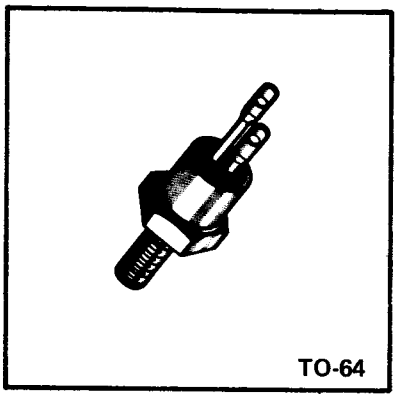
REVERSE BLOCKING TRIODE THYRISTORS

(SCRs)



TO-64

DESIGN FEATURES

- Blocking to 400 V
- Operation to 150°C
- 25 A surge capability

Transitron's hermetically sealed 2N1600 SCR series is designed specifically for those industrial and consumer applications where excellent electrical performance and high reliability are companion requirements. These SCRs are exceptionally well suited to such applications as solenoid and lamp drivers, temperature controllers, voltage and current sensing, motor control, and many other current and voltage switching requirements.

REPETITIVE PEAK OFF-STATE VOLTAGE (V_{DRM}) and REPETITIVE PEAK REVERSE VOLTAGE (V_{RRM})

Symbol	2N 1600	2N 1601	2N 1602	2N 1603	2N 1604	Test Conditions
V_{DRM} – VOLTS	50	100	200	300	400	T_C = 125°C
V_{RRM} – VOLTS	50	100	200	300	400	

ABSOLUTE MAXIMUM RATINGS @ T_C = 80°C

Definitions	Symbol	Limits
Average On-State Current	$I_{T(AV)}$	3.0 A
RMS On-State Current	$I_{T(RMS)}$	4.8 A
Peak One-Cycle Surge Current	I_{TSM}	25 A
Peak Reverse Gate Voltage	V_{GRM}	6 V
Peak Gate Power	P_{GM}	5 W
Average Gate Power	$P_{G(AV)}$	500 mW
Operating Temperature Range	T_{op}	–65 to +150°C
Storage Temperature Range	T_{stg}	–65 to +150°C

4.8 AMP SCR

ELECTRICAL CHARACTERISTICS

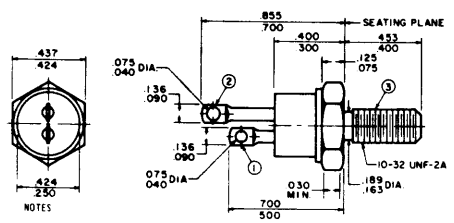
PARAMETERS			LIMITS		TEST CONDITIONS			
Symbol	Units	Definitions	Min.	Max.	T °C	R_{GK} ohms	V_{AA} volts	Other Conditions
V_{TM}	Volts	Max. On-State Voltage	–	2.0	25	–	–	I_{TM} = 3 A
I_{DRM}	mA	Rep. Peak Off-State Current	– –	.25 1.0	25 125	∞ ∞	V_{DRM} V_{DRM}	
I_{RRM}	mA	Rep. Peak Reverse Current	– –	.25 1.0	25 125	∞ ∞	V_{RRM} V_{RRM}	
I_{GT}	mA	Gate Trigger Current	–	10	25	∞	6	
V_{GT}	Volts	Gate Trigger Voltage	–	3.0	25	∞	6	
I_H	mA	Holding Current	–	25	25	∞	6	
T_Q	μs	Turn-off Time	–	5*	25	∞	–	I_{TM} = 3.0 A = I_R
dv/dt	V/μs	Rate of rise of V_{DRM}	100*	–	25	∞	V_{DRM}	

*Typical

NOTE
FOR CHARACTERISTIC CURVES FOR THIS FAMILY REFER TO THE END OF THIS GROUP OF SPECIFICATIONS.

