SCRs

0.5 Amp, Planar

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FEATURES

- Low On-State Voltage and Fast Switching at High Current Levels
- Typical Turn-On Time: 0.12μs
- Typical Recovery Time: 0.7μs
- Pulse Currents: to 30A

DESCRIPTION

The 2N3027 series of planar SCRs (controlled switches)

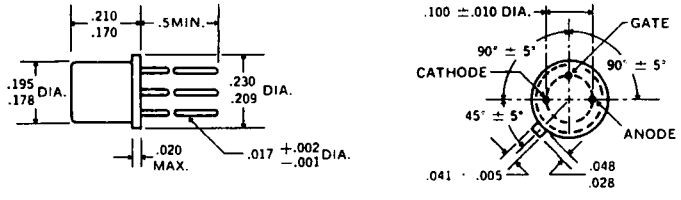
ABSOLUTE MAXIMUM RATINGS

	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.)

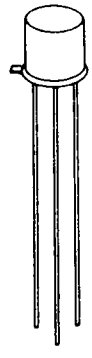
MECHANICAL SPECIFICATIONS

2N3027-2N3032



Dimensions in inches.

TO18



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} = Rating
Reverse Current	I_{RRM}	—	.002	0.1	μA	R_{GK} = 1K, V_{RRM} = 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} = 100Ω, 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

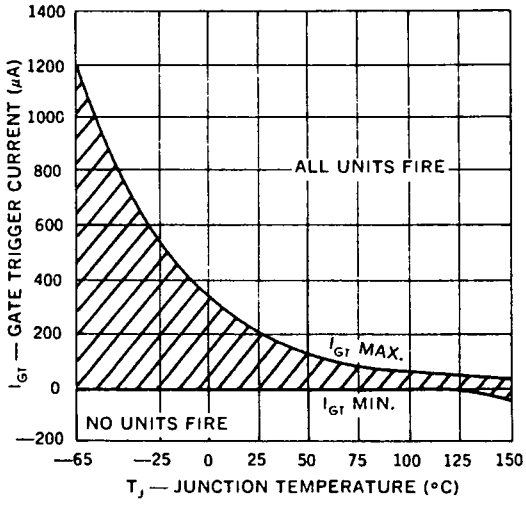
ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

2N3030 — 2N3031 — 2N3032

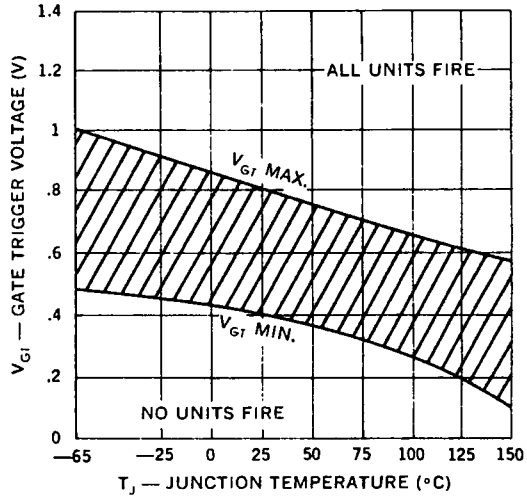
Parameter	Symbol	Min.	Typical	Max.	Units	Test Conditions
(25°C Tests)						
Off-State Current	I_{DRM}	—	.002	0.1	μA	R_{GK} = 1K, V_{DRM} = Rating
Reverse Current	I_{RRM}	—	.002	0.1	μA	R_{GK} = 1K, V_{RRM} = Rating
Reverse Gate Voltage	V_{GR}	5	8	—	V	I_{GR} = 0.1mA
Gate Trigger Current	I_{GT}	−5	50	200	μA	R_{GS} = 10K, V_D = 5V
Gate Trigger Voltage	V_{GT}	.40	.55	.80	V	R_{GS} = 100Ω, 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

