

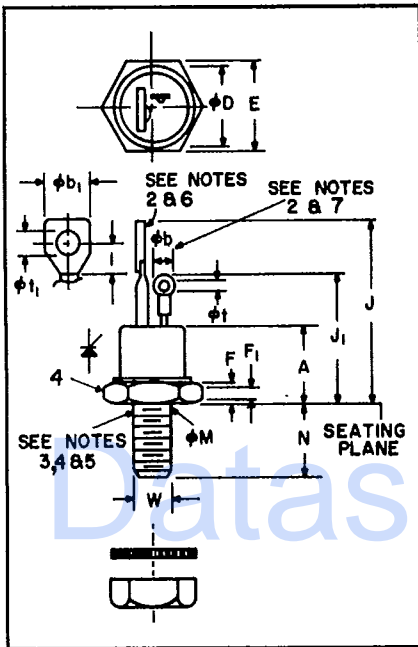


T-25-17

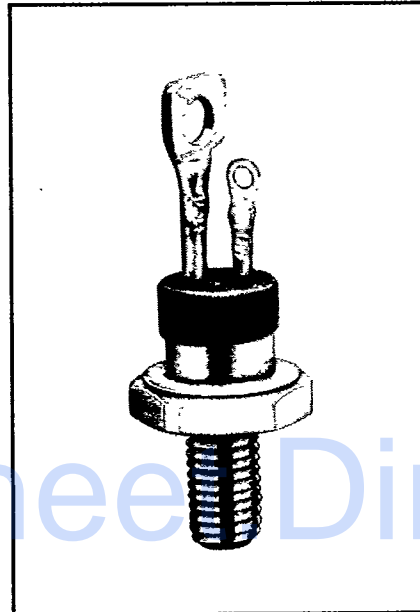
**2N5204-2N5207**

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**  
**22 Amperes/600-1200 Volts**



**2N5204-2N5207 Outline Drawing**  
 Complies with TO-48



**2N5204-2N5207**  
**Phase Control SCR**  
**22 Amperes/600-1200 Volts**

**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
- Hermetic Packaging
- Low Thermal Impedance
- Long Creepage Path
- Thermal Fatigue Resistant
- Excellent Surge Rating

**Applications:**

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

**Ordering Information**

Example: Select the complete 6 digit part number you desire from the table — i.e. 2N5206 is a 1000 Volt, 22 Ampere Phase Control SCR.

Type	Voltage $V_{DRM} / V_{RRM}$	Current Rating $I_{T(AV)}$ Amperes (22)
2N5204	600	—
2N5205	800	—
2N5206	1000	—
2N5207	1200	—

Dimension	Inches		Metric	
	Min.	Max.	Min.	Max.
A	.330	.505	8.38	12.83
$\phi b$ ②	.115	.140	2.92	3.56
$\phi b_1$ ②	.210	.300	5.33	7.62
$\phi D$	—	.544	—	13.82
E	.544	.562	13.82	14.27
F ④	.113	.200	2.87	5.08
F <sub>1</sub>	.060	—	1.52	—
J	—	1.193	—	30.30
J <sub>1</sub>	—	.875	—	22.23
L	.120	—	3.05	—
$\phi M$ ①	—	—	—	—
N	.422	.453	10.72	11.51
$\phi t$	.060	.075	1.52	1.91
$\phi t_1$	.125	.165	3.18	4.19
W ③	—	—	—	—

**Notes:**

1. Complete threads to extend to within 2½ threads of seating plane. Diameter of unthreaded portion .249" (6.32MM) Maximum, .220" (5.59MM) Minimum.
2. Angular orientation of these terminals is undefined.
3. ¼-28 UNF-2A. Maximum pitch diameter of plated threads shall be basic pitch diameter .2268" (5.76MM), minimum pitch diameter .2225" (5.66MM), reference: screw thread standards for Federal Service 1957, Handbook H28, 1957, P1.

4. A chamfer (or undercut) on one or both ends of hexagonal portion is optional.
5. Case is anode connection.
6. Large terminal is cathode connection.
7. Small terminal is gate connection.
8. Insulating kit available upon request.
- A. ¼-28 steel nut, Ni. plated, .178 min. thk.
- B. Ext. tooth lockwasher, steel, Ni. plated, .023 min. thk.