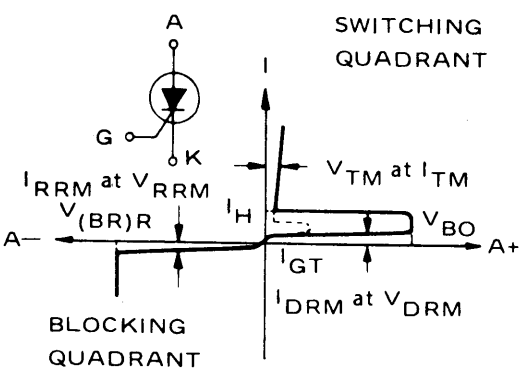
PACKAGING DATA

JEDEC TO-64 OUTLINE



PIN CONNECTIONS
1. Gate
2. Cathode
3. Anode

V-I CHARACTERISTICS



SILICON PLANAR

REVERSE BLOCKING TRIODE THYRISTORS

(SCRs)

TO-18

DESIGN FEATURES

- Gate sensitivity 20 μA
- Blocking voltage to 200 V
- Peak pulse current to 40 A
- dv/dt typically greater than 100 V/μs
- Operating temperature to +150°C

Transitron's 2N3001 series is designed specifically for those military and industrial applications where excellent electrical performance and high reliability are companion requirements. These SCRs are exceptionally well suited to such military and industrial applications as solenoid and lamp drivers, temperature controllers, voltage and current sensing, motor control, and many other current and voltage switching requirements.

REPETITIVE PEAK OFF-STATE VOLTAGE (V_{DRM}) and REPETITIVE PEAK REVERSE VOLTAGE (V_{RRM})

Symbol	2N 3001	2N 3002	2N 3003	2N 3004	Test Conditions
V_{DRM} – VOLTS	30	60	100	200	T_A = 150°C & R_{GK} = 1.0 kilohms
V_{RRM} – VOLTS	30	60	100	200	

ABSOLUTE MAXIMUM RATINGS @ T_A = 55°C

Definitions	Symbol	Limits
Average On-State Current	$I_{T(AV)}$	250 mA
RMS On-State Current	$I_{T(RMS)}$	400 mA
Peak One-Cycle Surge Current (60 Hz)	I_{TSM}	6.0 A
Peak Reverse Gate Voltage	V_{GRM}	5.0 V
Peak Gate Power	P_{GM}	200 mW
Average Gate Power	$P_{G(AV)}$	100 mW
Operating Temperature Range	T_{op}	–65 to +150°C
Storage Temperature Range	T_{stg}	–65 to +200°C

ELECTRICAL CHARACTERISTICS

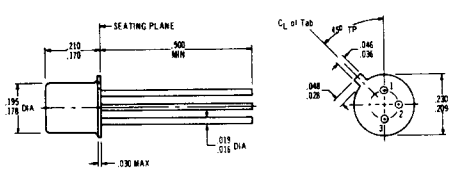
PARAMETERS			LIMITS		TEST CONDITIONS			
Symbol	Units	Definitions	Min.	Max.	T °C	R_{GK} ohms	V_{AA} volts	Other Conditions
V_{TM}	Volts	Max. On-State Voltage	–	1.2	25	–	–	I_{TM} = 350 mA peak
I_{DRM}	μA	Rep. Peak Off-State Current	–	0.1	25	1K	V_{DRM}	
			–	100	150	1K	V_{DRM}	
I_{RRM}	μA	Rep. Peak Reverse Current	–	0.1	25	1K	V_{RRM}	
			–	100	150	1K	V_{RRM}	
I_{GT}	μA	Gate Trigger Current	–	20	25	∞	5	
V_{GT}	Volts	Gate Trigger Voltage	–	0.7	25	∞	5	
I_H	mA	Holding Current	–	3.0	25	1K	5	
I_{GR}	μA	Gate Reverse Current	–	5.0	25	∞	OPEN	V_{GC} = –5 Volts
dv/dt	V/μs	Rate of rise of V_{DRM}	100*	–	25	1K	V_{DRM}	

*Typical

NOTE
FOR CHARACTERISTIC CURVES FOR THIS FAMILY REFER TO THE END OF THIS GROUP OF SPECIFICATIONS.

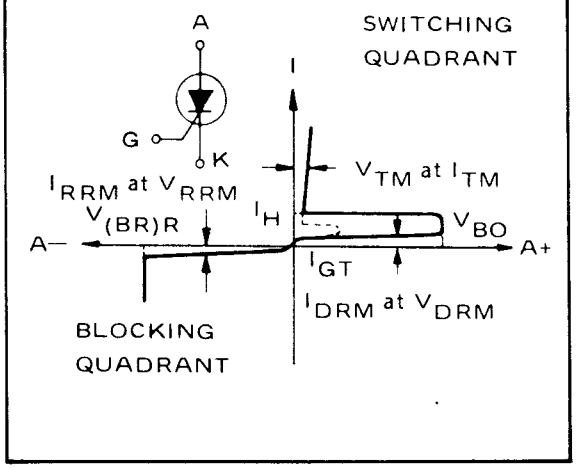
PACKAGING DATA

JEDEC TO-18 OUTLINE



PIN CONNECTIONS
1. Cathode
2. Gate
3. Anode (connected to case)

