MCR264-4, MCR264-6, MCR264-8

Preferred Device

Silicon Controlled Rectifiers

Reverse Blocking Thyristors

   Designed for back-to-back SCR output devices for solid state relays or applications requiring high surge operation.

- Photo Glass Passivated Blocking Junctions for High Temperature Stability, Center Gate for Uniform Parameters
- 400 Amperes Surge Capability
- Blocking Voltage to 600 Volts
- Device Marking: Logo, Device Type, e.g., MCR264–4, Date Code

ON Semiconductor

SCRs
40 AMPERES RMS
200 thru 600 VOLTS

A ○——▷|——○ K   G

4

1 2 3

TO–220AB
CASE 221A
STYLE 3

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off–State Voltage[1] (T_J = −40 to 125°C, Sine Wave 50 to 60 Hz; Gate Open) MCR264–4 MCR264–6 MCR264–8	V_{DRM}, V_{RRM}	200 400 600	Volts
On-State RMS Current (T_C = 80°C; 180° Conduction Angles)	$I_{T(RMS)}$	40	A
Average On-State Current (T_C = 80°C; 180° Conduction Angles)	$I_{T(AV)}$	25	A
Peak Non-repetitive Surge Current (T_C = 80°C) (1/2 Cycle, Sine Wave 60 Hz, T_J = 125°C)	I_{TSM}	400 450	A
Forward Peak Gate Power (Pulse Width ≤ 1.0 μs, T_C = 80°C)	P_{GM}	20	Watts
Forward Average Gate Power (t = 8.3 ms, T_C = 80°C)	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current (Pulse Width ≤ 1.0 μs, T_C = 80°C)	I_{GM}	2.0	A
Operating Junction Temperature Range	T_J	−40 to +125	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C

(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
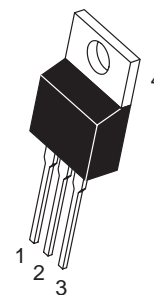
   These devices are rated for use in applications subject to high surge conditions. Care must be taken to insure proper heat sinking when the device is to be used at high sustained currents.

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

ORDERING INFORMATION

Device	Package	Shipping
MCR264–4	TO220AB	500/Box
MCR264–6	TO220AB	500/Box
MCR264–8	TO220AB	500/Box

Preferred devices are recommended choices for future use and best overall value.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.0	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Forward or Reverse Blocking Current (V_{AK} = Rated V_{DRM} or V_{RRM}, Gate Open) T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	— —	— —	10 2.0	μA mA
ON CHARACTERISTICS					
Peak Forward On–State Voltage[1] (I_{TM} = 80 A)	V_{TM}	—	1.4	2.0	Volts
Gate Trigger Current (Continuous dc) (V_{AK} = 12 Vdc, R_L = 100 Ohms, T_C = – 40°C)	I_{GT}	— —	15 30	50 90	mA
Gate Trigger Voltage (Continuous dc) (V_{AK} = 12 Vdc, R_L = 100 Ohms)	V_{GT}	—	1.0	1.5	Volts
Gate Non-Trigger Voltage (V_{AK} = 12 Vdc, R_L = 100 Ohms, T_J = 125°C)	V_{GD}	0.2	—	—	Volts
Holding Current (V_{AK} = 12 Vdc, Initiating Current = 200 mA, Gate Open)	I_H	—	30	60	mA
Turn-On Time (I_{TM} = 40 A, I_{GT} = 60 mAdc)	t_{gt}	—	1.5	—	μs
DYNAMIC CHARACTERISTICS					
Critical Rate-of-Rise of Off-State Voltage (Gate Open, V_D = Rated V_{DRM}, Exponential Waveform)	dv/dt	—	50	—	V/μs

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

MCR264–4, MCR264–6, MCR264–8

Voltage Current Characteristic of SCR

Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak On State Voltage
I_H	Holding Current

+ Current

Anode +

V_{TM}

on state

I_H

I_{RRM} at V_{RRM}

+ Voltage

Reverse Blocking Region
(off state)

