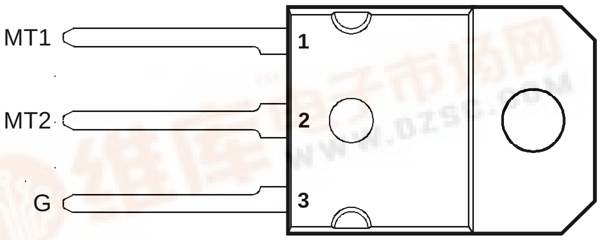
TIC253 SERIES
SILICON TRIACS

DECEMBER 1971 - REVISED MARCH 1997

- **High Current Triacs**
- **20 A RMS**
- **Glass Passivated Wafer**
- **400 V to 800 V Off-State Voltage**
- **150 A Peak Current**
- **Max I_{GT} of 50 mA (Quadrants 1 - 3)**

SOT-93 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

absolute maximum ratings over operating case temperature (unless otherwise noted)

RATING		SYMBOL	VALUE	UNIT
Repetitive peak off-state voltage (see Note 1)	TIC253D	V_{DRM}	400	V
	TIC253M		600	
	TIC253S		700	
	TIC253N		800	
Full-cycle RMS on-state current at (or below) 70°C case temperature (see Note 2)		$I_{T(RMS)}$	20	A
Peak on-state surge current full-sine-wave (see Note 3)		I_{TSM}	150	A
Peak gate current		I_{GM}	±1	A
Operating case temperature range		T_C	-40 to +110	°C
Storage temperature range		T_{stg}	-40 to +125	°C
Lead temperature 1.6 mm from case for 10 seconds		T_L	230	°C

NOTES:
1. These values apply bidirectionally for any value of resistance between the gate and Main Terminal 1.
2. This value applies for 50-Hz full-sine-wave operation with resistive load. Above 70°C derate linearly to 110°C case temperature at the rate of 500 mA/°C.
3. This value applies for one 50-Hz full-sine-wave when the device is operating at (or below) the rated value of peak reverse voltage and on-state current. Surge may be repeated after the device has returned to original thermal equilibrium.

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
I_{DRM}	Repetitive peak off-state current	V_D = Rated V_{DRM}	$I_G = 0$	T_C = 110°C			±2	mA
I_{GTM}	Peak gate trigger current	V_{supply} = +12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		7	50	mA
		V_{supply} = +12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		-15	-50	
		V_{supply} = -12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		-16	-50	
		V_{supply} = -12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		28		
V_{GTM}	Peak gate trigger voltage	V_{supply} = +12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		0.7	2	V
		V_{supply} = +12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		-0.7	-2	
		V_{supply} = -12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		-0.8	-2	
		V_{supply} = -12 V†	R_L = 10 Ω	$t_{p(g)}$ > 20 µs		0.8	2	
V_{TM}	Peak on-state voltage	I_{TM} = ±28.2 A	I_G = 50 mA	(see Note 4)		±1.4	±1.7	V
I_H	Holding current	V_{supply} = +12 V†	$I_G = 0$	Init' I_{TM} = 100 mA		6	40	mA
		V_{supply} = -12 V†	$I_G = 0$	Init' I_{TM} = -100 mA		-13	-40	

† All voltages are with respect to Main Terminal 1.

NOTE 4: This parameter must be measured using pulse techniques, t_p = ≤ 1 ms, duty cycle ≤ 2 %. Voltage-sensing contacts separate from the current carrying contacts are located within 3.2 mm from the device body.

electrical characteristics at 25°C case temperature (unless otherwise noted) (continued)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
I_L	Latching current	V_{supply} = +12 V† (see Note 5) V_{supply} = -12 V†		20 -20		mA
dv/dt	Critical rate of rise of off-state voltage	V_D = Rated V_D I_G = 0 T_C = 110°C		±450		V/µs
$dv/dt_{(c)}$	Critical rise of commutation voltage	V_D = Rated V_D T_C = 80°C di/dt = 0.5 $I_{T(RMS)}$/ms I_T = 1.4 $I_{T(RMS)}$		±1		V/µs
di/dt	Critical rate of rise of on -state current	V_D = Rated V_D I_{GT} = 50 mA T_C = 110°C di_G/dt = 50 mA/µs		±200		A/µs

† All voltages are with respect to Main Terminal 1.

NOTE 5: The triacs are triggered by a 15-V (open-circuit amplitude) pulse supplied by a generator with the following characteristics: R_G = 100 Ω, $t_{p(g)}$ = 20 µs, t_r = ≤ 15 ns, f = 1 kHz.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1.52	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			36	°C/W

TYPICAL CHARACTERISTICS

GATE TRIGGER CURRENT
vs
CASE TEMPERATURE

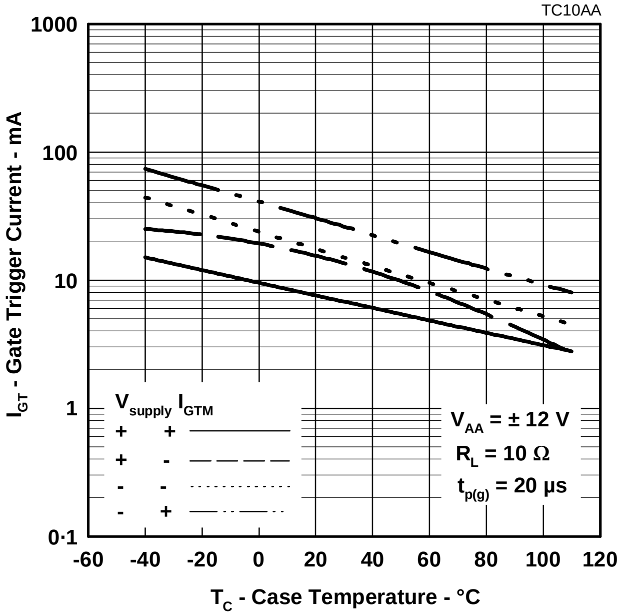


Figure 1.

