

D-PAK Triacs

(4 Amps)

General Description

Teccor's new line of D-PAK and V-PAK triacs include surface mount devices with current capabilities through 4 amperes. Voltage ranges are available from 200 to 800 volts.

Teccor's D-PAK and V-PAK triacs are available in a choice of two packages as shown above, surface mount (SMT) TO-252AA and through hole TO-251AA.

These gated triacs from Teccor Electronics are part of a broad line of bidirectional semiconductors.

This new line of devices is designed for high volume, low cost AC power applications such as controllers for motor loads, lights, temperature, and general line voltage switching.

The triac may be gate triggered from a blocking to conduction state for either polarity of applied voltage and is designed for AC switching and phase control applications such as speed and temperature modulation controls, lighting controls and static switching relays. The triggering signal is normally applied between the gate and MT1 with three operating modes guaranteed.

All Teccor triacs have glass-passivated junctions to ensure long term device reliability and permanent stability. Teccor's glass offers a rugged, reliable barrier against junction contamination.

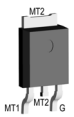
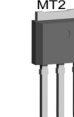
Variations of devices covered in this data sheet are available for custom design applications. Please consult factory for more information.

Tape-and-reel capability is available for through hole TO-251AA. The TO-252AA is furnished in pocket / embossed tape on reels.

Features

- **Surface mount package TO-252AA and through hole TO-251AA**
- **Glass-passivated junctions ensure long device reliability and parameter stability**
- **Voltage capability — up to 800 Volts**
- **Surge capability — up to 55 Amps**

Electrical Specifications

$I_T(\text{RMS})$	Part No.		V_{DRM}	I_{GT}				I_{DRM}		V_{TM}	V_{GT}		
	Surface Mount	Through Hole		mAmps				mAmps			Volts		
RMS On-State Current Conduction Angle of 360°			Repetitive Peak Blocking Voltage (1)	DC Gate Trigger Current in Specific Operating Quadrants $V_D = 12\text{VDC}$ $R_L = 60\Omega$ (3)				Peak Off-State Current Gate Open $V_{\text{DRM}} = \text{Max Rated Value}$ (1) (7)		Peak On-State Voltage at Max Rated RMS Current $T_C = 25^\circ\text{C}$ (1)	DC Gate Trigger Voltage $V_D = 12\text{VDC}$ $R_L = 60\Omega$ (2) (8)		
	TO-252AA D-PAK	TO-251AA V-PAK	Volts	QI	QII	QIII	QIV	$T_C = 25^\circ\text{C}$	$T_C = 125^\circ\text{C}$	Volts	$T_C = 125^\circ\text{C}$	$T_C = 25^\circ\text{C}$	
MAX	Non Isolated	Non Isolated	MIN	MAX				TYP	MAX	MAX	MAX	MIN	MAX
4.0 AMP	Q2004D3		200	10	10	10	25	.05	2.0	1.6	0.2	2.0	
	Q4004D3		400	10	10	10	25	.05	2.0	1.6	0.2	2.0	
	Q5004D3		500	10	10	10	25	.05	2.0	1.6	0.2	2.0	
	Q6004D3		600	10	10	10	25	.05	2.0	1.6	0.2	2.0	
	Q2004D4		200	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q4004D4		400	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q5004D4		500	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q6004D4		600	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q7004D4		700	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q8004D4		800	25	25	25	50	.05	2.0	1.6	0.2	2.5	
		Q2004V3		200	10	10	10	25	.05	2.0	1.6	0.2	2.0
		Q4004V3		400	10	10	10	25	.05	2.0	1.6	0.2	2.0
		Q5004V3		500	10	10	10	25	.05	2.0	1.6	0.2	2.0
		Q6004V3		600	10	10	10	25	.05	2.0	1.6	0.2	2.0
		Q2004V4		200	25	25	25	50	.05	2.0	1.6	0.2	2.5
		Q4004V4		400	25	25	25	50	.05	2.0	1.6	0.2	2.5
	Q5004V4		500	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q6004V4		600	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q7004V4		700	25	25	25	50	.05	2.0	1.6	0.2	2.5	
	Q8004V4		800	25	25	25	50	.05	2.0	1.6	0.2	2.5	

General Notes

- All measurements are made with 60Hz resistive load and at an ambient temperature of +25°C unless otherwise specified.
- Operating temperature range (T_J) is -40°C to +125°C.
- Storage temperature range (T_S) is -40°C to +150°C.
- Lead solder temperature is a maximum of 230°C for 10 seconds maximum at a minimum of 1/16" (1.59mm) from case.
- The case temperature (T_C) is measured as shown on dimensional outline drawings. See mechanical specifications on page - 4 of this data sheet.