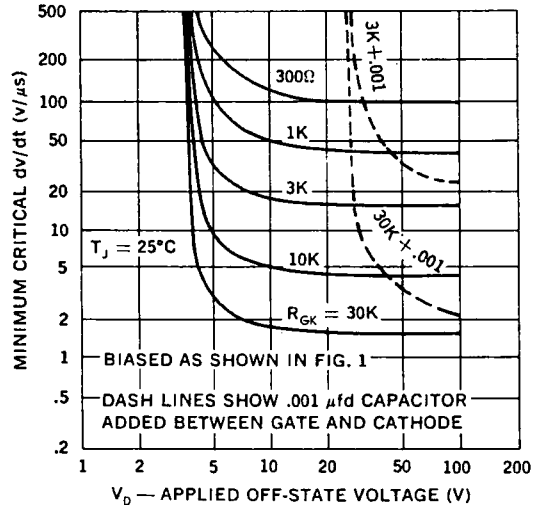
1 Gate Trigger Current



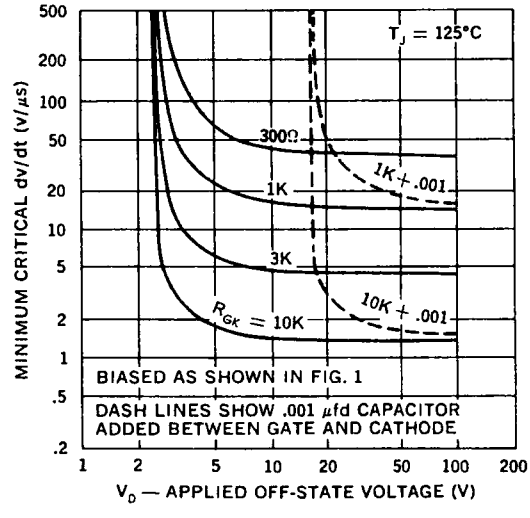
2 Gate Trigger Voltage



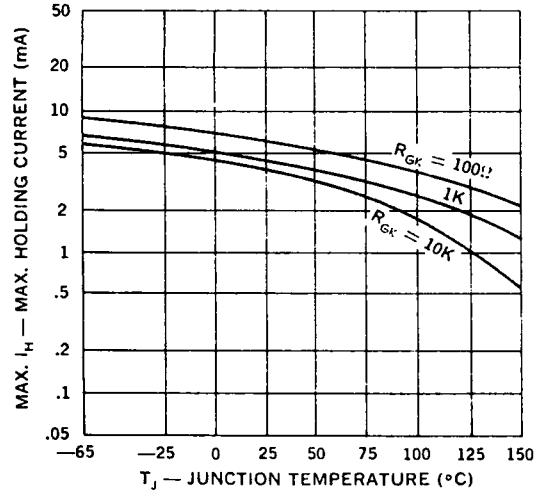
3 Min. Critical dv/dt (25°C — R Bias)



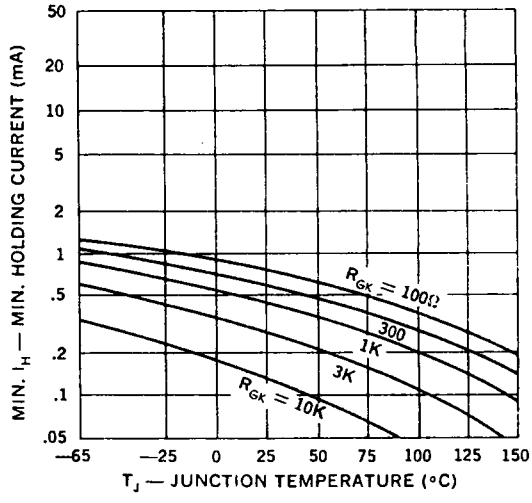
4 Min. Critical dv/dt (125°C — R Bias)



