SOLID STATE INC.
46 FARRAND STREET
BLOOMFIELD, NEW JERSEY 07003
www.solidstateinc.com

2N1842A thru 2N1850A SILICON

TO-208AA
(TO-48)

Industrial-type, silicon controlled rectifiers in a stud package with current handling capability to 16 amperes at junction temperatures to 125°C.

MAXIMUM RATINGS (T_J = 125°C unless otherwise noted)

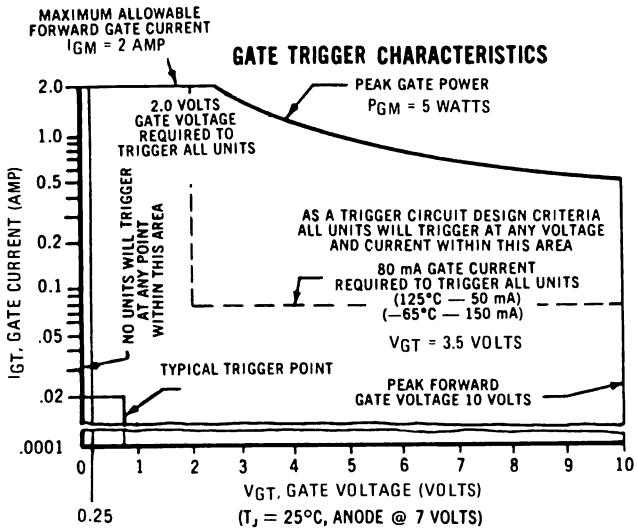
Rating		Symbol	Value	Unit
Peak Reverse Blocking Voltage*		$V_{RSM(rep)}$*		Volts
	2N1842A		25	
	2N1843A		50	
	2N1844A		100	
	2N1845A		150	
	2N1846A		200	
	2N1847A		250	
	2N1848A		300	
	2N1849A		400	
	2N1850A		500	
Peak Reverse Blocking Voltage (Transient) (Non-Recurrent 5 ms max.)		$V_{RSM(non-rep)}$		Volts
	2N1842A		35	
	2N1843A		75	
	2N1844A		150	
	2N1845A		225	
	2N1846A		300	
	2N1847A		350	
	2N1848A		400	
	2N1849A		500	
	2N1850A		600	
Forward Current RMS		$I_{T(RMS)}$	16	Amp
Peak Forward Surge Current (One Cycle, 60 Hz, T_J = -65 to +125°C)		I_{TSM}	125	Amp
Circuit Fusing Considerations (T_J = -65 to +125°C, t ≦ 8.3 ms)		I^2t	60	A^2s
Peak Gate Power - Forward		P_{GM}	5.0	Watts
Average Gate Power - Forward		$P_{G(AV)}$	0.5	Watt
Peak Gate Current - Forward		I_{GM}	2.0	Amp
Peak Gate Voltage - Forward		V_{GFM}	10	Volts
Reverse		V_{GRM}	5.0	
Operating Junction Temperature Range		T_J	-65 to +125	°C
Storage Temperature Range		T_{stg}	-65 to +150	°C
Stud Torque		—	30	in. lb.

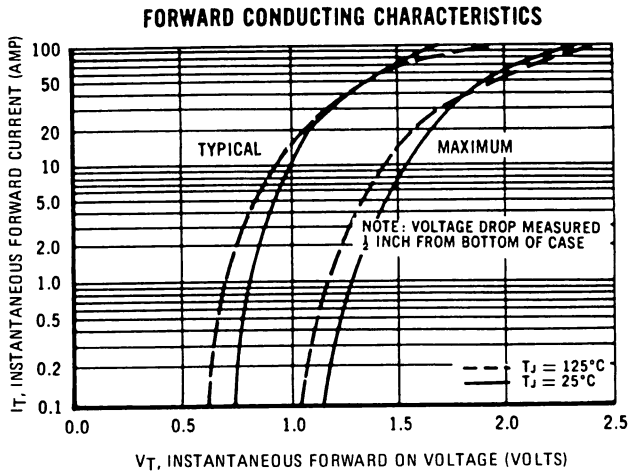
*$V_{RSM(rep)}$ for all types can be applied on a continuous dc basis without incurring damage. Ratings apply for zero or negative gate voltage.

