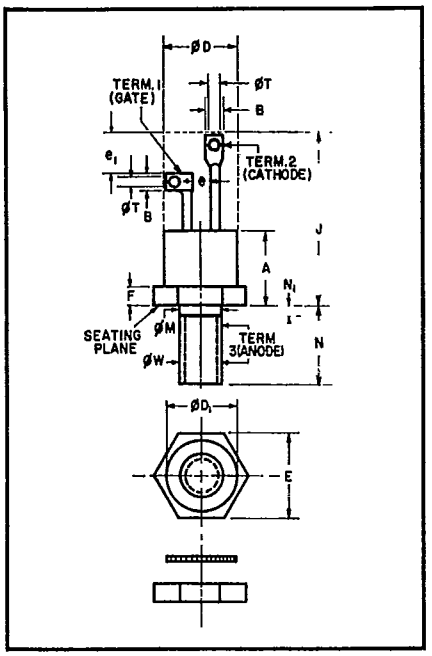
T-25-13

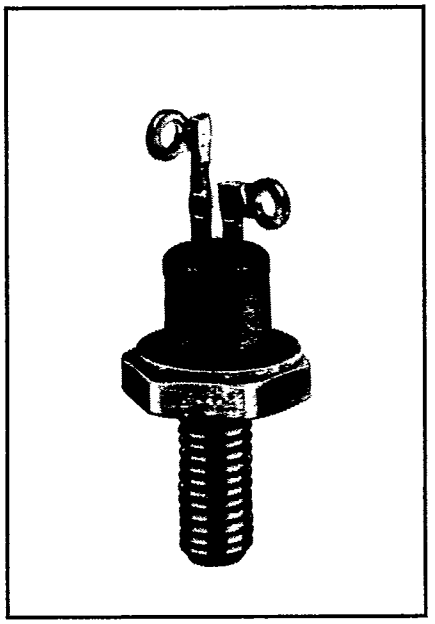
C10
2N1770A-2N1777A

Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR
4.7 Amperes/25-400 Volts



C10, 2N1770A-2N1777A
Conforms to TO-64
Outline Drawing



C10, 2N1770A-2N1777A
Phase Control SCR
4.7 Amperes/25-400 Volts

Dimension	Inches Min.	Inches Max.	Metric Min.	Metric Max.
A	.300	.400	7.62	10.16
B ①	.080	.136	2.03	3.45
øD ②	—	.424	—	10.77
øD1 ③ ④	.400	—	10.16	—
E	.424	.437	10.77	11.10
e ⑦	.013	—	.330	—
e1 ⑤	.060	—	1.52	—
F ④	.060	.175	1.52	4.45
J ②	.700	.855	17.78	21.72
øM	.163	.189	4.14	4.80
N	.400	.453	10.16	11.51
N1	—	.078	—	1.98
øT	.040	.075	1.02	1.91
øW ⑥	.1658	.1697	4.212	4.310

Notes:
1. Contour and orientation of fixed terminal lugs are optional.
2. The outline contour (with exception of hexagon) is optional within zone defined by øD and J.
3. Minimum diameter of seating plane.
4. A chamfer (or undercut) on one or both ends of hexagonal portion is optional.
5. Minimum difference in terminal lengths to establish datum line for numbering terminals.
6. Pitch diameter — thread 10-32 NF-2A (Coated). Reference (Screw Thread Standards for Federal Services 1957) Handbook 1957 H28.
7. Minimum spacing between terminals.

Description
Powerex 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.

Features:
- ☐ Low Gate Current
- ☐ Low On-State Voltage
- ☐ High Junction Temperature
- ☐ Hermetic Packaging
- ☐ Low Thermal Impedance
- ☐ Thermal Fatigue Resistant
- ☐ Excellent Surge Rating

Applications:
- ☐ Phase Control
- ☐ Power Switching

Ordering Information
Example: Select the complete 7 digit part number you desire from the table — i.e. 2N1777A is a 400 Volt, 4.7 Ampere Phase Control SCR.