Gate Characteristics

Teccor triacs may be turned on between gate and MT1 terminals in the following ways:

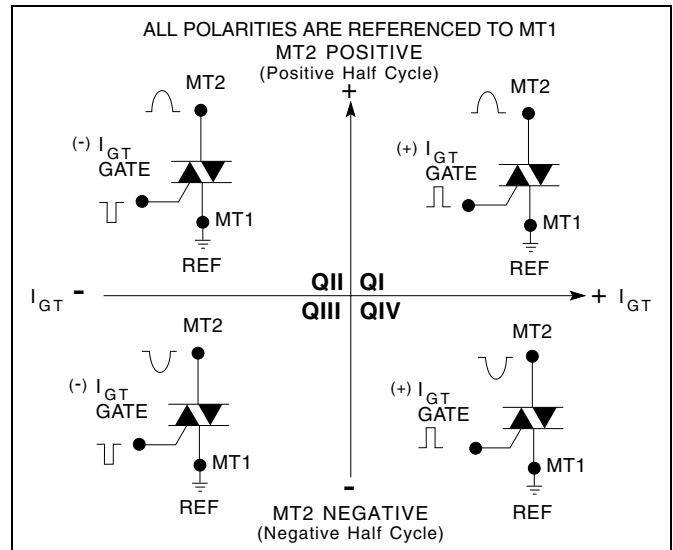
- With in-phase signals (using standard AC line) Quadrants I and III are used.
- By applying unipolar pulses (gate always positive or negative) — with negative gate pulses Quadrants II and III are used and with positive gate pulses Quadrants I and IV are used.

When maximum surge capability is required, pulses should be a minimum of one magnitude above I_{GT} rating with a steep rising waveform ($\leq 1\mu\text{sec}$ rise time).

I_H	I_{GTM}	P_{GM}	$P_{G(AV)}$	I_{TSM}		$dv/dt(c)$	dv/dt	t_{gt}	I^2t	di/dt
				Amps						
Holding Current Gate Open Initial On-State Current = 200mA DC (1)	Peak Gate Trigger Current (6)	Peak Gate Power Dissipation $I_{GT} \leq I_{GTM}$ (6)	Average Gate Power Dissipation	60Hz	50Hz	Critical Rate-of-Rise of Commutation Voltage at Rated V_{DRM} and $I_{T(RMS)}$ Commutating $di/dt = 0.54$ Rated $I_{T(RMS)}$ /ms Gate Unenergized (1) (5)	Critical Rate-of-Rise of Off-State Voltage at Rated V_{DRM} Gate Open (1) Volts/ μ Sec $T_C = 100^\circ C$	Gate Controlled Turn-On Time $I_{GT} = 200mA$ 0.1 μ s Rise Time	RMS Surge (Non-Repetitive) On-State Current for Period of 8.3ms for Fusing	Maximum Rate-of-Change of On-State Current $I_{GT} = 200mA$ With 0.1 μ s Rise Time
mAmps	Amps	Watts	Watts			Volts/ μ Sec		μ Sec	Amps ² Sec	Amps/ μ Sec
MAX						TYP	TYP	TYP		
20	1.2	15	0.3	55	46	2.0	50	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	50	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	40	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	40	2.5	12.5	50
30	1.2	15	0.3	55	46	2.0	100	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	100	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	75	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	75	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	60	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	60	3.0	12.5	50
20	1.2	15	0.3	55	46	2.0	50	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	50	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	40	2.5	12.5	50
20	1.2	15	0.3	55	46	2.0	40	2.5	12.5	50
30	1.2	15	0.3	55	46	2.0	100	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	100	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	75	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	75	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	60	3.0	12.5	50
30	1.2	15	0.3	55	46	2.0	60	3.0	12.5	50

Electrical Specification Notes

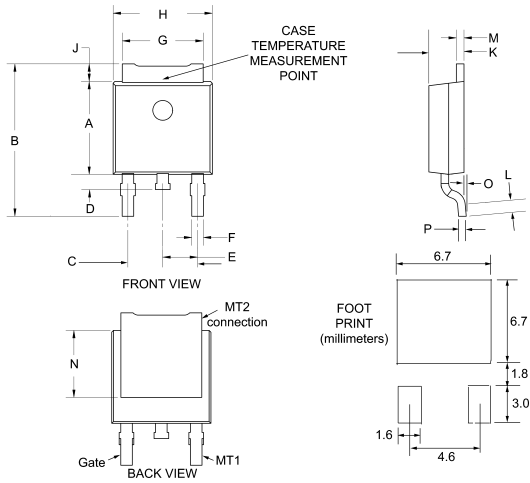
- (1) For either polarity of MT2 with reference to MT1 terminal.
- (2) For either polarity of gate voltage V_{GT} with reference to MT1 terminal.
- (3) See definition of quadrants and gate characteristics.
- (4) See Figure 1.2 for surge rating and specific duration.
- (5) See Figure 1.1 for maximum allowable case temperature at maximum rated current.
- (6) Pulse width $\leq 10\mu s$.
- (7) $T_C = T_J$ for test conditions in off-state.
- (8) Quadrants I, II, and III only.