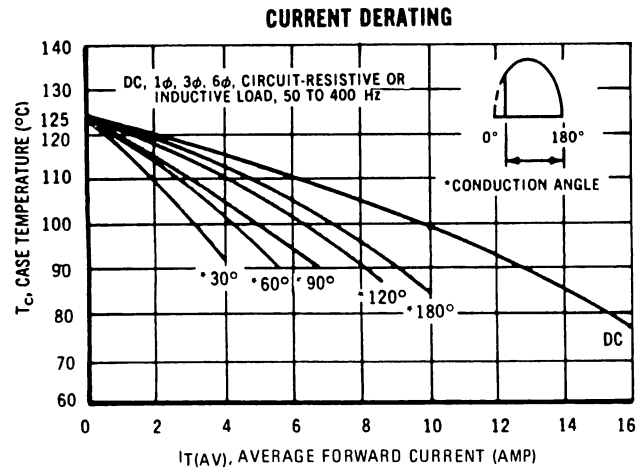
ELECTRICAL CHARACTERISTICS (Tc = 25°C unless otherwise noted)

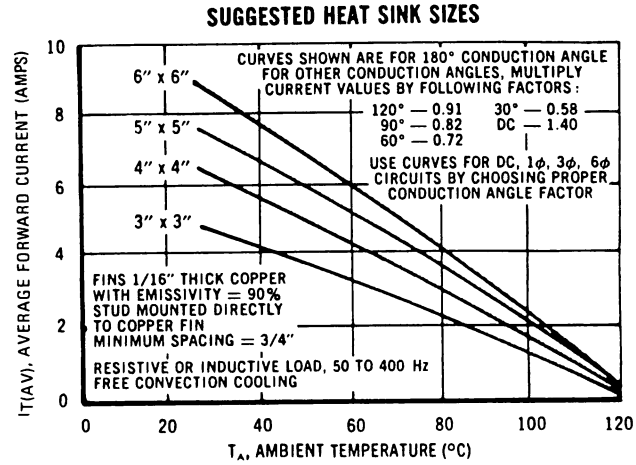
Characteristic		Symbol	Min	Typ	Max	Units
Peak Forward Blocking Voltage* (T_J = 125°C)	2N1842A	V_{DRM}*	25	—	—	Volts
	2N1843A		50	—	—	
	2N1844A		100	—	—	
	2N1845A		150	—	—	
	2N1846A		200	—	—	
	2N1847A		250	—	—	
	2N1848A		300	—	—	
	2N1849A		400	—	—	
	2N1850A		500	—	—	
Peak Forward or Reverse Blocking Current (V_{DRM}, OR V_{RSM}, gate open, T_J = 125°C)		I_{DRM} I_{RRM}	—	—	6.0	mA
Gate Trigger Current (Continuous dc) (Anode Voltage = 7 Vdc, R_L = 50 Ω)		I_{GT}	—	15	80	mA
Gate Trigger Voltage (Anode Voltage = 7 Vdc, R_L = 50 Ω)		V_{GT}	—	0.8	2.0	Volts
(V_{DRM} = Rated V, R_L = 50 Ω, T_J = 125°C)		V_{GNT}	0.25	—	—	
Holding Current (Anode Voltage = 7 Vdc, Gate Open)		I_H	—	20	—	mA
Forward On Voltage (I_T = 16 Adc)		V_T	—	1.1	1.6	Volts
Turn-On Time (t_d + t_r) (I_{GT}= 50 mA, I_T = 10 A)		t_{gt}	—	1.0	—	μs
Turn-Off Time (I_T = 10 A, I_R = 10 A, dv/dt = 20 V/μs, T_J = 125°C)		t_q	—	30	—	μs
Forward Voltage Application Rate (Gate Open, T_J = 125°C)		dv/dt	—	30	—	V/ μs
Thermal Resistance (Junction to Case)		θ_{JC}	—	1.0	2.0	°C/W

