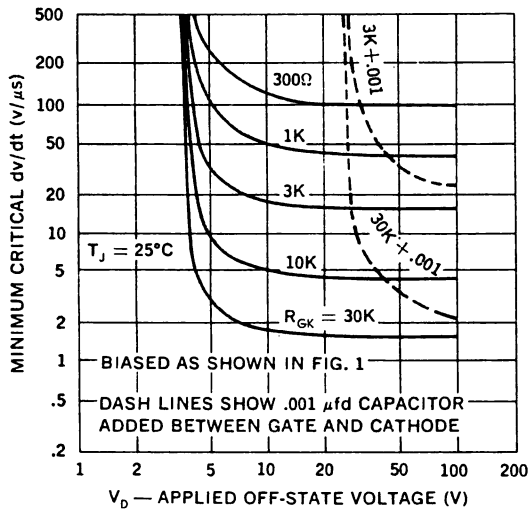
1 Gate Trigger Current



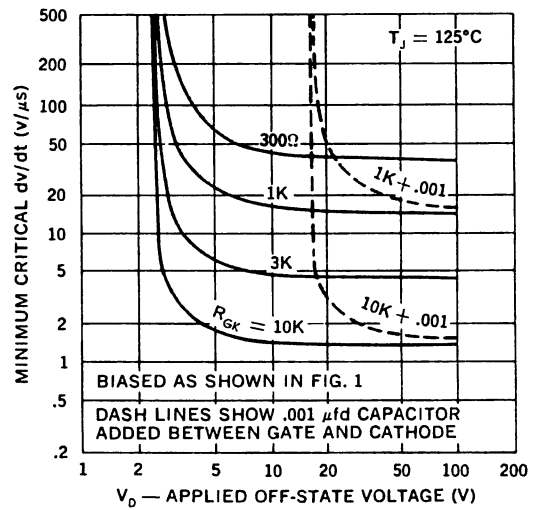
2 Gate Trigger Voltage



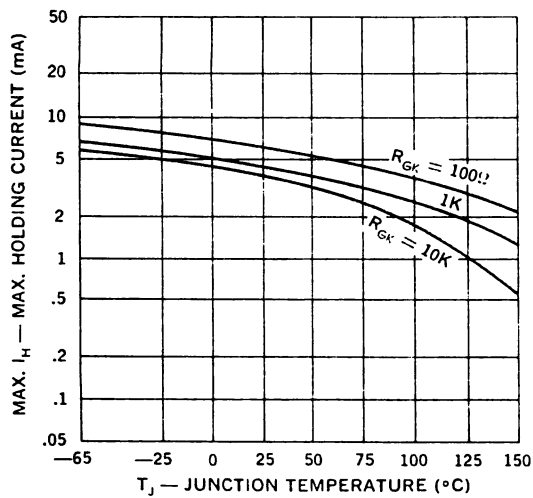
3 Min. Critical dv/dt (25°C — R Bias)



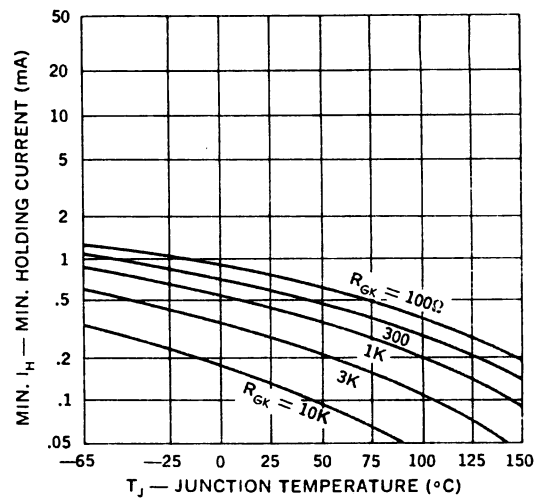
4 Min. Critical dv/dt (125°C — R Bias)



