Description

Silicon Controlled Rectifiers (SCR) are reverse blocking triode thyristor semiconductor devices designed for power switching and phase control applications. They are all-diffused devices backed by years of design and field experience.

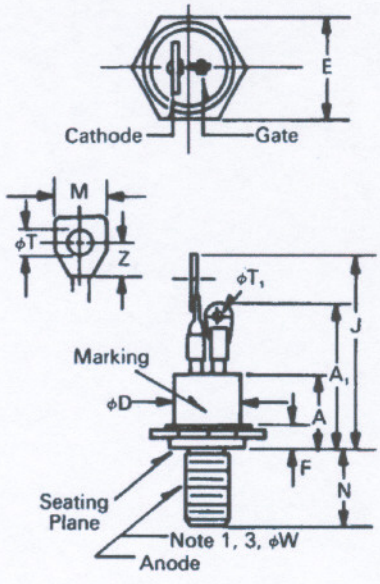
Phase Control SCR
16 Amperes / 25-800 Volts

Features

- Low Gate Current
- Low On-State Voltage
- Hermetic Packaging
- Long Creepage Path
- Thermal Fatigue Resistant
- Excellent Surge Rating
- Available JAN/JANTX
- Slash Sheet MIL-PRF-19500/108

Outline Drawing

Complies with TO-48



Applications

- Phase Control
- Power Supplies
- Static Switch
- Battery Chargers
- Motor Control

Ordering Information

Type	Voltage V_{DRM}/V_{RRM} @ $I_{T(AV)}$ = 16 Amps	Available JAN/JAN TX
2N681	25	
2N682	50	√
2N683	100	√
2N684	150	
2N685	200	√
2N686	250	√
2N687	300	√
2N688	400	√
2N689	500	√
2N690	600	√
2N691	700	
2N692	800	

Dim.	Inches		Metric(mm)	
	Min	Max	Min	Max
A	.330	.505	8.38	12.83
A_1		.880		22.35
ØD		.544		13.82
E	.544	.562	13.82	14.27
F	.113	.152	2.87	3.86
J		1.193		30.30
M	.210	.300	5.33	7.62
N	.422	.453	10.72	11.51
ØT	.125	.165	3.18	4.19
$ØT_1$	.060	.075	1.52	1.91
Z	.120		3.05	
ØW	¼-28 UNF-2A			

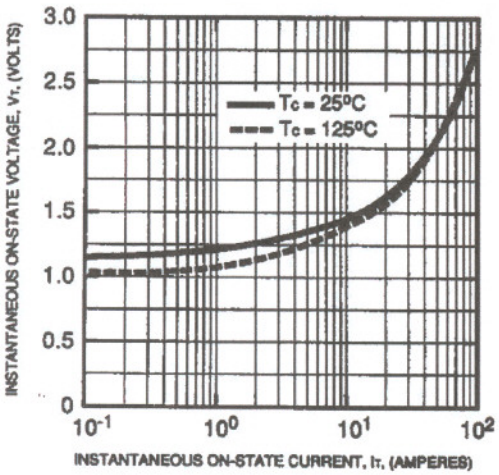
Absolute Maximum Ratings, (Tj = +125°C unless otherwise specified)								
	Symbol	**2N681**	**2N682**	**2N683**	**2N684**	**2N685**	**2N686**	**Units**
Repetitive peak off-state voltage	V_{DRM}	25	50	100	150	200	250	Volts
Non-repetitive peak off-state voltage	V_{DSM}	35	75	150	225	300	350	Volts
Repetitive peak reverse voltage	V_{RRM}	25	50	100	150	200	250	Volts
Non-repetitive peak reverse voltage	V_{RSM}	35	75	150	225	300	350	Volts
		2N687	**2N688**	**2N689**	**2N690**	**2N691**	**2N692**	
Repetitive peak off-state voltage	V_{DRM}	300	400	500	600	700	800	Volts
Non-repetitive peak off-state voltage	V_{DSM}	400	500	600	720	840	960	Volts
Repetitive peak reverse voltage	V_{RRM}	300	400	500	600	700	800	Volts
Non-repetitive peak reverse voltage	V_{RSM}	400	500	600	720	840	960	Volts
ALL DEVICE TYPES 2N681 through 2N692								
RMS On-State Current	$I_{T(RMS)}$	25						Amps
Average On-state Current, Tc = 67°C	$I_{T(AV)}$	16						Amps
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60 Hz)	I_{TSM}	150						Amps
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50 Hz)	I_{TSM}	136						Amps
I^2t (for Fusing), 8.3 ms	I^2t	93.4						A^2sec
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	10						A/µs
Peak Gate Power Dissipation	P_{GM}	5						Watts
Average Gate Power Dissipation	$P_{G(AV)}$	0.5						Watts
Peak Forward Gate Voltage	V_{FGM}	10						Volts
Peak Forward Gate Current	I_{FGM}	2						Amps
Peak Reverse Gate Voltage	V_{RGM}	5						Volts
Storage Temperature	$T_{STORAGE}$	-65 to +150						°C
Operating Temperature	Tj	-65 to +125						°C
Mounting Torque	-	30						in-lb
Mounting Torque (metric)	-	35						kg-cm

