DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

2N5060-2N5064

SILICON CONTROLLED RECTIFIERS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

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 2N5061 2N5062 2N5064	V_{DRM} V_{RRM}	30 60 100 200	V
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 0.255	A
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^2t	0.4	A^2s
Average on-state current **(180° conduction angles)** (T_C = 67°C) (T_C = 102°C)		$I_{T(AV)}$	 0.51 0.255	A
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.

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.

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal resistance, junction to case	$R_{\theta JC}$	75	°C/W
Thermal resistance, junction to ambient	$R_{\theta JA}$	200	°C/W
Lead solder temperature (lead length ≥ 1/16" from case, 10 s max.)	-	230	°C

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Characteristics		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak repetitive forward or reverse blocking current [2] (V_{AK} = Rated V_{DRM} or V_{RRM})	T_C = 25°C T_C = 110°C	I_{DRM}, I_{RRM}	- -	- -	10 50	µA
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 T_C = -40°C	I_{GT}	- -	- -	200 350	µA
Gate trigger voltage (continuous DC) [4] (V_{AK} = 7.0 Vdc, R_L = 100 Ω)	T_C = 25°C T_C = -40°C	V_{GT}	- -	- -	0.8 1.2	V
Gate non-trigger voltage (V_{AK} = rated V_{DRM}, R_L = 100 Ω) T_C = 110°C		V_{GD}	0.1	-	-	V
Characteristics		**Symbol**	**Min**	**Typ**	**Max**	**Unit**
ON CHARACTERISTICS						
Holding current [4] (V_{AK} = 7.0 Vdc, initiating current = 20mA)	T_C = 25°C T_C = -40°C	I_H	- -	- -	5.0 10	mA
Turn-on time **Delay time** **Rise time** (I_{GT} = 1.0 mA, V_D = 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 = 50µs, 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} = 1000Ω is included in measurement.
3. Forward current applied for 1 ms maximum duration, duty cycle ≤ 1%.
4. R_{GK} current is not included in measurement.

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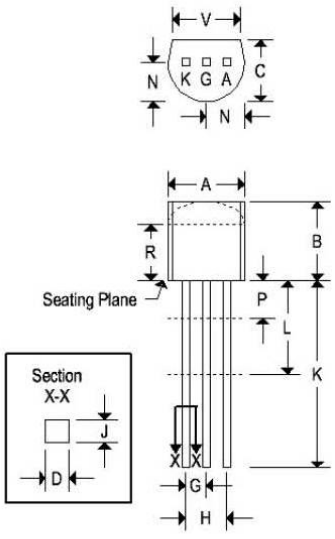
MECHANICAL CHARACTERISTICS

Case:	TO-92
Marking:	Body painted, 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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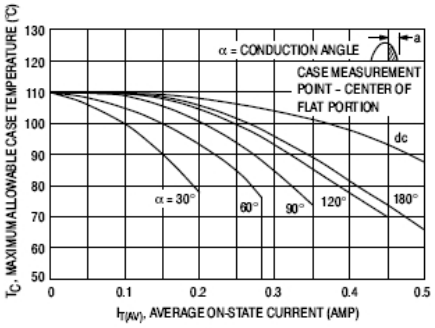