5 Max. Holding Current (Resistor Bias)

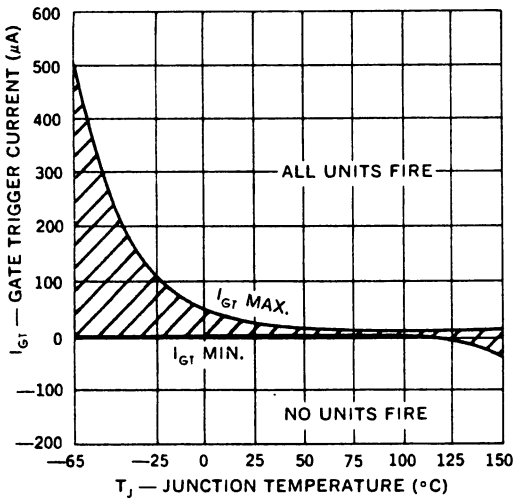


6 Min. Holding Current (Resistor Bias)

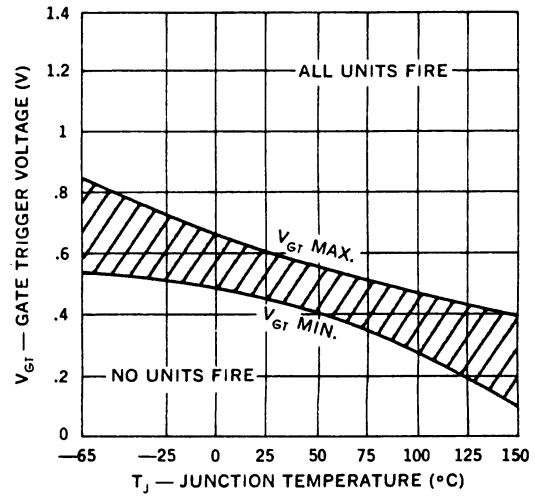


TYPICAL CHARACTERISTICS
2N3030 — 2N3031 — 2N3032

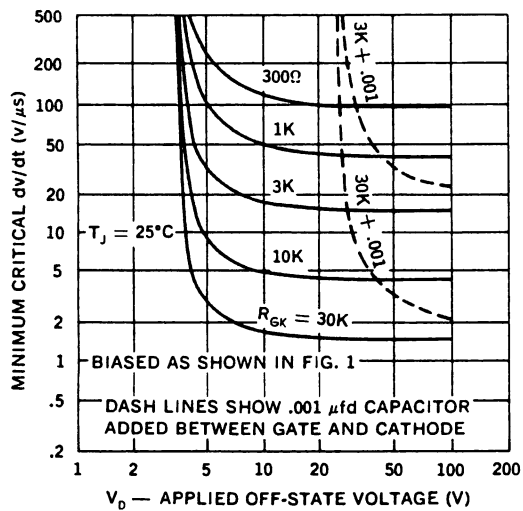