Electrical Characteristics

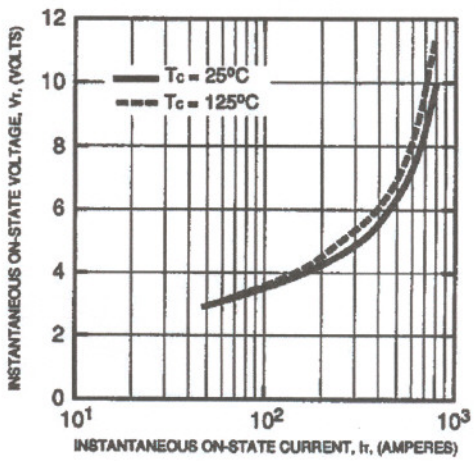
Parameter	**Conditions**	**Symbol**	**Device Types**						**Units**
Voltage, Blocking State Maximums			**2N681**	**2N682**	**2N683**	**2N684**	**2N685**	**2N686**	
Forward Leakage, Peak	Tj = 125°C, $V_D = V_{DRM}$	I_{DRM}	13.0	13.0	13.0	13.0	12.0	11.0	mA
Reverse Leakage, Peak	T = 125°C, $V_R = V_{RRM}$	I_{RRM}	13.0	13.0	13.0	13.0	12.0	11.0	mA
			2N687	**2N688**	**2N689**	**2N690**	**2N691**	**2N692**	
Forward Leakage, Peak	Tj = 125°C, $V_D = V_{DRM}$	I_{DRM}	10.0	8.0	6.0	5.0	4.5	4.0	mA
Reverse Leakage, Peak	T = 125°C, $V_R = V_{RRM}$	I_{RRM}	10.0	8.0	6.0	5.0	4.5	4.0	mA

ALL DEVICE TYPES 2N681 through 2N692				
Current, Conducting State Maximums	**Test Conditions**	**Symbol**		**Units**
Peak On-State Voltage	Tc = 25°C, I_{FM} = 50 A	V_{TM}	2	Volts
Switching				
Typical Critical dv/dt exponential to V_{DRM}	Tj = 125°C, Gate Open	dv/dt	50	V/µs
Gate Parameters				
Gate Current to Trigger	Tj = 25°C, V_D = 12V, R_L = 50Ω	I_{GT}	40	mA
Gate Voltage to Trigger	Tj = 125°C, V_D = 12V, R_L = 50Ω	V_{GT}	3	Volts
Minimum Non-Triggering Gate Voltage	Tj = 125°C, $V_D = ½V_{DRM}$	V_{GD}	0.30	Volts

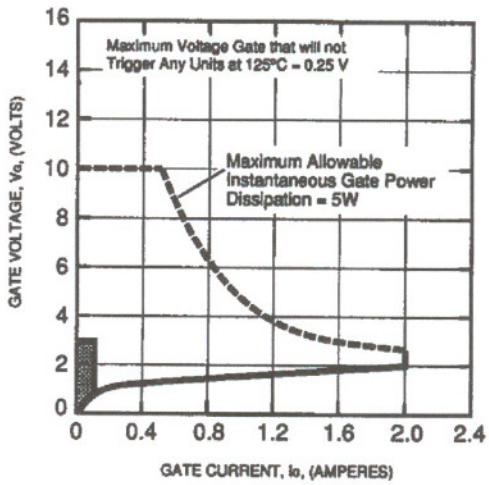
MAXIMUM ON-STATE CHARACTERISTICS



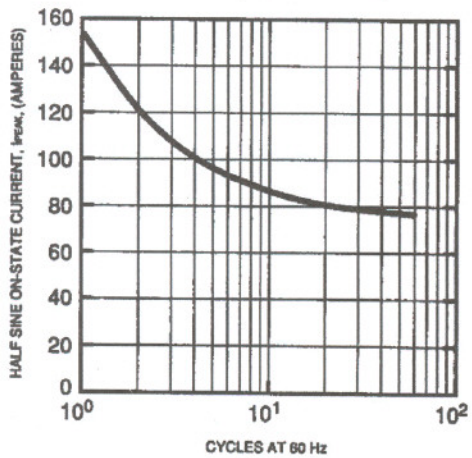
MAXIMUM ON-STATE CHARACTERISTICS
(HIGH LEVEL)