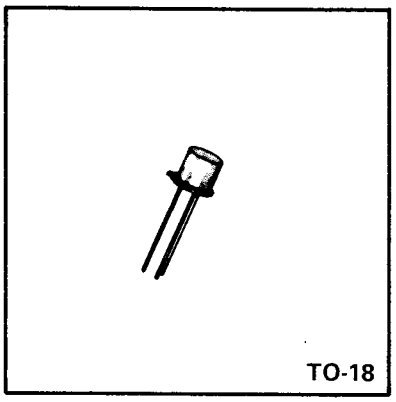
V-I CHARACTERISTICS



SILICON PLANAR

REVERSE BLOCKING TRIODE THYRISTORS

(SCRs)



TO-18

DESIGN FEATURES

- Gate sensitivity 200 μA
- Blocking voltage to 200 V
- Peak pulse current to 40 A
- dv/dt typically greater than 100 V/μs
- Operating temperature to +150°C

Transitron's 2N3005 series is designed specifically for those military and industrial applications where excellent electrical performance and high reliability are companion requirements. These SCRs are exceptionally well suited to such military and industrial applications as solenoid and lamp drivers, temperature controllers, voltage and current sensing, motor control, and many other current and voltage switching requirements.

REPETITIVE PEAK OFF-STATE VOLTAGE (V_{DRM}) and REPETITIVE PEAK REVERSE VOLTAGE (V_{RRM})

Symbol	2N 3005	2N 3006	2N 3007	2N 3008	Test Conditions
V_{DRM} – VOLTS	30	60	100	200	T_A = 150°C & R_{GK} = 1.0 kilohms
V_{RRM} – VOLTS	30	60	100	200	

ABSOLUTE MAXIMUM RATINGS @ T_A = 55°C

Definitions	Symbol	Limits
Average On-State Current	$I_{T(AV)}$	250 mA
RMS On-State Current	$I_{T(RMS)}$	400 mA
Peak One-Cycle Surge Current (60 Hz)	I_{TSM}	6.0 A
Peak Reverse Gate Voltage	V_{GRM}	5.0 V
Peak Gate Power	P_{GM}	200 mW
Average Gate Power	$P_{G(AV)}$	100 mW
Operating Temperature Range	T_{op}	–65 to +150°C
Storage Temperature Range	T_{stg}	–65 to +200°C

ELECTRICAL CHARACTERISTICS

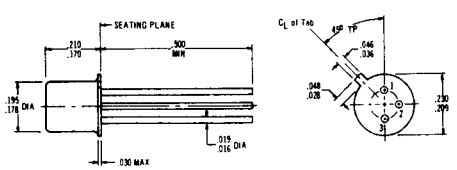
PARAMETERS			LIMITS		TEST CONDITIONS			
Symbol	Units	Definitions	Min.	Max.	T °C	R_{GK} ohms	V_{AA} volts	Other Conditions
V_{TM}	Volts	Max. On-State Voltage	–	1.2	25	–	–	I_{TM} = 350 mA peak
I_{DRM}	μA	Rep. Peak Off-State Current	–	0.1	25	1K	V_{DRM}	
			–	100	150	1K	V_{DRM}	
I_{RRM}	μA	Rep. Peak Reverse Current	–	0.1	25	1K	V_{RRM}	
			–	100	150	1K	V_{RRM}	
I_{GT}	μA	Gate Trigger Current	–	200	25	∞	5	
V_{GT}	Volts	Gate Trigger Voltage	–	0.8	25	∞	5	
I_H	mA	Holding Current	–	5.0	25	1K	5	
I_{GR}	μA	Gate Reverse Current	–	5.0	25	∞	OPEN	V_{GC} = –5 Volts
dv/dt	V/μs	Rate of rise of V_{DRM}	100*	–	25	1K	V_{DRM}	

*Typical

NOTE
FOR CHARACTERISTIC CURVES FOR THIS FAMILY REFER TO THE END OF THIS GROUP OF SPECIFICATIONS.