1 Gate Trigger Current



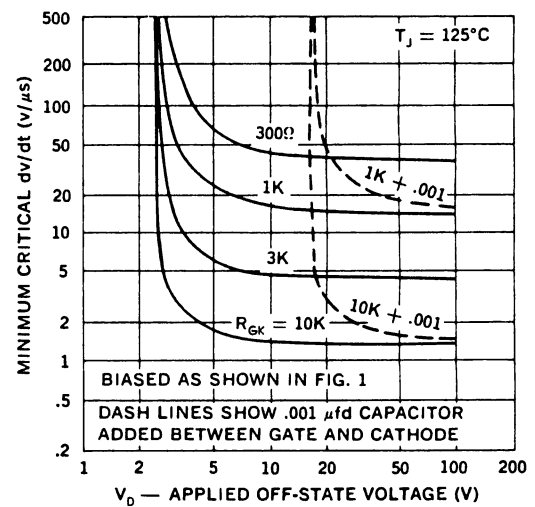
2 Gate Trigger Voltage



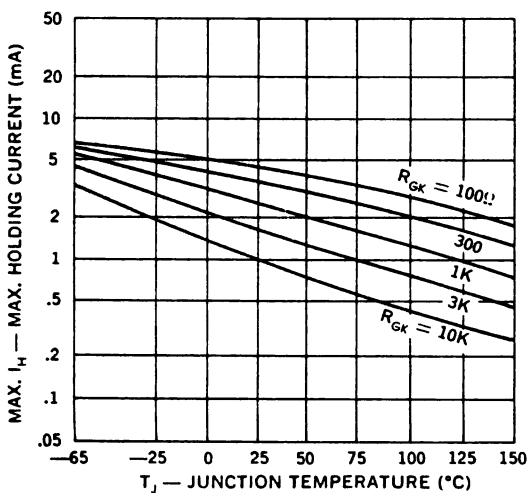
3 Min. Critical dv/dt (25°C — R Bias)



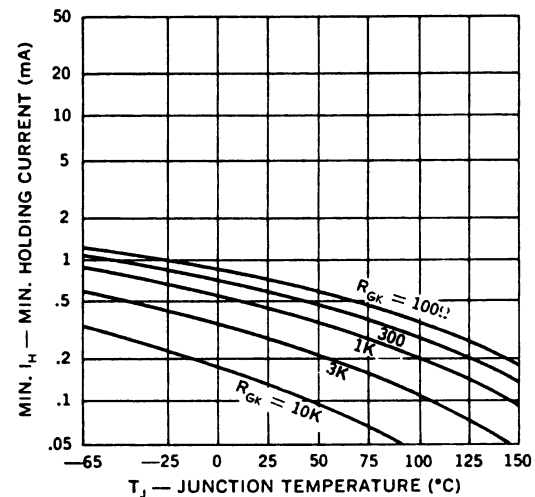
4 Min. Critical dv/dt (125°C — R Bias)