5 Max. Holding Current (Resistor Bias)

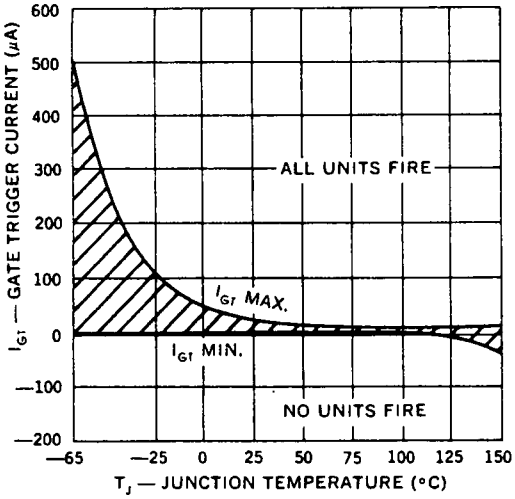


6 Min. Holding Current (Resistor Bias)

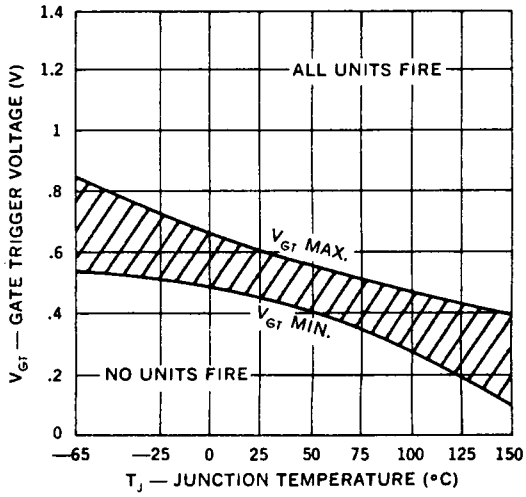


TYPICAL CHARACTERISTICS
2N3030 — 2N3031 — 2N3032

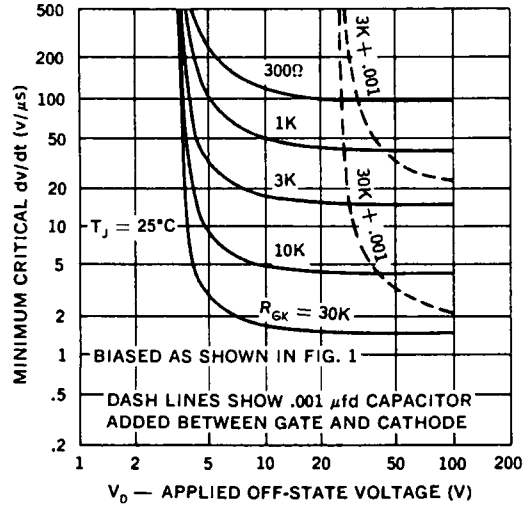