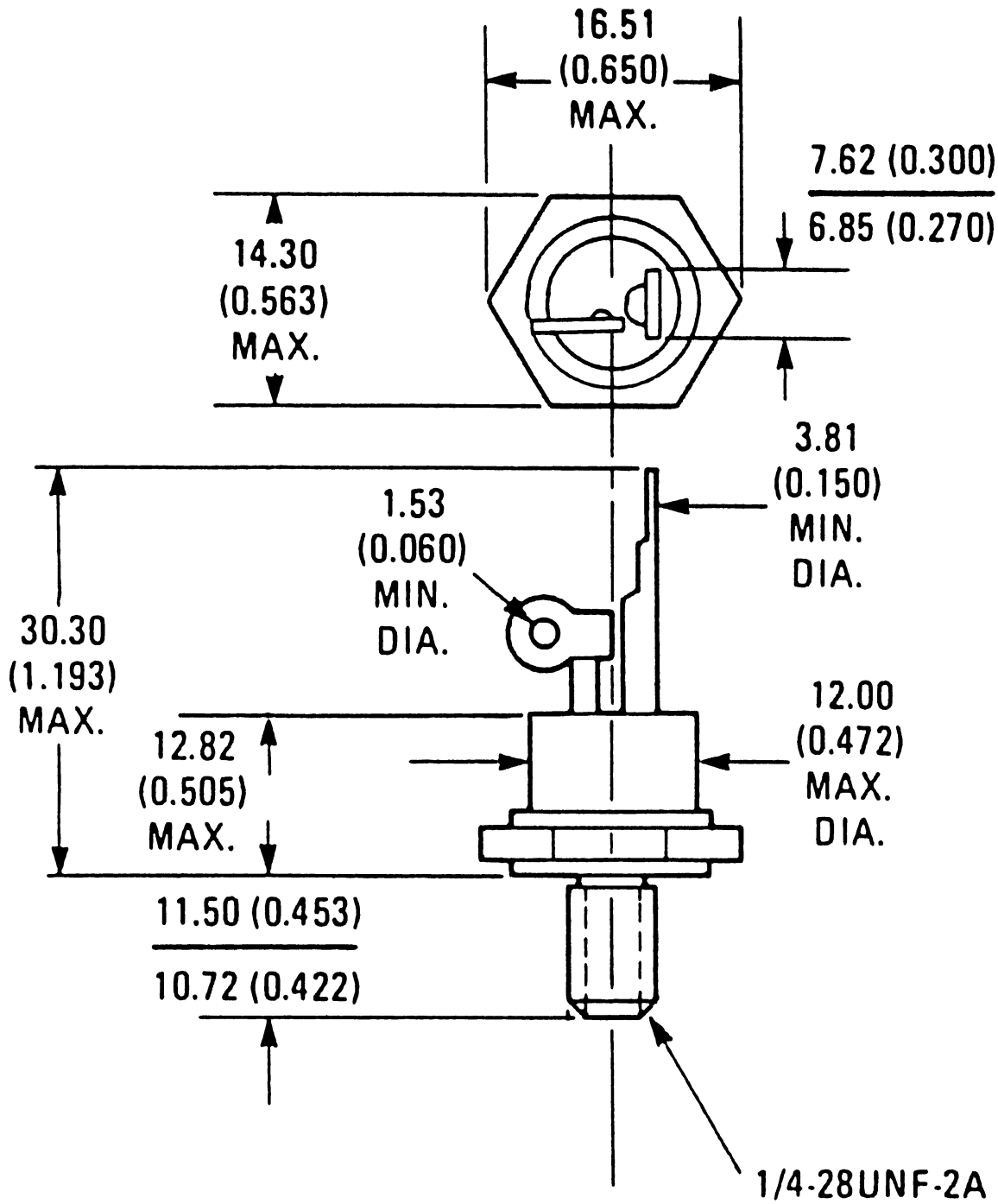
*V_{DRM} for all types can be applied on a continuous dc basis without incurring damage. Ratings apply for zero or negative gate voltage.