Type	Voltage V_{DRM}/V_{RRM}	Code	Product Family
2N1770A	25	—	C10U
2N1771A*	50	—	C10F
2N1772A*	100	—	C10A
2N1773A	150	—	C10G
2N1774A*	200	—	C10B
2N1775A	250	—	C10H
2N1776A*	300	—	C10C
2N1777A*	400	—	C10D

*Also available in JAN/JANTX

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C10, 2N1770A-2N1777A
Phase Control SCR
4.7 Amperes/25-400 Volts

Absolute Maximum Ratings, (T_j=150°C unless otherwise specified)

Ratings	Symbol	C10U 2N1770A	C10F 2N1771A	C10A 2N1772A	C10G 2N1773A	Units
Repetitive peak off-state voltage	V_{DRM}	25	50	100	150	Volts
Repetitive peak reverse voltage	V_{RRM}	25	50	100	150	Volts
Non-repetitive peak reverse voltage	V_{RSM}	35	75	150	225	Volts

		C10B 2N1774A	C10H 2N1775A	C10C 2N1776A	C10D 2N1777A	
Repetitive peak off-state voltage	V_{DRM}	200	250	300	400	Volts
Repetitive peak reverse voltage	V_{RRM}	200	250	300	400	Volts
Non-repetitive peak reverse voltage	V_{RSM}	300	350	400	500	Volts

		C10 2N1770A-2N1777A	
RMS On-State Current	$I_{T(RMS)}$	7.4	Amperes
Average On-State Current T_c = 105°C (Nominal, See Graphs)	$I_{T(AV)}$	4.7	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60 Hz)	I_{TSM}	60	Amperes
I^2t (for Fusing), 8.3 ms	I^2t	15	A^2sec
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	60	A/μs
Peak Gate Power Dissipation	P_{GM}	5	Watts
Average Gate Power Dissipation	$P_{G(AV)}$	0.5	Watts
Peak Forward Gate Current	I_{FGM}	2	Amperes
Peak Reverse Gate Voltage	V_{RGM}	10	Volts
Storage Temperature	T_{stg}	-65 to 150	°C
Operating Temperature	T_j	-65 to 150	°C
Mounting Torque ①	—	15	in.-lb.
Mounting Torque ①	—	17.5	kg-cm

① Consult recommended mounting procedures; do not exceed maximums.

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C10, 2N1770A-2N1777A
Phase Control SCR
4.7 Amperes/25-400 Volts

Electrical Characteristics

Characteristics	Symbol	Test Conditions	C10U 2N1770A	C10F 2N1771A	C10A 2N1772A	C10G 2N1773A	Units
Voltage—Blocking State Maximums							
Forward Leakage, Peak	I_{DRM}	T_j=150°C, V_D=V_{DRM}	9	9	9	8	mA
Reverse Leakage, Peak	I_{RRM}	T_j=150°C, V_R=V_{RRM}	9	9	9	8	mA

Characteristics	Symbol	Test Conditions	C10B 2N1774A	C10H 2N1775A	C10C 2N1776A	C10D 2N1777A	Units
Voltage—Blocking State Maximums							
Forward Leakage, Peak	I_{DRM}	T_j=150°C, V_D=V_{DRM}	6	5	4	2	mA
Reverse Leakage, Peak	I_{RRM}	T_j=150°C, V_R=V_{RRM}	6	5	4	2	mA

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C10, 2N1770A-2N1777A
Phase Control SCR
4.7 Amperes/25-400 Volts

Characteristics	Symbol	Test Conditions	C10 2N1770A-2N1777A	Units
Current—Conducting State Maximums				
Peak On-State Voltage	V_{TM}	T_C=25°C, I_{FM}=15A	1.85	Volts
Holding Current	I_H	V_D=24V, R_L=20Ω, T_j=25°C	25	mA
Switching				
Typical Critical dv/dt exponential to V_{DRM}	dv/dt	—	20	V/μs
Thermal				
Maximum Thermal Resistance, Junction to Case	$R_{th(j-c)}$	—	3.1	°C/Watt
Gate — Maximum Parameters		V_D=12V, R_L=250Ω, T_C=-25°C	15	mA
Gate Current to Trigger	I_{GT}	V_D=12V, R_L=250Ω, T_C=-65°C	30	mA
Gate Voltage to Trigger	V_{GT}	V_D=12V, R_L=250Ω, T_C=150°C	2	Volts
Minimum Non-Triggering Gate Voltage	V_{GD}	T_C=150°C, V_D=V_{DRM}, R_L=250Ω	0.2	Volts