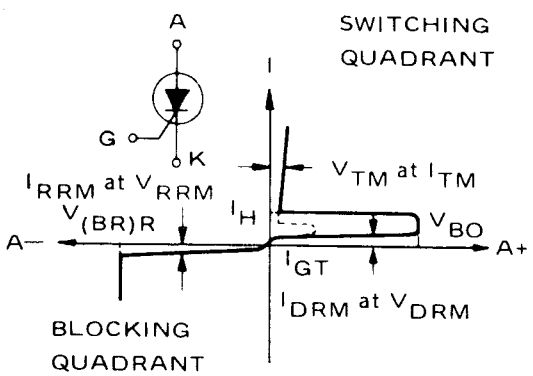
PACKAGING DATA

JEDEC TO-18 OUTLINE



PIN CONNECTIONS
1. Cathode
2. Gate
3. Anode (connected to case)

V-I CHARACTERISTICS



SILICON PLANAR

REVERSE BLOCKING TRIODE THYRISTORS

(SCRs)

TO-46

DESIGN FEATURES

- Gate sensitivity 20 μA
- Blocking voltage to 60V
- Peak pulse current to 40A
- dv/dt typically greater than 100 V/μs
- Operating temperature to +150°C

Transitron's 2N3254 series is designed specifically for those military and industrial applications where compactness as well as excellent electrical performance and high reliability are companion requirements. These SCRs are exceptionally well suited to such military and industrial applications such as solenoid and lamp drivers, temperature controllers, voltage and current sensing, motor control, and many other current and voltage switching requirements.

REPETITIVE PEAK OFF-STATE VOLTAGE (V_{DRM}) and REPETITIVE PEAK REVERSE VOLTAGE (V_{RRM})

Symbol	2N 3254	2N 3255	2N 3256	Test Conditions
V_{DRM} – VOLTS	15	30	60	T_A = 150°C & R_{GK} = 1.0 kilohms
V_{RRM} – VOLTS	15	30	60	

ABSOLUTE MAXIMUM RATINGS @ T_A = 55°C

Definitions	Symbol	Limits
Average On-State Current	$I_{T(AV)}$	160 mA
RMS On-State Current	$I_{T(RMS)}$	250 mA
Peak One-Cycle Surge Current (60 Hz)	I_{TSM}	1.0 A
Peak Reverse Gate Voltage	V_{GRM}	5.0 V
Peak Gate Power	P_{GM}	200 mW
Average Gate Power	$P_{G(AV)}$	20 mW
Operating Temperature Range	T_{op}	–65 to +150°C
Storage Temperature Range	T_{stg}	–65 to +300°C

ELECTRICAL CHARACTERISTICS

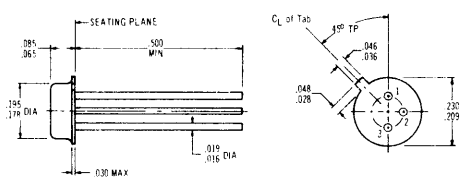
PARAMETERS			LIMITS		TEST CONDITIONS			
Symbol	Units	Definitions	Min.	Max.	T °C	R_{GK} ohms	V_{AA} volts	Other Conditions
V_{TM}	Volts	Max. On-State Voltage	–	1.25	25	–	–	I_{TM} = 250 mA peak
I_{DRM}	μA	Rep. Peak Off-State Current	– –	0.02 20	25 150	1K 1K	V_{DRM} V_{DRM}	
I_{RRM}	μA	Rep. Peak Reverse Current	– –	0.1 100	25 150	1K 1K	V_{RRM} V_{RRM}	
I_{GT}	μA	Gate Trigger Current	–	20	25	∞	5	
V_{GT}	Volts	Gate Trigger Voltage	0.5	0.75	25	∞	5	
I_H	mA	Holding Current	–	2	25	1K	5	
I_{GR}	μA	Gate Reverse Current	–	0.2	25	∞	OPEN	V_{GC} = –2 Volts
dv/dt	V/μs	Rate of rise of V_{DRM}	100*	–	25	1K	V_{DRM}	

*Typical

NOTE
FOR CHARACTERISTIC CURVES FOR THIS FAMILY REFER TO THE END OF THIS GROUP OF SPECIFICATIONS.

PACKAGING DATA

JEDEC TO-46 OUTLINE



PIN CONNECTIONS
1. Cathode
2. Gate
3. Anode (connected to case)

V-I CHARACTERISTICS