GATE TRIGGER CHARACTERISTICS
MAXIMUM ALLOWABLE FORWARD GATE CURRENT
IGM = 2 AMP
PEAK GATE POWER
PGM = 5 WATTS
2.0 VOLTS GATE VOLTAGE REQUIRED TO TRIGGER ALL UNITS
NO UNITS WILL TRIGGER AT ANY POINT WITHIN THIS AREA
AS A TRIGGER CIRCUIT DESIGN CRITERIA ALL UNITS WILL TRIGGER AT ANY VOLTAGE AND CURRENT WITHIN THIS AREA
80 mA GATE CURRENT REQUIRED TO TRIGGER ALL UNITS
(125°C — 50 mA)
(—65°C — 150 mA)
VGT = 3.5 VOLTS
TYPICAL TRIGGER POINT
PEAK FORWARD GATE VOLTAGE 10 VOLTS
IGT, GATE CURRENT (AMP)
2.0
1.0
0.5
0.2
0.1
.05
.02
.0001
0
1
2
3
4
5
6
7
8
9
10
0.25
VGT, GATE VOLTAGE (VOLTS)
(TJ = 25°C, ANODE @ 7 VOLTS)


FORWARD CONDUCTING CHARACTERISTICS
IT, INSTANTANEOUS FORWARD CURRENT (AMP)
100
50
20
10
5.0
2.0
1.0
0.5
0.2
0.1
TYPICAL
MAXIMUM
NOTE: VOLTAGE DROP MEASURED ½ INCH FROM BOTTOM OF CASE
TJ = 125°C
TJ = 25°C
0.0
0.5
1.0
1.5
2.0
2.5
VT, INSTANTANEOUS FORWARD ON VOLTAGE (VOLTS)


CURRENT DERATING
TC, CASE TEMPERATURE (°C)
140
130
125
120
110
100
90
80
70
60
DC, 1φ, 3φ, 6φ, CIRCUIT-RESISTIVE OR INDUCTIVE LOAD, 50 TO 400 Hz
0°
180°
*CONDUCTION ANGLE
*30°
*60°
*90°
*120°
*180°
DC
0
2
4
6
8
10
12
14
16
IT(AV), AVERAGE FORWARD CURRENT (AMP)


SUGGESTED HEAT SINK SIZES
IT(AV), AVERAGE FORWARD CURRENT (AMPS)
10
8
6
4
2
0
CURVES SHOWN ARE FOR 180° CONDUCTION ANGLE
FOR OTHER CONDUCTION ANGLES, MULTIPLY CURRENT VALUES BY FOLLOWING FACTORS:
120° — 0.91
90° — 0.82
60° — 0.72
30° — 0.58
DC — 1.40
USE CURVES FOR DC, 1φ, 3φ, 6φ CIRCUITS BY CHOOSING PROPER CONDUCTION ANGLE FACTOR
6" x 6"
5" x 5"
4" x 4"
3" x 3"
FINS 1/16" THICK COPPER WITH EMISSIVITY = 90% STUD MOUNTED DIRECTLY TO COPPER FIN MINIMUM SPACING = 3/4"
RESISTIVE OR INDUCTIVE LOAD, 50 TO 400 Hz
FREE CONVECTION COOLING
0
20
40
60
80
100
120
TA, AMBIENT TEMPERATURE (°C)



Conforms to JEDEC OUTLINE TO-208AA (TO-48)

Dimensions in Millimeters and (Inches)