5 Max. Holding Current (Resistor Bias)

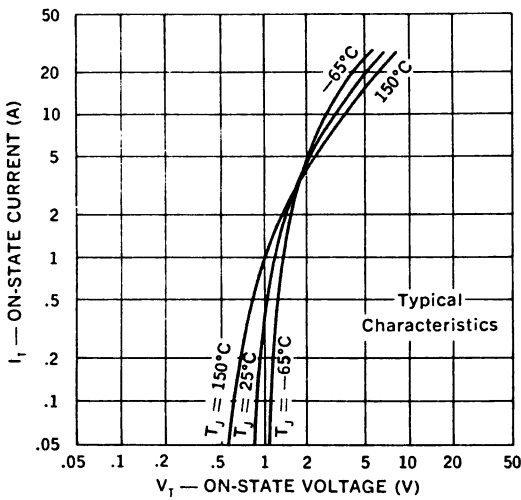


6 Min. Holding Current (Resistor Bias)

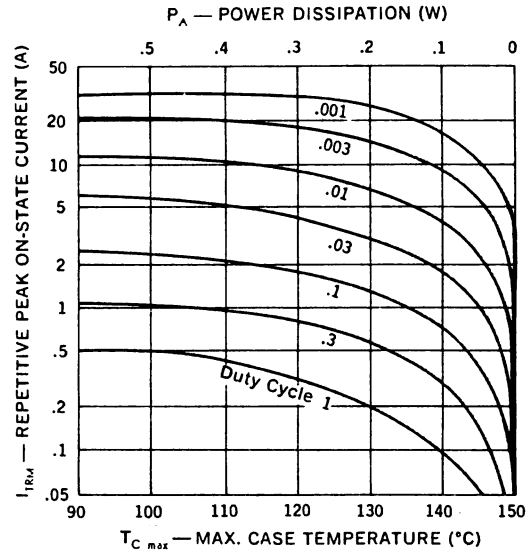


CURRENT RATINGS

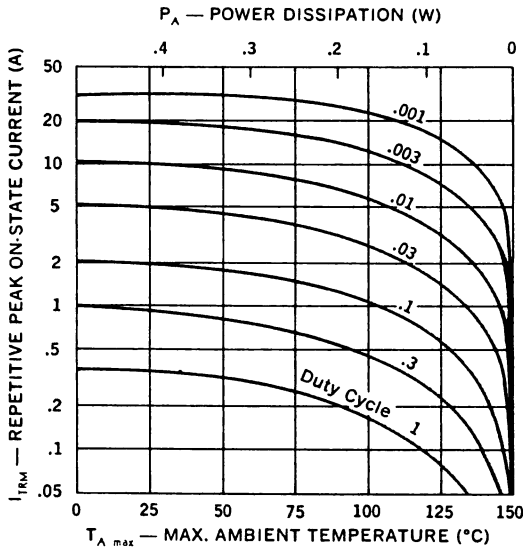
C1 Forward on Current vs. Voltage



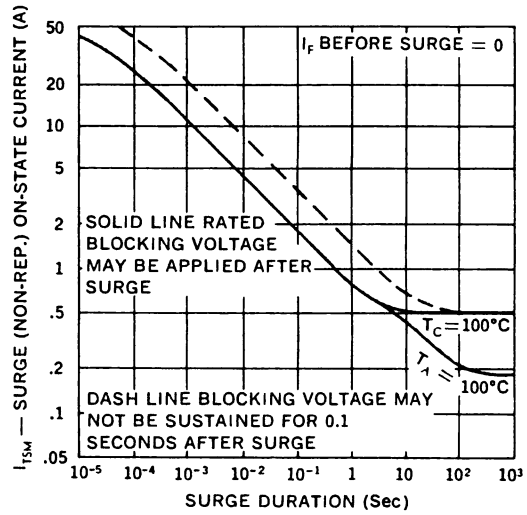
C2 Peak Current vs. Case Temperature



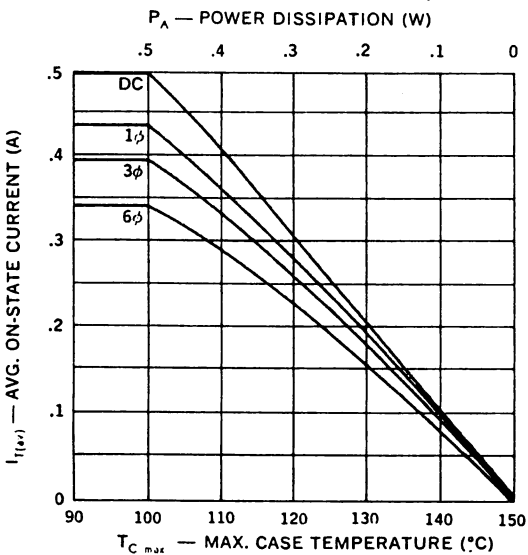
C3 Peak Current vs. Ambient Temperature TO-18 Ratings (see note)