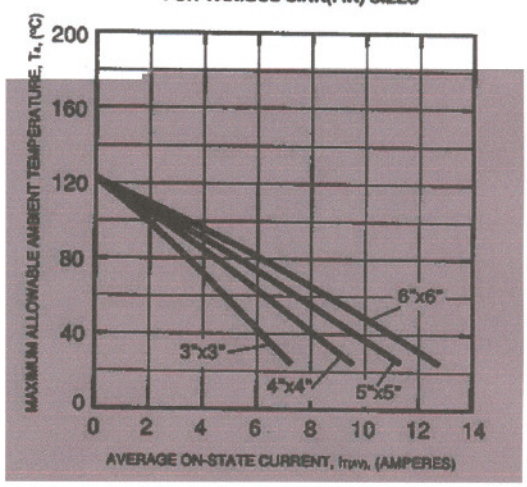
GATE CHARACTERISTICS



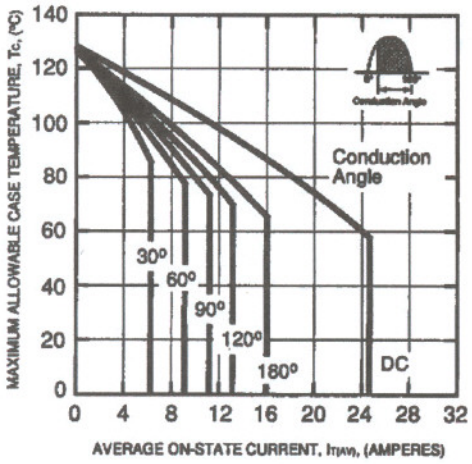
MAXIMUM ALLOWABLE SURGE ON-STATE
CURRENT (NON-REPETITIVE)



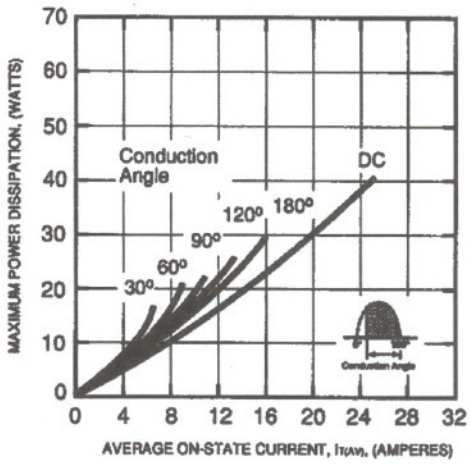
MAXIMUM ALLOWABLE AMBIENT TEMPERATURE
FOR VARIOUS SINK(FIN) SIZES



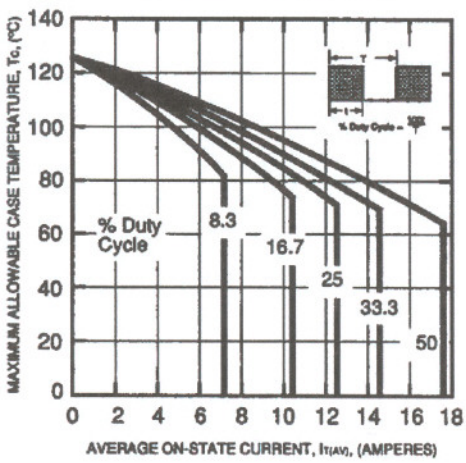
MAXIMUM ALLOWABLE CASE TEMPERATURE
(SINUSOIDAL WAVEFORM)



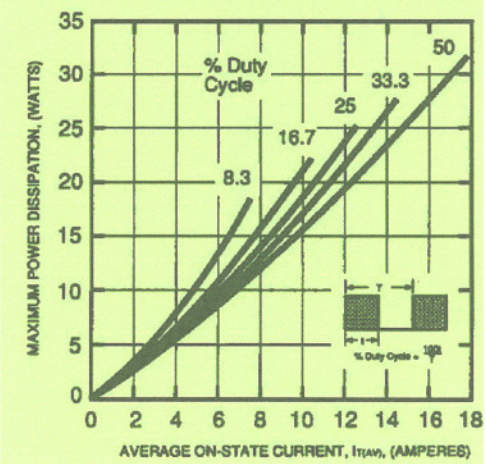
MAXIMUM ON-STATE POWER DISSIPATION
(SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE
(RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION
(RECTANGULAR WAVEFORM)



MINIMUM GATE CURRENT REQUIRED TO
TRIGGER ALL DEVICES