I_{DRM} at V_{DRM}

Reverse Avalanche Region

Forward Blocking Region
(off state)

Anode –

α = CONDUCTION ANGLE

α = 30°

60°

90°

180°

dc
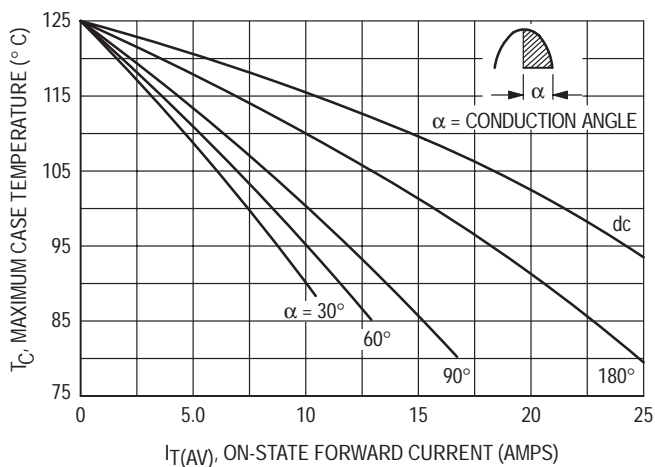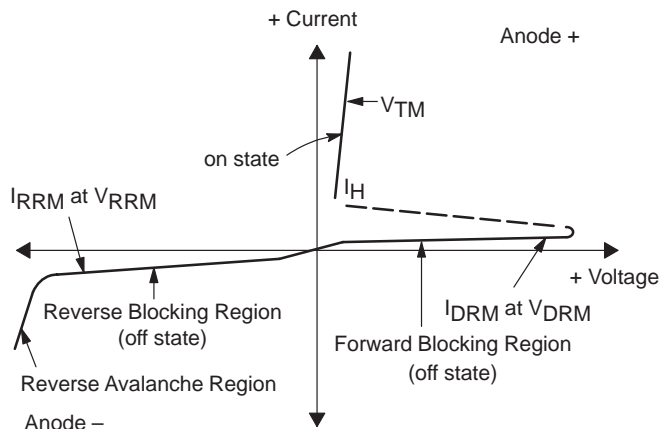
Figure 1. Average Current Derating