1 Gate Trigger Current



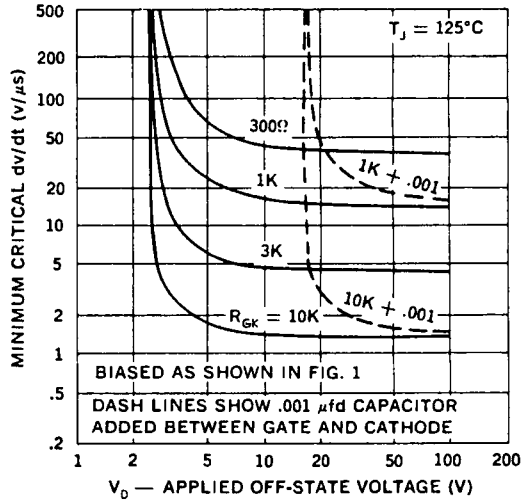
2 Gate Trigger Voltage



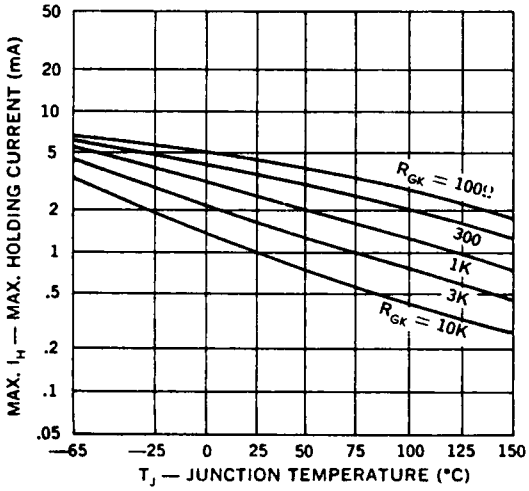
3 Min. Critical dv/dt (25°C — R Bias)



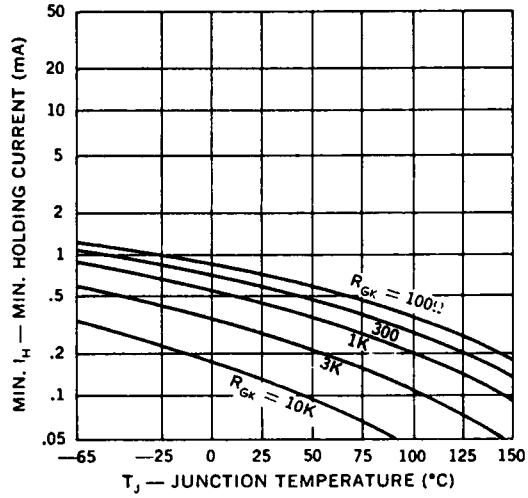
4 Min. Critical dv/dt (125°C — R Bias)