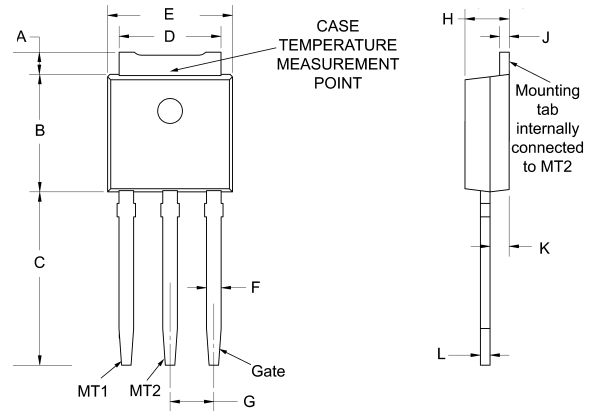
Definition of Quadrants

Mechanical Specifications

TO-252AA D-PAK Surface Mount



TO-251AA V-PAK Through Hole



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.236	.244	6.00	6.20
B	.379	.409	9.63	10.39
C	.176	.184	4.47	4.67
D	.035	.050	0.89	1.27
E	.087	.093	2.21	2.36
F	.027	.033	0.69	0.84
G	.205	.213	5.21	5.41
H	.251	.261	6.38	6.63
J	.040	.050	1.02	1.27
K	.086	.094	2.18	2.39
L	.026	.036	0.66	0.91
M	.018	.023	0.46	0.58
N	.170	.180	4.32	4.57
O	.002	.010	0.05	0.25
P	.018	.023	0.46	0.58

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.040	.050	1.02	1.27
B	.236	.244	6.00	6.20
C	.350	.375	8.89	9.53
D	.205	.213	5.21	5.41
E	.251	.261	6.38	6.63
F	.027	.033	0.69	0.84
G	.087	.093	2.21	2.36
H	.086	.094	2.18	2.39
J	.018	.023	0.46	0.58
K	.036	.042	0.91	1.07
L	.018	.023	0.46	0.58

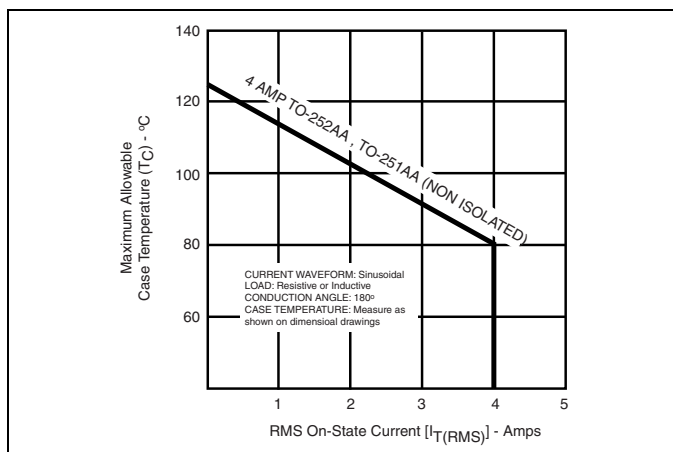


Figure 1.1 Maximum Allowable Case Temperature vs On-State Current (4.0 Amp)

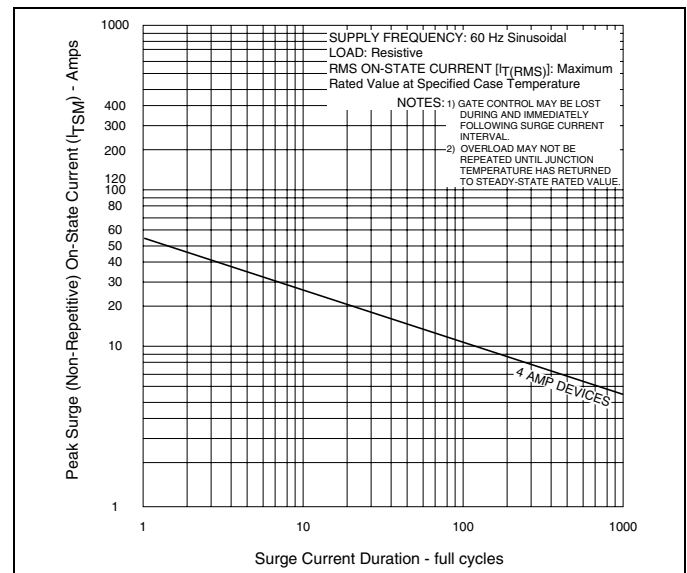


Figure 1.2 Peak Surge Current vs Surge Current Duration