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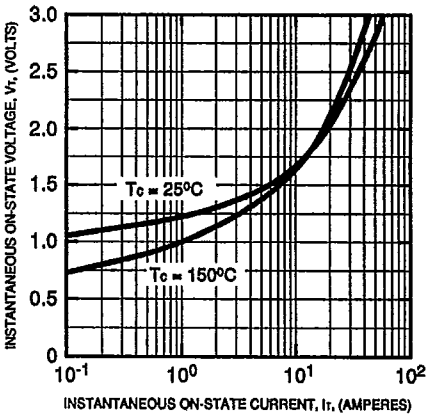
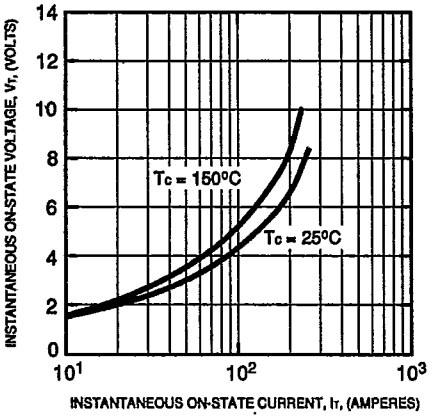
C10, 2N1770A-2N1777A
Phase Control SCR
4.7 Amperes/25-400 Volts

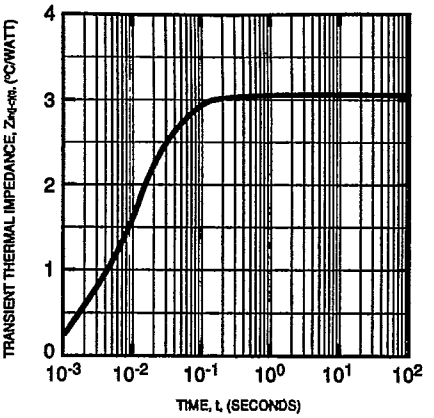
MAXIMUM ON-STATE CHARACTERISTICS



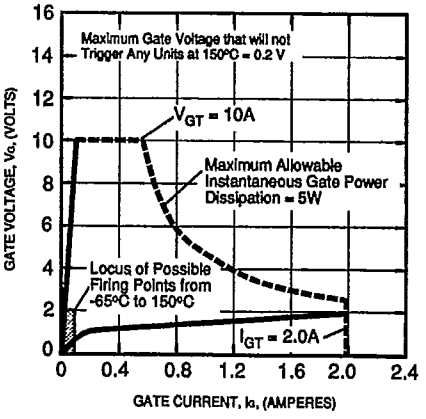
MAXIMUM ON-STATE CHARACTERISTICS (HIGH LEVEL)



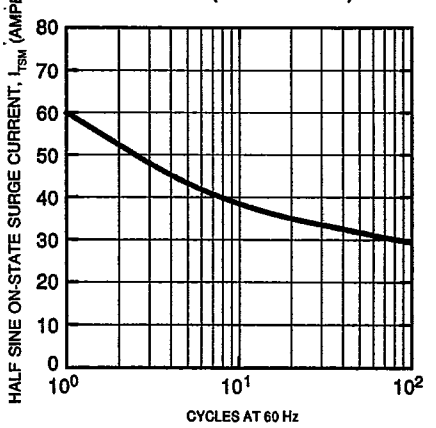
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



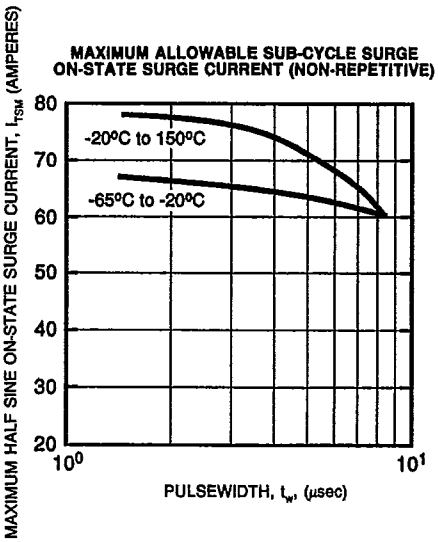
GATE CHARACTERISTICS



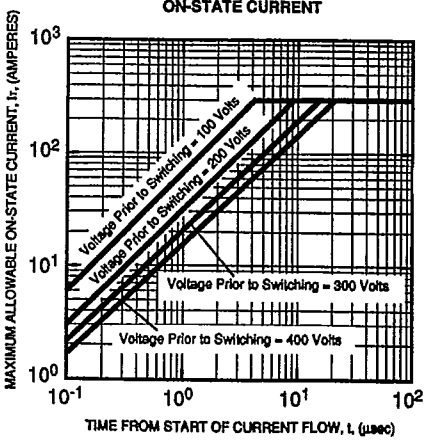
MAXIMUM ALLOWABLE SURGE ON-STATE CURRENT (NON-REPETITIVE)



