New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

2N5060 Series

Preferred Device

Sensitive Gate Silicon Controlled Rectifiers

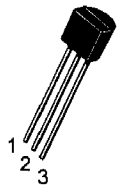
Reverse Blocking Thyristors

Annular PNPN devices designed for high volume consumer applications such as relay and lamp drivers, small motor controls, gate drivers for larger thyristors, and sensing and detection circuits. Supplied in an inexpensive plastic TO−92/TO-226AA package which is readily adaptable for use in automatic insertion equipment.

Features

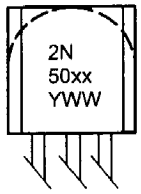
- Sensitive Gate Trigger Current − 200 μA Maximum
- Low Reverse and Forward Blocking Current − 50 μA Maximum, T_C = 110°C
- Low Holding Current − 5 mA Maximum
- Passivated Surface for Reliability and Uniformity
- Device Marking: Device Type, e.g., 2N5060, Date Code

SILICON CONTROLLED RECTIFIERS
0.8 A RMS, 30 − 200 V



TO−92

MARKING DIAGRAM



50xx	Specific Device Code
Y	= Year
WW	= Work Week

PIN ASSIGNMENT	
1	Cathode
2	Gate
3	Anode

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off−State Voltage (Note 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, 60 Hz)	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 ≤ 1.0 μsec; T_A = 25°C)	P_{GM}	0.1	W
*Forward Average Gate Power (T_A = 25°C, t = 8.3 ms)	$P_{G(AV)}$	0.01	W
*Forward Peak Gate Current (Pulse Width ≤ 1.0 μsec; T_A = 25°C)	I_{GM}	1.0	A
*Reverse Peak Gate Voltage (Pulse Width ≤ 1.0 μsec; 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

Characteristic	Symbol	Max	Unit
*Thermal Resistance, Junction−to−Case (Note 2)	$R_{\theta JC}$	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

2. This measurement is made with the case mounted "flat side down" on a heatsink and held in position by means of a metal clamp over the curved surface.

*Indicates JEDEC Registered Data.

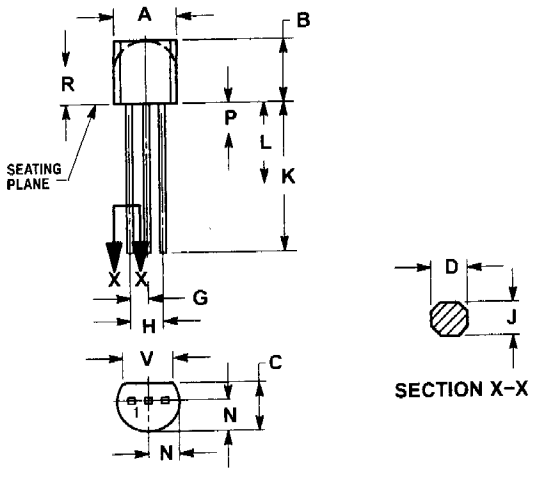
2N5060 Series

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
*Peak Repetitive Forward or Reverse Blocking Current (Note 3)		I_{DRM}, I_{RRM}				
(V_{AK} = Rated V_{DRM} or V_{RRM})	T_C = 25°C		–	–	10	μA
	T_C = 110°C		–	–	50	μA
ON CHARACTERISTICS						
*Peak Forward On-State Voltage (Note 4)		V_{TM}	–	–	1.7	V
(I_{TM} = 1.2 A peak @ T_A = 25°C)						
Gate Trigger Current (Continuous DC) (Note 5)		I_{GT}				μA
*(V_{AK} = 7.0 Vdc, R_L = 100 Ω)	T_C = 25°C		–	–	200	
	T_C = −40°C		–	–	350	
Gate Trigger Voltage (Continuous DC) (Note 5)	T_C = 25°C	V_{GT}	–	–	0.8	V
*(V_{AK} = 7.0 Vdc, R_L = 100 Ω)	T_C = −40°C		–	–	1.2	
*Gate Non-Trigger Voltage		V_{GD}				V
(V_{AK} = Rated V_{DRM}, R_L = 100 Ω) T_C = 110°C			0.1	–	–	
Holding Current (Note 5)	T_C = 25°C	I_H	–	–	5.0	mA
*(V_{AK} = 7.0 Vdc, initiating current = 20 mA)	T_C = −40°C		–	–	10	
Turn-On Time						μs
Delay Time		t_d	–	3.0	–	
Rise Time		t_r	–	0.2	–	
(I_{GT} = 1.0 mA, V_D = Rated V_{DRM}, Forward Current = 1.0 A, di/dt = 6.0 A/μs						
Turn-Off Time		t_q				μs
(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		–	10	–	
	2N5062, 2N5064		–	30	–	
DYNAMIC CHARACTERISTICS						
Critical Rate of Rise of Off-State Voltage		dv/dt	–	30	–	V/μs
(Rated V_{DRM}, Exponential)						

3. R_{GK} = 1000 Ω is included in measurement.
4. Forward current applied for 1 ms maximum duration, duty cycle ≤ 1%.
5. R_{GK} current is not included in measurement.

*Indicates JEDEC Registered Data.



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 10:
PIN 1. CATHODE
2. GATE
3. ANODE