5 Max. Holding Current (Resistor Bias)

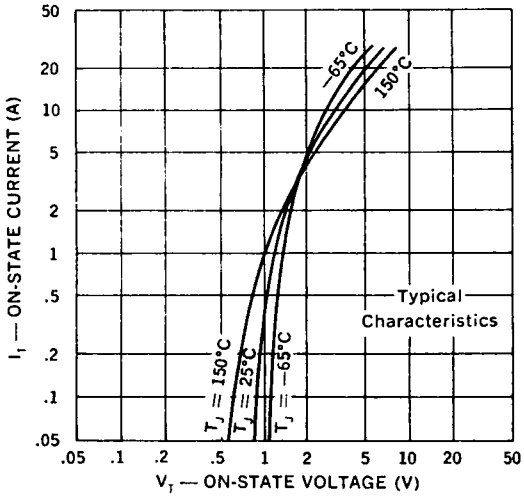


6 Min. Holding Current (Resistor Bias)

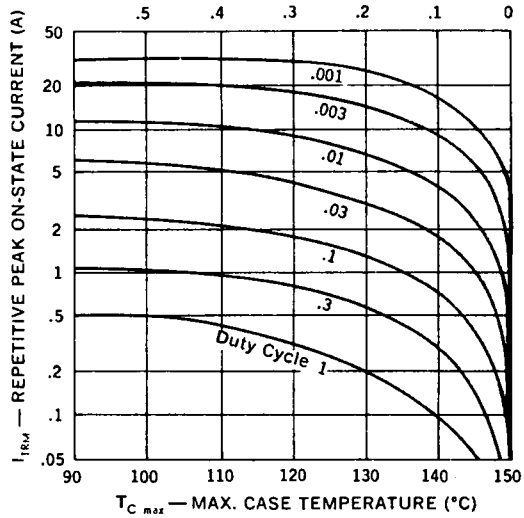


CURRENT RATINGS

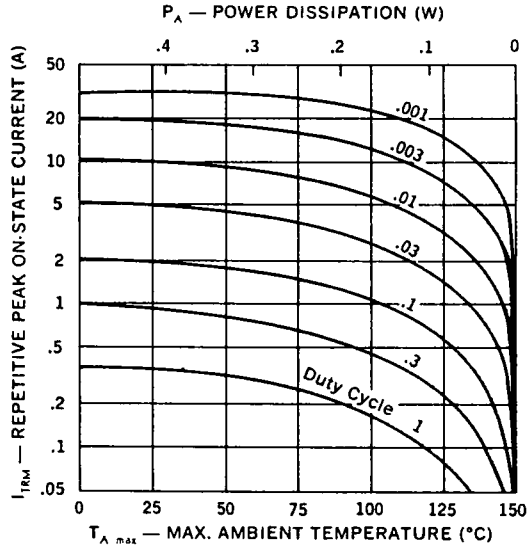
C1 Forward on Current vs. Voltage



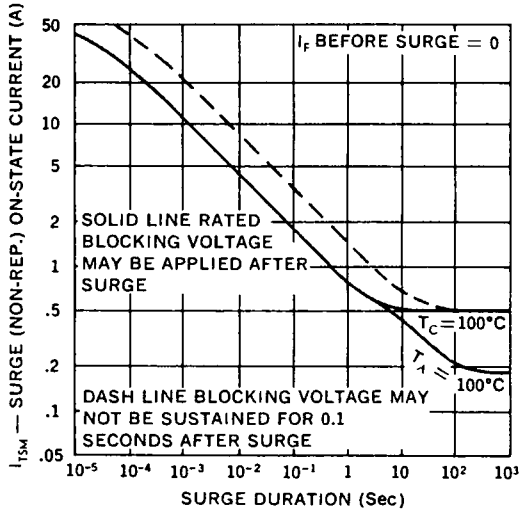
C2 Peak Current vs. Case Temperature



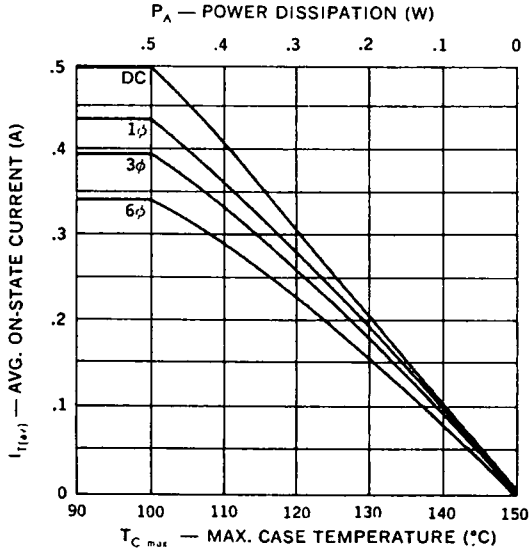
C3 Peak Current vs. Ambient Temperature TO-18 Ratings (see note)