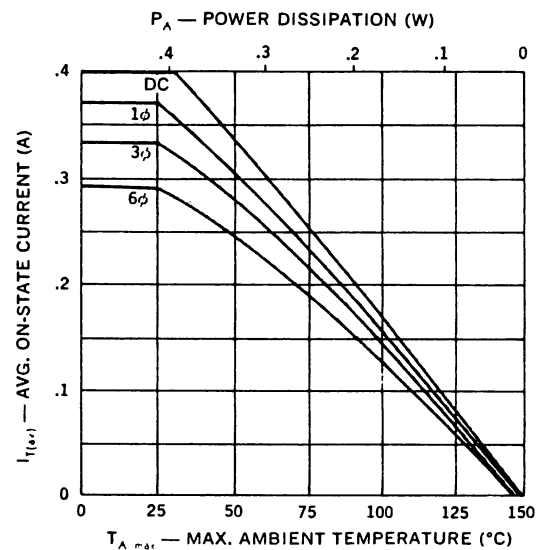
C4 Surge Current vs. Time



C5 Average Current vs. Case Temperature

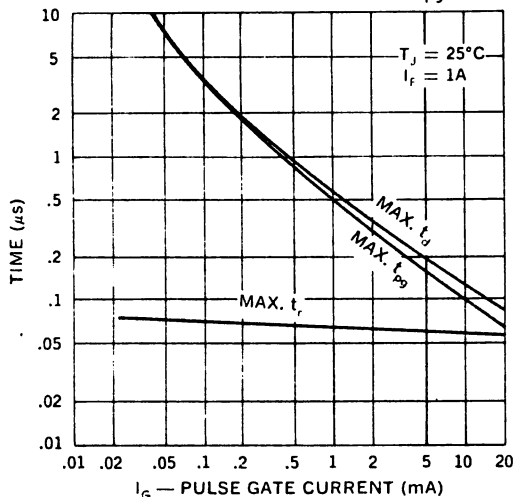


C6 Average Current vs. Ambient Temperature TO-18 Ratings (see note)

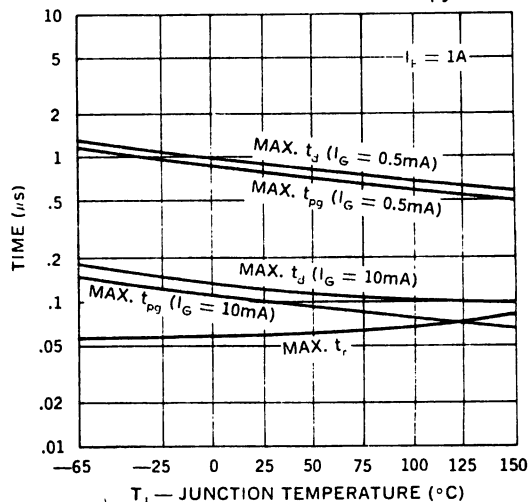


SWITCHING SPEEDS

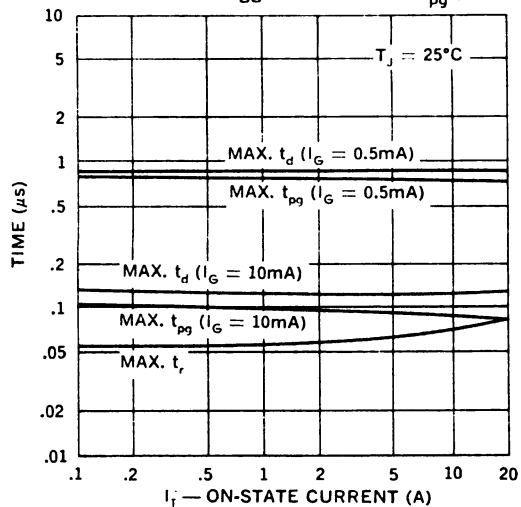
S1 Maximum Delay Time t_d , Rise Time t_r , and Gate Trigger Pulse Width t_{pg} (on)



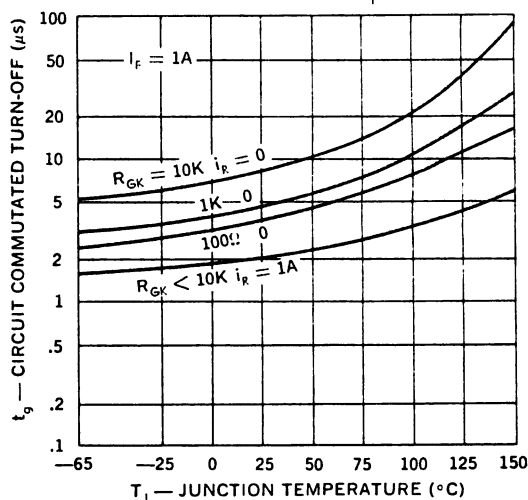
S2 Maximum Delay Time t_d , Rise Time t_r , and Gate Trigger Pulse Width t_{pg} (on)



S3 Maximum Delay Time t_d , Rise Time t_r , and Gate Trigger Pulse Width t_{pg} (on)



S4 Maximum Circuit Commutated Turn-off Time t_q



S5 Maximum Circuit Commutated Turn-off Time t_q