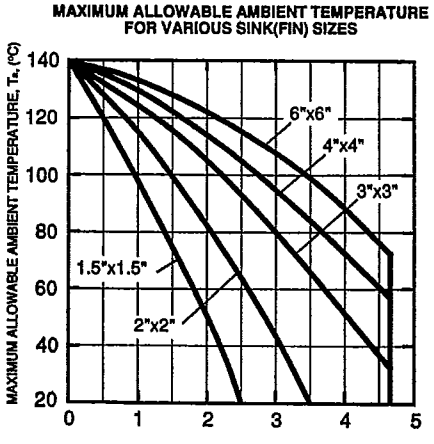
MAXIMUM ALLOWABLE SUB-CYCLE SURGE ON-STATE SURGE CURRENT (NON-REPETITIVE)



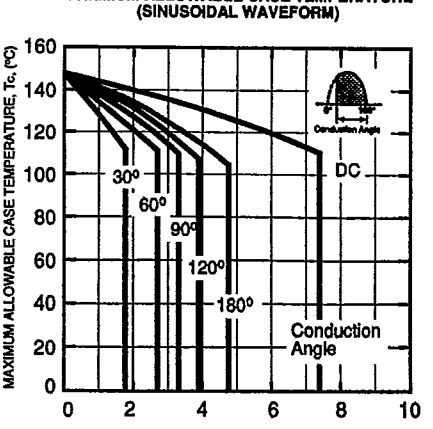
MAXIMUM ALLOWABLE RATE OF RISE OF ON-STATE CURRENT



MAXIMUM ALLOWABLE AMBIENT TEMPERATURE FOR VARIOUS SINK(FIN) SIZES



MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



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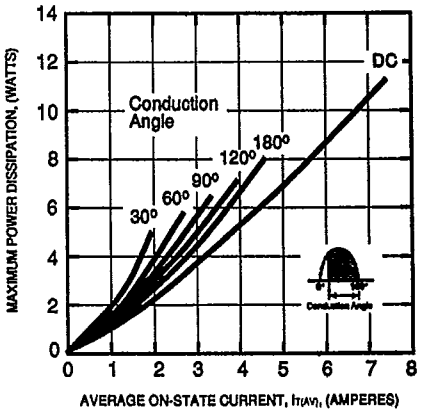
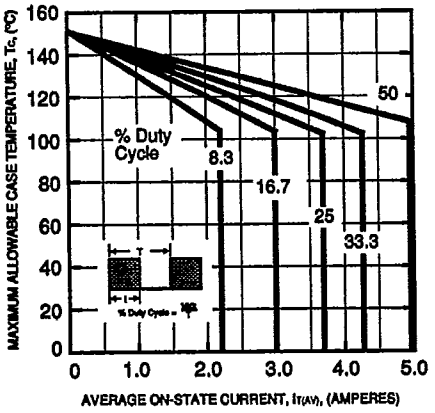
C10, 2N1770A-2N1777A
Phase Control SCR
4.7 Amperes/25-400 Volts

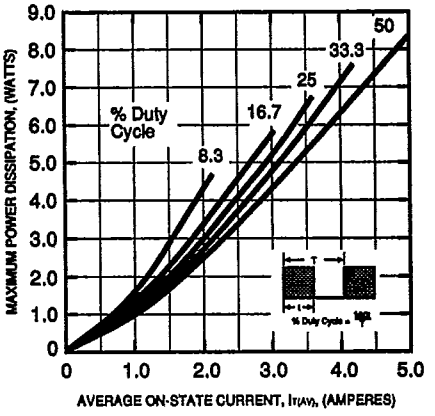
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)



MINIMUM GATE CURRENT REQUIRED TO TRIGGER ALL DEVICES