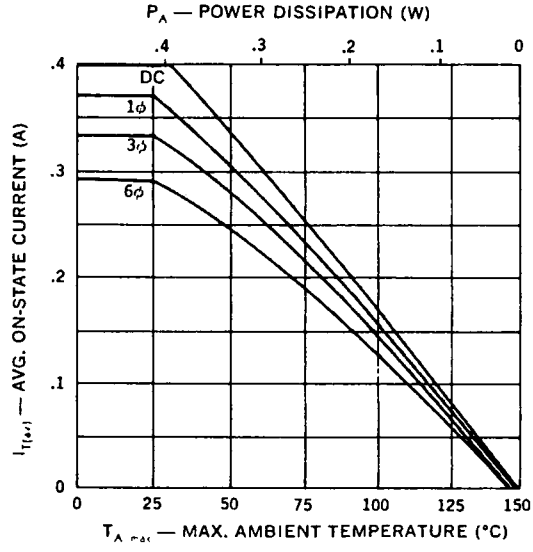
C4 Surge Current vs. Time



C5 Average Current vs. Case Temperature

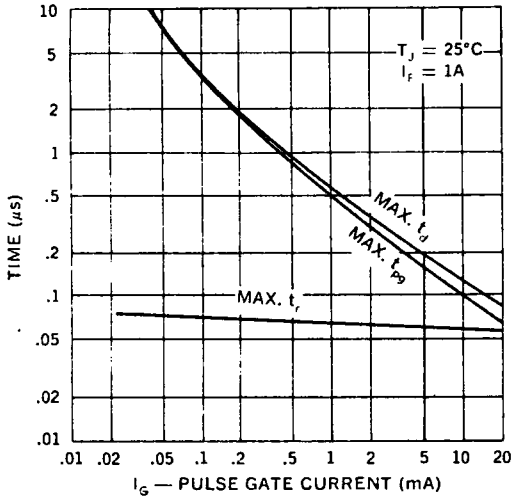


C6 Average Current vs. Ambient Temperature TO-18 Ratings (see note)

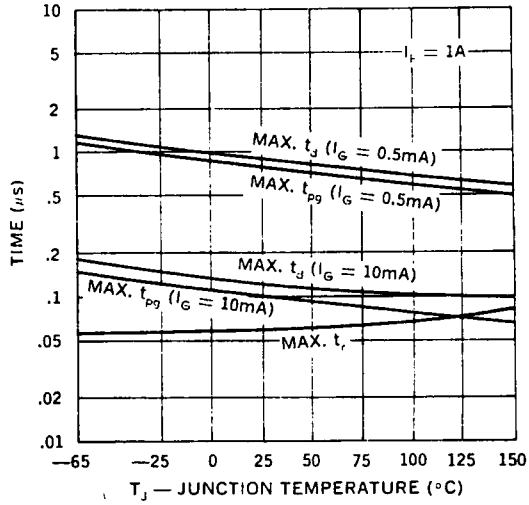


SWITCHING SPEEDS

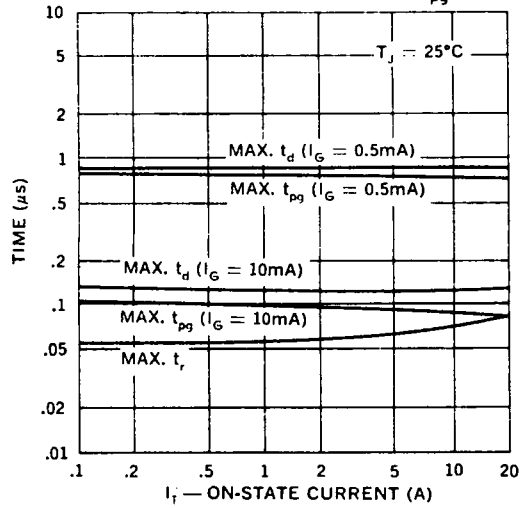
S1 Maximum Delay Time t_d, Rise Time t_r, and Gate Trigger Pulse Width t_{pg} (on)



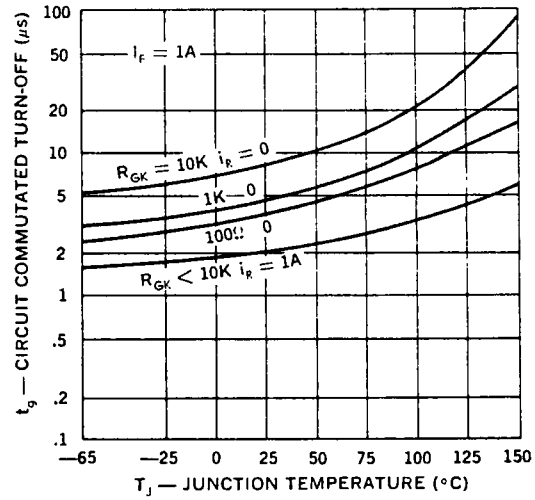
S2 Maximum Delay Time t_d, Rise Time t_r, and Gate Trigger Pulse Width t_{pg} (on)



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