α = 30°

60°

90°

180°

dc

α = CONDUCTIVE ANGLE
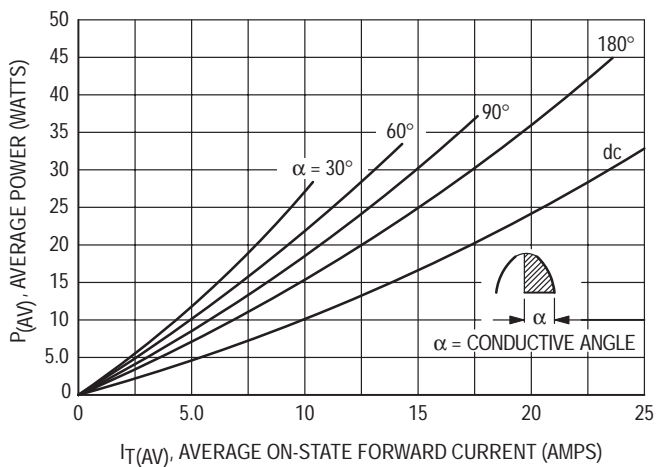
Figure 2. Maximum On–State Power Dissipation
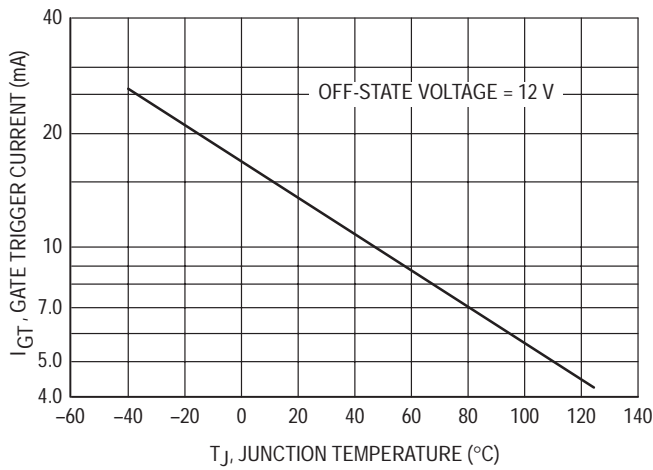
Figure 3. Typical Gate Trigger Current
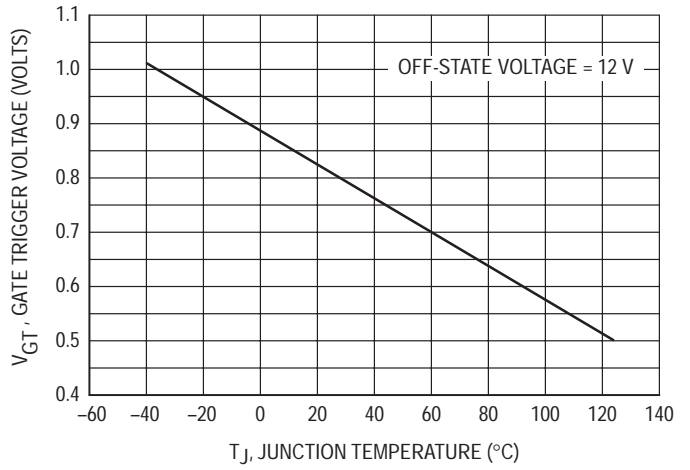
Figure 4. Typical Gate Trigger Voltage
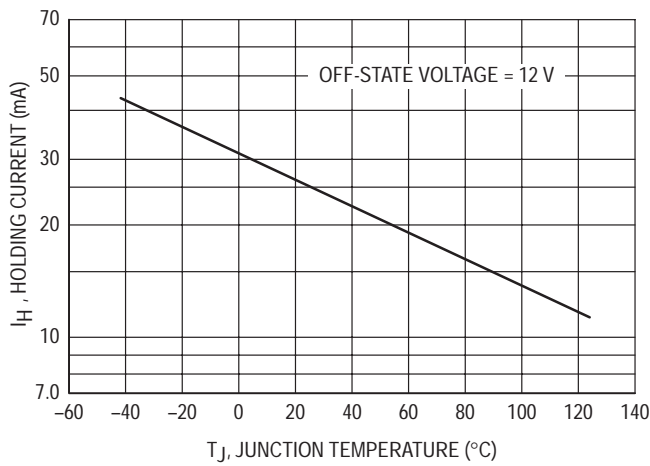
Figure 5. Typical Holding Current
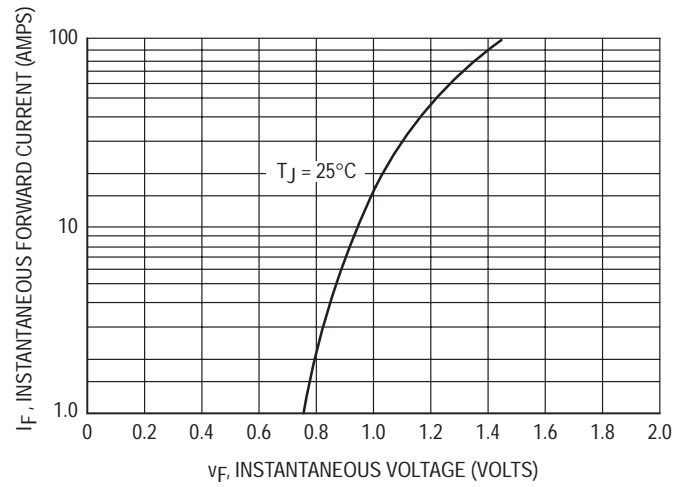
Figure 6. Typical Forward Voltage