T-25-17

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

2N5204-2N5207

Phase Control SCR

22 Amperes/600-1200 Volts

**Absolute Maximum Ratings, ( $T_j = 125^\circ\text{C}$  unless otherwise specified)**

Ratings	Symbol	2N5204	2N5205	2N5206	2N5207	Units
Repetitive peak off-state voltage	$V_{DRM}$	600	800	1000	1200	Volts
Repetitive peak reverse voltage	$V_{RRM}$	600	800	1000	1200	Volts
Non-repetitive peak reverse voltage	$V_{RSM}$	720	960	1200	1440	Volts
<b>2N5204-2N5207</b>						
RMS On-State Current	$I_{T(RMS)}$			35		Amperes
Average On-State Current (Nominal, See Charts) $T_c = 40^\circ\text{C}$	$I_{T(AV)}$			22		Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60 Hz)	$I_{TSM}$			300		Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50 Hz)	$I_{TSM}$			272		Amperes
$I^2t$ (for Fusing), 8.3 ms	$I^2t$			375		$\text{A}^2\text{sec}$
$I^2t$ (for Fusing), 1.0 ms	$I^2t$			200		$\text{A}^2\text{sec}$
Critical Rate-of-Rise of On-State Current (Repetitive)	$di/dt$			100		$\text{A}/\mu\text{s}$
Peak Gate Power Dissipation	$P_{GM}$			60		Watts
Average Gate Power Dissipation	$P_{G(AV)}$			10		Watts
Peak Reverse Gate Voltage	$V_{RGM}$			5		Volts
Storage Temperature	$T_{stg}$			-40 to 150		$^\circ\text{C}$
Operating Temperature	$T_j$			-40 to 125		$^\circ\text{C}$
Mounting Torque ①	—			30		in.-lb.
Mounting Torque ①	—			35		kg-cm

① Consult recommended mounting procedures; do not exceed maximums.



T-25-17

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

2N5204-2N5207  
 Phase Control SCR  
 22 Amperes/600-1200 Volts

### Electrical Characteristics

Characteristics	Symbol	Test Conditions	2N5204	2N5205	2N5206	2N5207	Units
<b>Voltage—Blocking State Maximums</b>							
Forward Leakage, Peak	$I_{DRM}$	$T_j = -40^\circ\text{C}$ to $125^\circ\text{C}$ , $V_D = V_{DRM}$	3.3	2.5	2.0	1.7	mA
Reverse Leakage, Peak	$I_{RRM}$	$T_j = -40^\circ\text{C}$ to $125^\circ\text{C}$ , $V_R = V_{RRM}$	3.3	2.5	2.0	1.7	mA
<b>2N5204-2N5207</b>							
<b>Current—Conducting State Maximums</b>							
Peak On-State Voltage	$V_{TM}$	$T_C = 25^\circ\text{C}$ , $I_{TM} = 70\text{ A}$		2.3			Volts
Holding Current	$I_H$	$V_D = 24\text{V}$ , $R_L = 20\Omega$ , $T_j = 25^\circ\text{C}$		100			mA
		$V_D = 24\text{V}$ , $R_L = 20\Omega$ , $T_j = -40^\circ\text{C}$		200			mA
<b>Switching</b>							
Typical Turn-Off Time	$t_q$	—		75			$\mu\text{s}$
Typical Critical dv/dt exponential to $V_{DRM}$	dv/dt	$T_j = 125^\circ\text{C}$ , Gate Open		100			V/ $\mu\text{s}$
<b>Thermal</b>							
Maximum Thermal Resistance, Junction to Case	$R_{th(j-c)}$			1.5			$^\circ\text{C}/\text{Watt}$
<b>Gate — Maximum Parameters</b>							
Gate Current to Trigger	$I_{GT}$	$V_D = 12\text{V}$ , $R_L = 12\Omega$ , $T_j = 25^\circ\text{C}$		40			mA
		$V_D = 12\text{V}$ , $R_L = 12\Omega$ , $T_j = -40^\circ\text{C}$		80			mA
Gate Voltage to Trigger	$V_{GT}$	$V_D = 12\text{V}$ , $R_L = 12\Omega$ , $T_j = 25^\circ\text{C}$		3			Volts
Minimum Non-Triggering Gate Voltage	$V_{GD}$	$V_D = \frac{1}{2} V_{DRM}$ , $T_j = 25^\circ\text{C}$		0.3			Volts

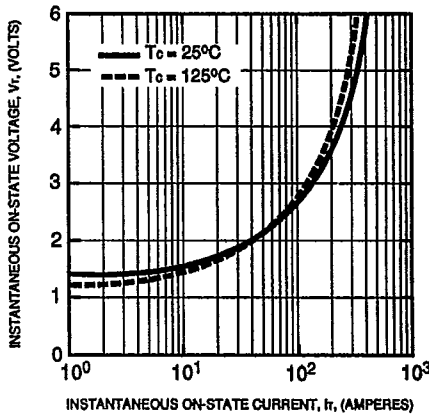


T-25-17

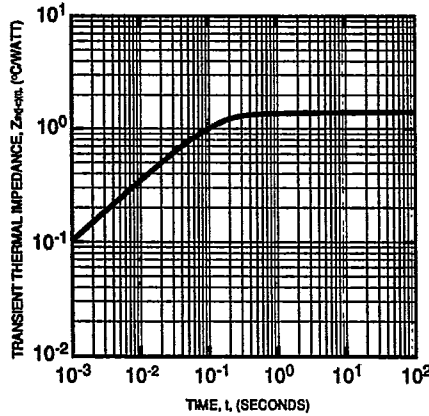
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

