2N1842 thru 2N1850 (SILICON)

CASE 263

Industrial-type, silicon controlled rectifiers in a stud package with current handling capability to 16 amperes at junction temperatures to 100°C. MCR equivalents available in TO-48 package – i.e. – 2N1842 available in TO-48 package as MCR1842.

MAXIMUM RATINGS (T_J = 100°C unless otherwise noted)

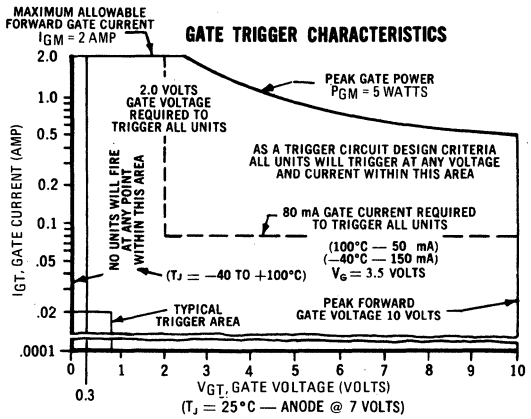
Rating		Symbol	Value	Unit
Peak Reverse Blocking Voltage*		$V_{RSM(rep)}$*		Volts
	2N1842		25	
	2N1843		50	
	2N1844		100	
	2N1845		150	
	2N1846		200	
	2N1847		250	
	2N1848		300	
	2N1849		400	
	2N1850		500	
Peak Reverse Blocking Voltage (Transient) (Non-Recurrent 5 ms max.)		$V_{RSM(non-rep)}$		Volts
	2N1842		35	
	2N1843		75	
	2N1844		150	
	2N1845		225	
	2N1846		300	
	2N1847		350	
	2N1848		400	
	2N1849		500	
	2N1850		600	
Forward Current RMS (All Conduction Angles)		$I_{T(RMS)}$	16	Amp
Circuit Fusing Considerations (T_J = -40 to +100°C, t ≦ 8.3 ms)		I^2t	60	A^2s
Peak Forward Surge Current (One Cycle, 60 Hz, T_J = -40 to +100°C)		I_{TSM}	125	Amp
Peak Gate Power -		P_{GM}	5.0	Watts
Average Gate Power		$P_{G(AV)}$	0.5	Watt
Peak Gate Current -		I_{GM}	2.0	Amp
Peak Gate Voltage - Forward		V_{GFM}	10	Volts
Reverse		V_{GRM}	5.0	
Operating Junction Temperature Range		T_J	-40 to +100	°C
Storage Temperature Range		T_{stg}	-40 to +125	°C
Stud Torque		—	30	in. lb.

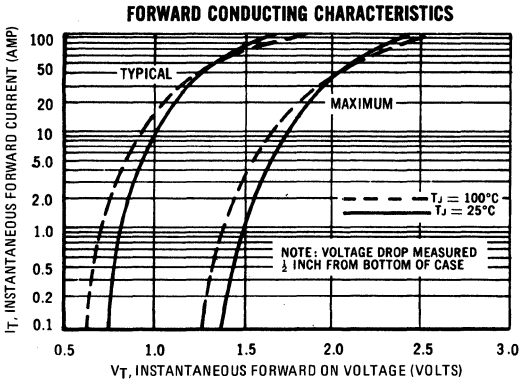
*$V_{RSM(rep)}$ for all types can be applied on a continuous dc basis without incurring damage. Ratings apply for zero or negative gate voltage.

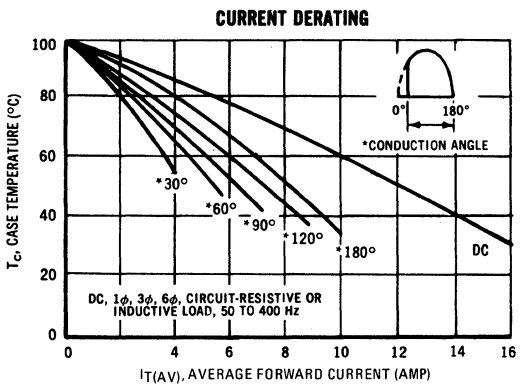
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

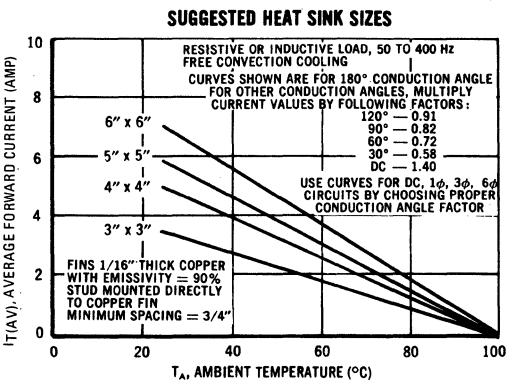
Characteristic		Symbol	Min	Typ	Max	Units
Peak Forward Blocking Voltage* (T_J = 100°C)	2N1842	V_{DRM}*	25	—	—	Volts
	2N1843		50	—	—	
	2N1844		100	—	—	
	2N1845		150	—	—	
	2N1846		200	—	—	
	2N1847		250	—	—	
	2N1848		300	—	—	
	2N1849		400	—	—	
	2N1850		500	—	—	
Peak Forward or Reverse Blocking Current (Rated V_{FOM} or V_{ROM} gate open, T_J = 100°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 (Continuous dc) (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 = 100°C)		V_{GNT}	0.3	—	—	
Holding Current (Anode Voltage = 7 Vdc, Gate Open)		I_H	—	20	—	mA
Forward On Voltage (I_F = 16 Adc)		V_{TM}	—	1.1	1.8	Volts
Turn-On Time (t_d + t_r) (I_G = 50 mA, I_F = 10 A)		t_{gt}	—	1.0	—	μs
Turn-Off Time (I_F = 10 A, I_R = 10 A; dv/dt = 20 V/μs, T_J = 100°C) (V_{DRM} = rated voltage)		t_q	—	25	—	μs
Forward Voltage Application Rate (Gate open, T_J = 100°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 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
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
(100°C — 50 mA)
(—40°C — 150 mA)
VG = 3.5 VOLTS
NO UNITS WILL FIRE AT ANY POINT WITHIN THIS AREA
(TJ = —40 TO +100°C)
TYPICAL TRIGGER AREA
PEAK FORWARD GATE VOLTAGE 10 VOLTS
IGT, GATE CURRENT (AMP)
VGT, GATE VOLTAGE (VOLTS)
(TJ = 25°C — ANODE @ 7 VOLTS)


FORWARD CONDUCTING CHARACTERISTICS
TYPICAL
MAXIMUM
TJ = 100°C
TJ = 25°C
NOTE: VOLTAGE DROP MEASURED ½ INCH FROM BOTTOM OF CASE
IT, INSTANTANEOUS FORWARD CURRENT (AMP)
VT, INSTANTANEOUS FORWARD ON VOLTAGE (VOLTS)


CURRENT DERATING
0°
180°
*CONDUCTION ANGLE
*30°
*60°
*90°
*120°
*180°
DC
DC, 1ϕ, 3ϕ, 6ϕ, CIRCUIT-RESISTIVE OR INDUCTIVE LOAD, 50 TO 400 Hz
TC, CASE TEMPERATURE (°C)
IT(AV), AVERAGE FORWARD CURRENT (AMP)


SUGGESTED HEAT SINK SIZES
RESISTIVE OR INDUCTIVE LOAD, 50 TO 400 Hz
FREE CONVECTION COOLING
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″
IT(AV), AVERAGE FORWARD CURRENT (AMP)
TA, AMBIENT TEMPERATURE (°C)