$$Z_{\theta JC}(t) = R_{\theta JC} \bullet r(t)$$
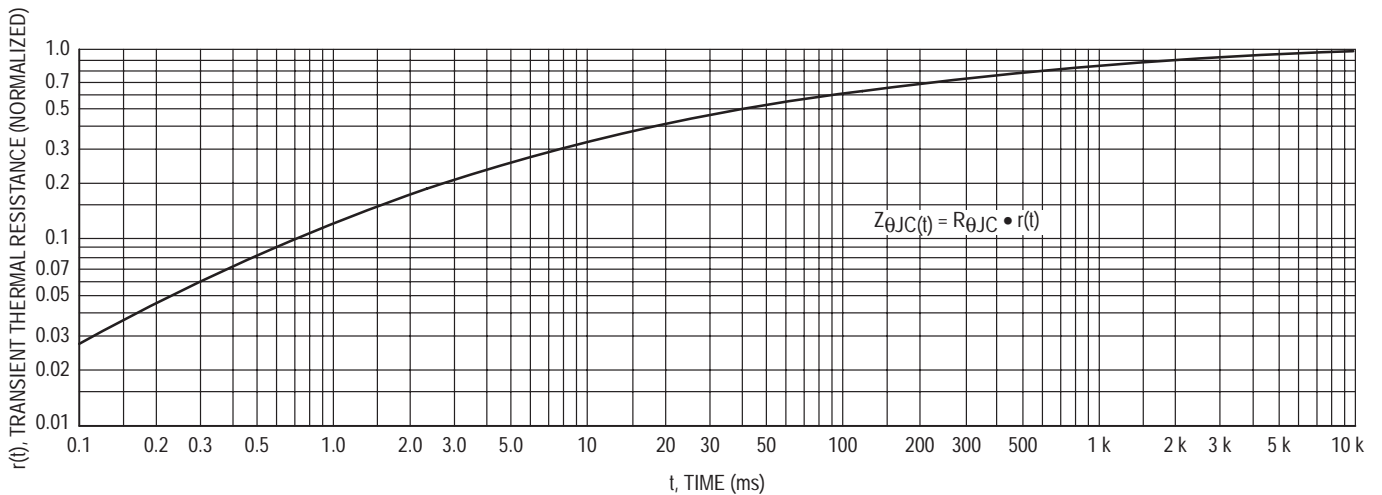
Figure 7. Thermal Response

MCR264–4, MCR264–6, MCR264–8

PACKAGE DIMENSIONS

TO–220AB
CASE 221A–07
ISSUE Z
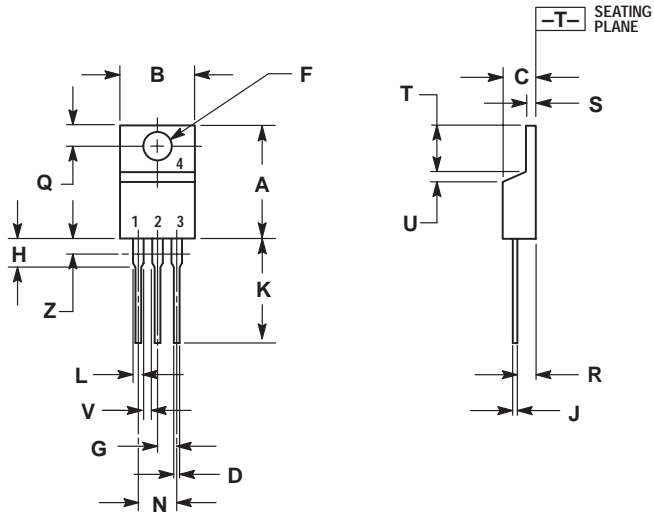
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	–––	1.15	–––
Z	–––	0.080	–––	2.04

STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

Notes

Notes

PUBLICATION ORDERING INFORMATION