

DIGITRON SEMICONDUCTORS

2N5060-2N5064

SENSITIVE GATE SILICON CONTROLLED RECTIFIERS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Peak repetitive off-state voltage ⁽¹⁾ (T _J = -40 to +110°C, sine wave, 50 to 60 Hz, gate open)	2N5060	V _{DRM}	30	V
	2N5061		60	
	2N5062	V _{RDM}	100	
	2N5064		200	
On-state current RMS (180° conduction angles, T _C = 80°C)		I _{T(RMS)}	0.8	A
Average on-state current (180° conduction angles) (T _C = 67°C) (T _C = 102°C)		I _{T(AV)}	0.51	A
			0.255	
Peak non-repetitive surge current (T _A = 25°C) (1/2 cycle, sine wave, 60Hz)		I _{TSM}	10	A
Circuit fusing considerations (t = 8.3 ms)		I ² t	0.4	A ² s
Average on-state current (180° conduction angles) (T _C = 67°C) (T _C = 102°C)		I _{T(AV)}	0.51	A
			0.255	
Forward peak gate power (Pulse width ≤ 1.0μsec; T _A = 25°C)		P _{GM}	0.1	W
Forward average gate power (T _A = 25°C, t = 8.3ms)		P _{G(AV)}	0.01	W
Forward peak gate current (Pulse width ≤ 1.0μsec; T _A = 25°C)		I _{GM}	1.0	A
Reverse peak gate voltage (Pulse width ≤ 1.0μsec; T _A = 25°C)		V _{RGM}	5.0	V
Operating junction temperature range		T _J	-40 to +110	°C
Storage temperature range		T _{stg}	-40 to +150	°C

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_{RDM} 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.

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal resistance, junction to case	R _{θJC}	75	°C/W
Thermal resistance, junction to ambient	R _{θJA}	200	°C/W
Lead solder temperature (lead length ≥ 1/16" from case, 10 s max.)	-	230	°C

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

Characteristics		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak repetitive forward or reverse blocking current ⁽²⁾ (V _{AK} = Rated V _{DRM} or V _{RDM})	T _C = 25°C	I _{DRM} , I _{RDM}	-	-	10	μA
	T _C = 110°C		-	-	50	
ON CHARACTERISTICS						
Peak forward on-state voltage ⁽³⁾ (I _{TM} = 1.2 A peak @ T _A = 25°C)		V _{TM}	-	-	1.7	V
Gate trigger current (continuous DC) ⁽⁴⁾ (V _{AK} = 7.0 Vdc, R _L = 100 Ω)	T _C = 25°C	I _{GT}	-	-	200	μA
	T _C = -40°C		-	-	350	
Gate trigger voltage (continuous DC) ⁽⁴⁾ (V _{AK} = 7.0 Vdc, R _L = 100 Ω)	T _C = 25°C	V _{GT}	-	-	0.8	V
	T _C = -40°C		-	-	1.2	
Gate non-trigger voltage (V _{AK} = rated V _{DRM} , R _L = 100 Ω) T _C = 110°C		V _{GD}	0.1	-	-	V

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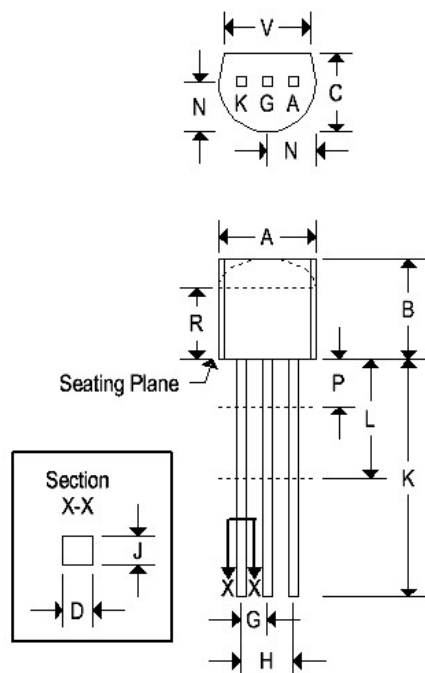
SENSITIVE GATE SILICON CONTROLLED RECTIFIERS