2N5204-2N5207  
 Phase Control SCR  
 22 Amperes/600-1200 Volts

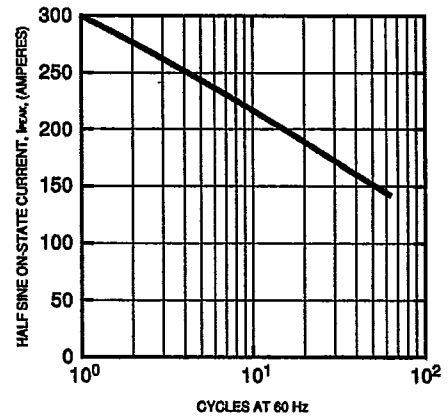
MAXIMUM ON-STATE CHARACTERISTICS



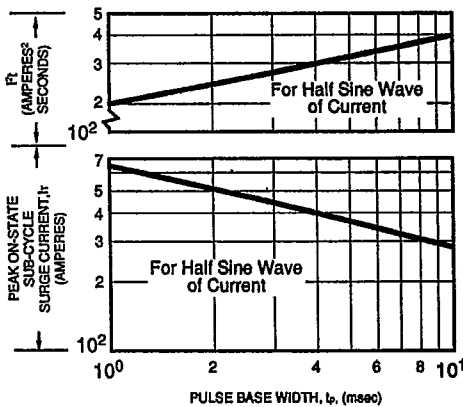
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



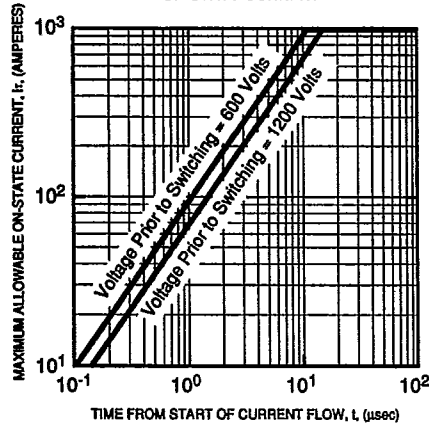
MAXIMUM ALLOWABLE SURGE ON-STATE CURRENT (NON-REPETITIVE)



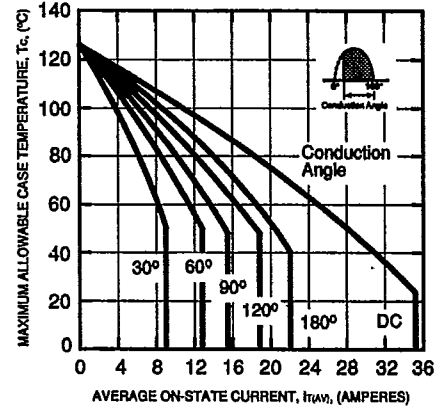
MAXIMUM ALLOWABLE SUB-CYCLE SURGE ON-STATE CURRENT AND PI RATING (NON-REPETITIVE)



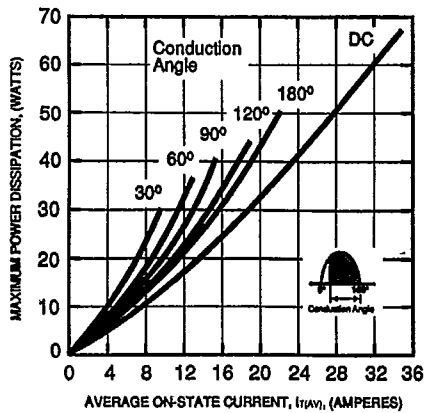
MAXIMUM ALLOWABLE RATE OF RISE OF ON-STATE CURRENT



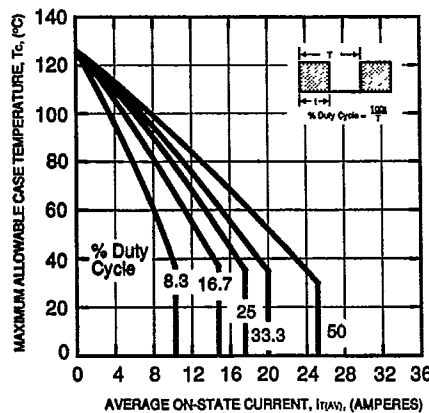
MAXIMUM ALLOWABLE CASE TEMPERATURE (HALF SINUSOIDAL WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (HALF SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)