Figure 1. Maximum Case Temperature

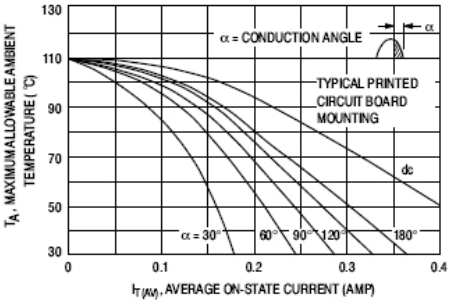

Figure 2. Maximum Ambient Temperature

CURRENT DERATING

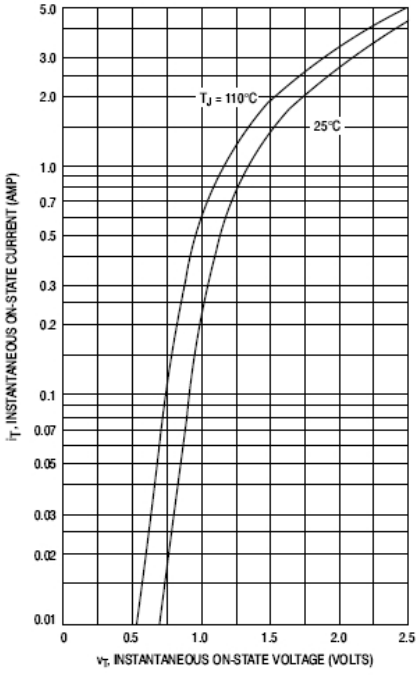

Figure 3. Typical Forward Voltage

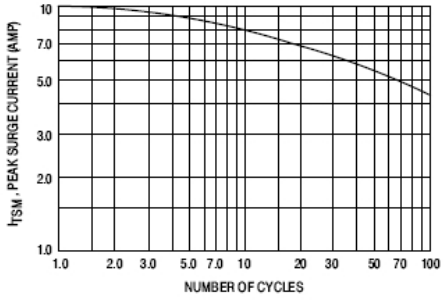

Figure 4. Maximum Non-Repetitive Surge Current

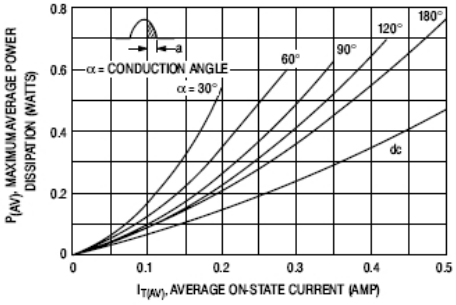

Figure 5. Power Dissipation

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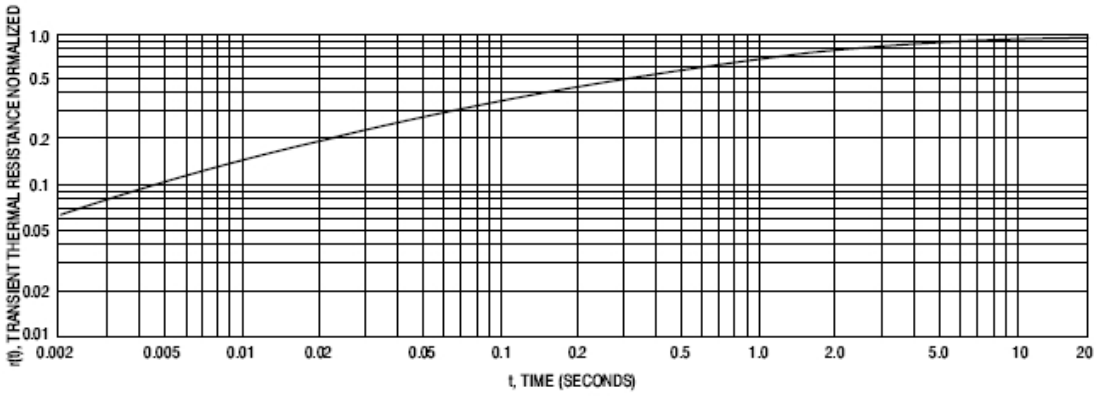

Figure 6. Thermal Response

TYPICAL CHARACTERISTICS

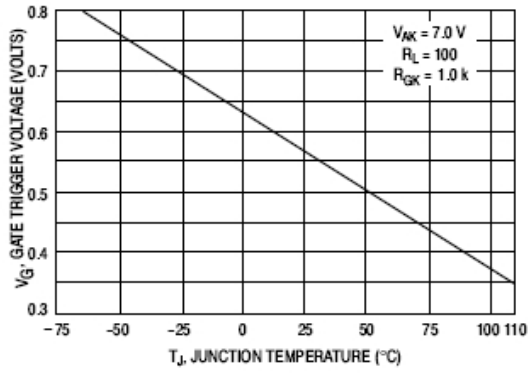

Figure 7. Typical Gate Trigger Voltage

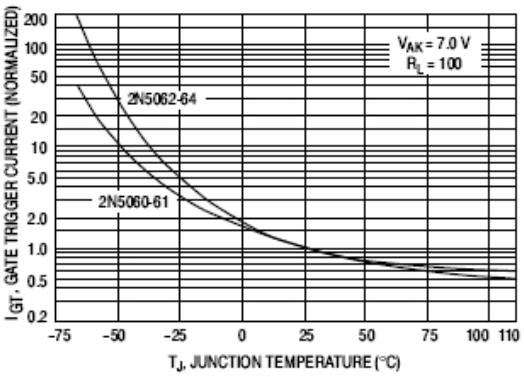

Figure 8. Typical Gate Trigger Current

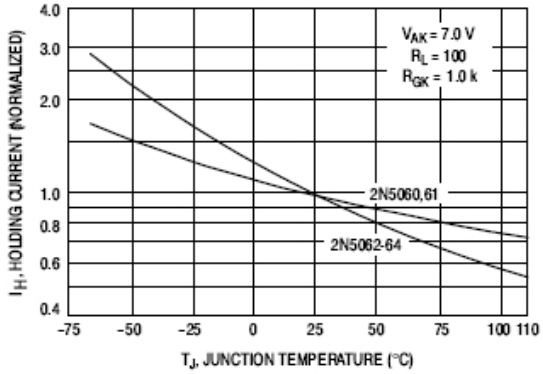

Figure 9. Typical Holding Current