Characteristics	Symbol	Min	Typ	Max	Unit	
ON CHARACTERISTICS						
Holding current ⁽⁴⁾ ($V_{AK} = 7.0$ Vdc, initiating current = 20mA)	$T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$	I_H	-	-	5.0 10	mA
Turn-on time Delay time Rise time ($I_{GT} = 1.0$ mA, $V_D = \text{rated } V_{DRM}$, forward current = 1.0 A, $di/dt = 6.0$ A/ μs)		t_d t_r	-	3.0 0.2	-	μs
Turn-off time (forward current = 1.0 A pulse, Pulse width = 50 μs , 0.1% duty cycle, $di/dt = 6.0$ A/ μs , $dv/dt = 20$ V/ μs , $I_{GT} = 1$ mA)	2N5060, 2N5061 2N5062, 2N5064	t_q	-	10 30	-	μs
DYNAMIC CHARACTERISTICS						
Critical rate of rise of off-state voltage (Rated V_{DRM} , exponential)		dv/dt	-	30	-	V/ μs

2. $R_{GK} = 1000\Omega$ is included in measurement.
3. Forward current applied for 1 ms maximum duration, duty cycle $\leq 1\%$.
4. R_{GK} current is not included in measurement.

MECHANICAL CHARACTERISTICS

Case	TO-92
Marking	Alpha-numeric
Pin out	See below



	TO-92			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.175	0.205	4.450	5.200
B	0.170	0.210	4.320	5.330
C	0.125	0.165	3.180	4.190
D	0.016	0.022	0.410	0.550
F	0.016	0.019	0.410	0.480
G	0.045	0.055	1.150	1.390
H	0.095	0.105	2.420	2.660
J	0.015	0.020	0.390	0.500
K	0.500	-	12.700	-
L	0.250	-	6.350	-
N	0.080	0.105	2.040	2.660
P	-	0.100	-	2.540
R	0.115	-	2.930	-
V	0.135	-	3.430	-

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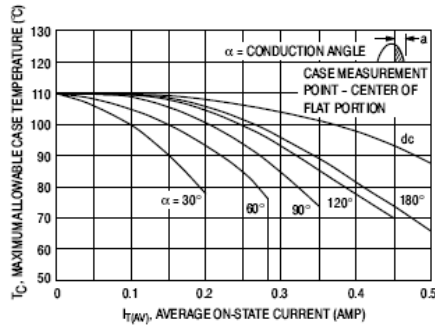


Figure 1. Maximum Case Temperature

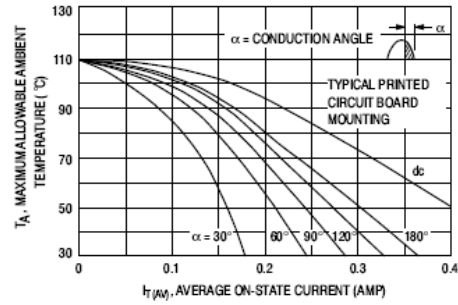


Figure 2. Maximum Ambient Temperature

CURRENT DERATING

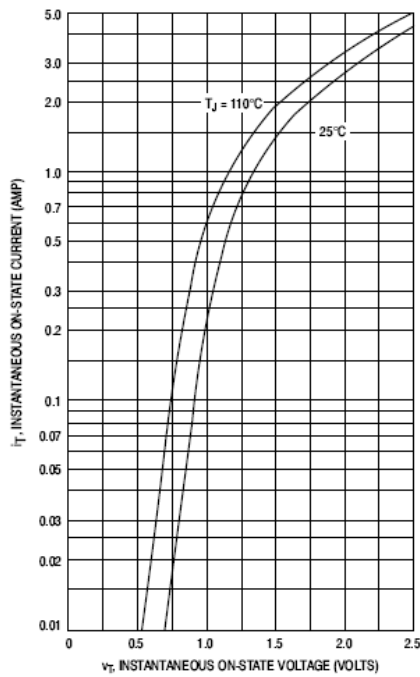


Figure 3. Typical Forward Voltage

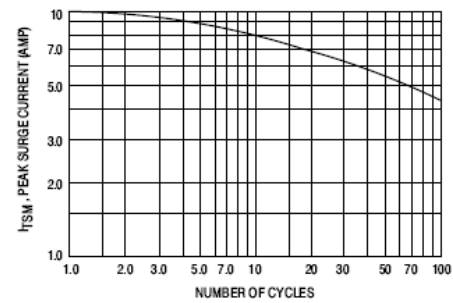


Figure 4. Maximum Non-Repetitive Surge Current

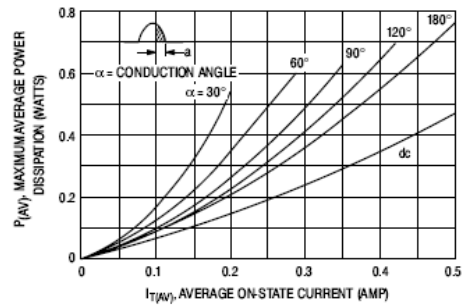


Figure 5. Power Dissipation

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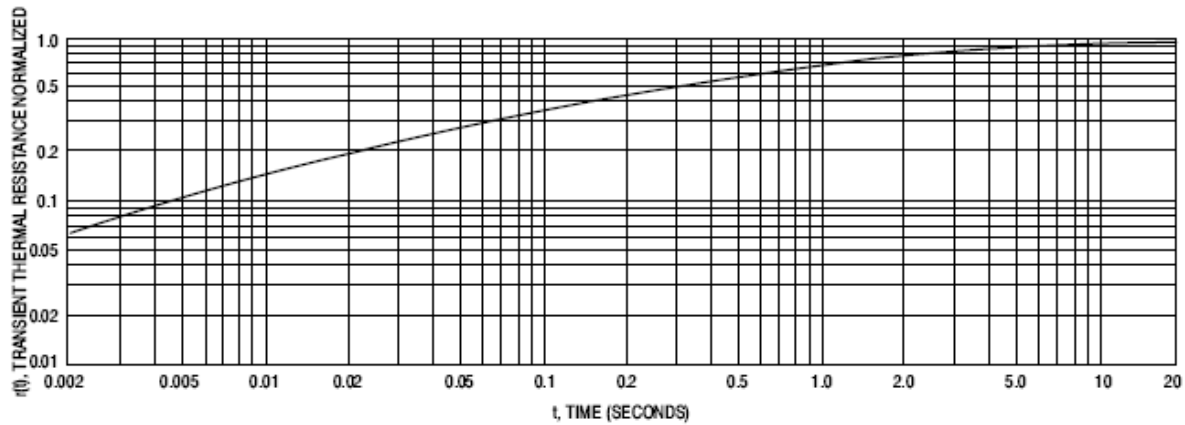


Figure 6. Thermal Response

TYPICAL CHARACTERISTICS

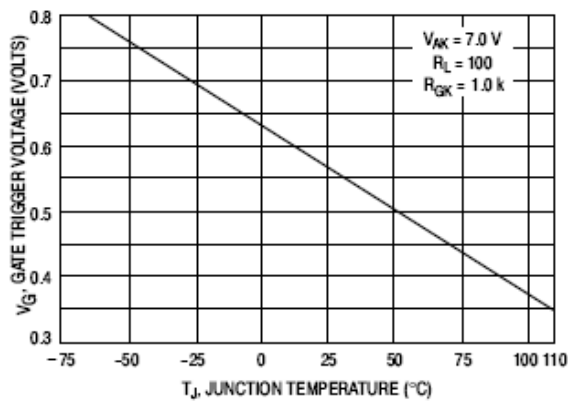


Figure 7. Typical Gate Trigger Voltage

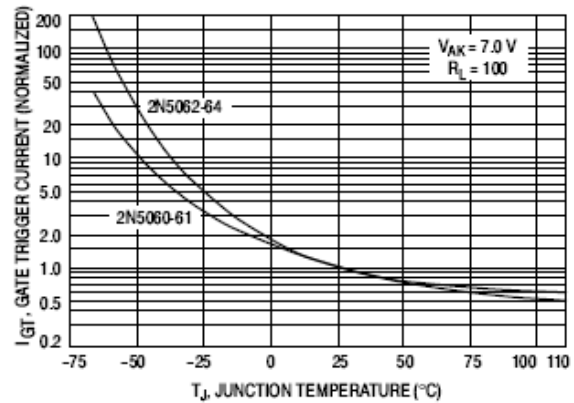


Figure 8. Typical Gate Trigger Current

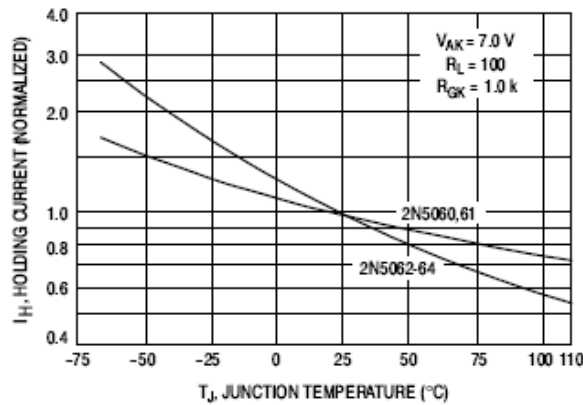


Figure 9. Typical Holding Current