GATE TRIGGER VOLTAGE
vs
CASE TEMPERATURE

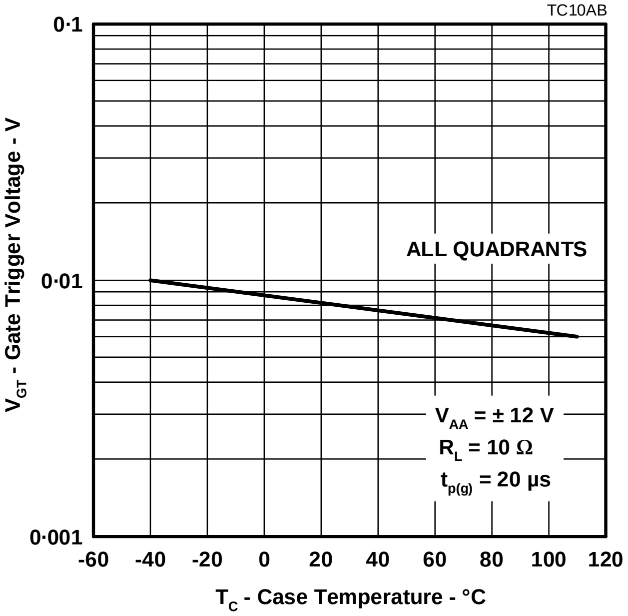


Figure 2.

TYPICAL CHARACTERISTICS

HOLDING CURRENT vs CASE TEMPERATURE

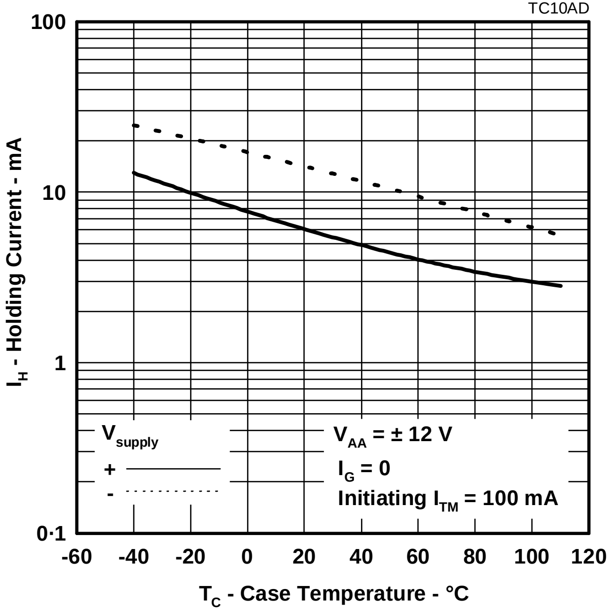


Figure 3.

GATE FORWARD VOLTAGE vs GATE FORWARD CURRENT

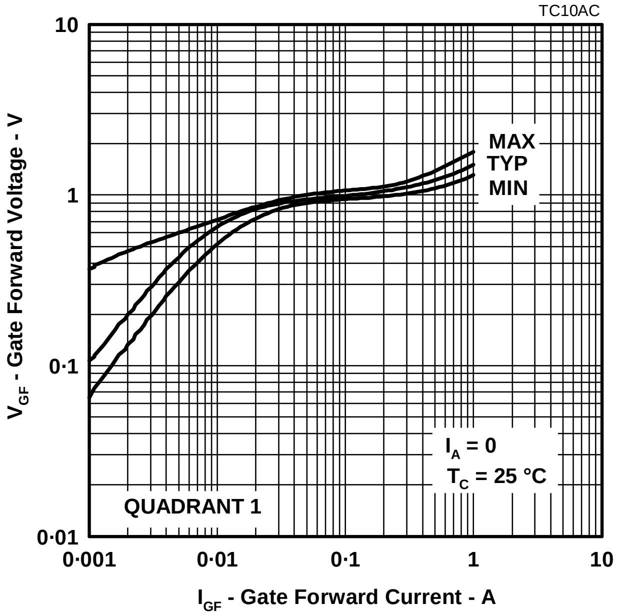


Figure 4.

LATCHING CURRENT vs CASE TEMPERATURE

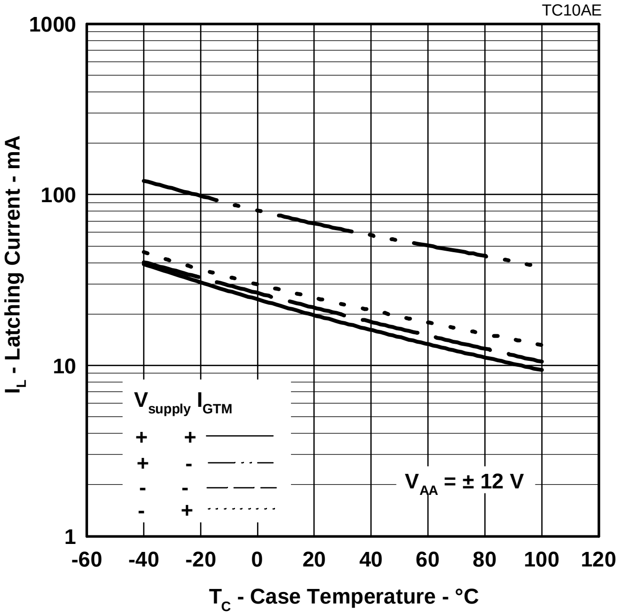
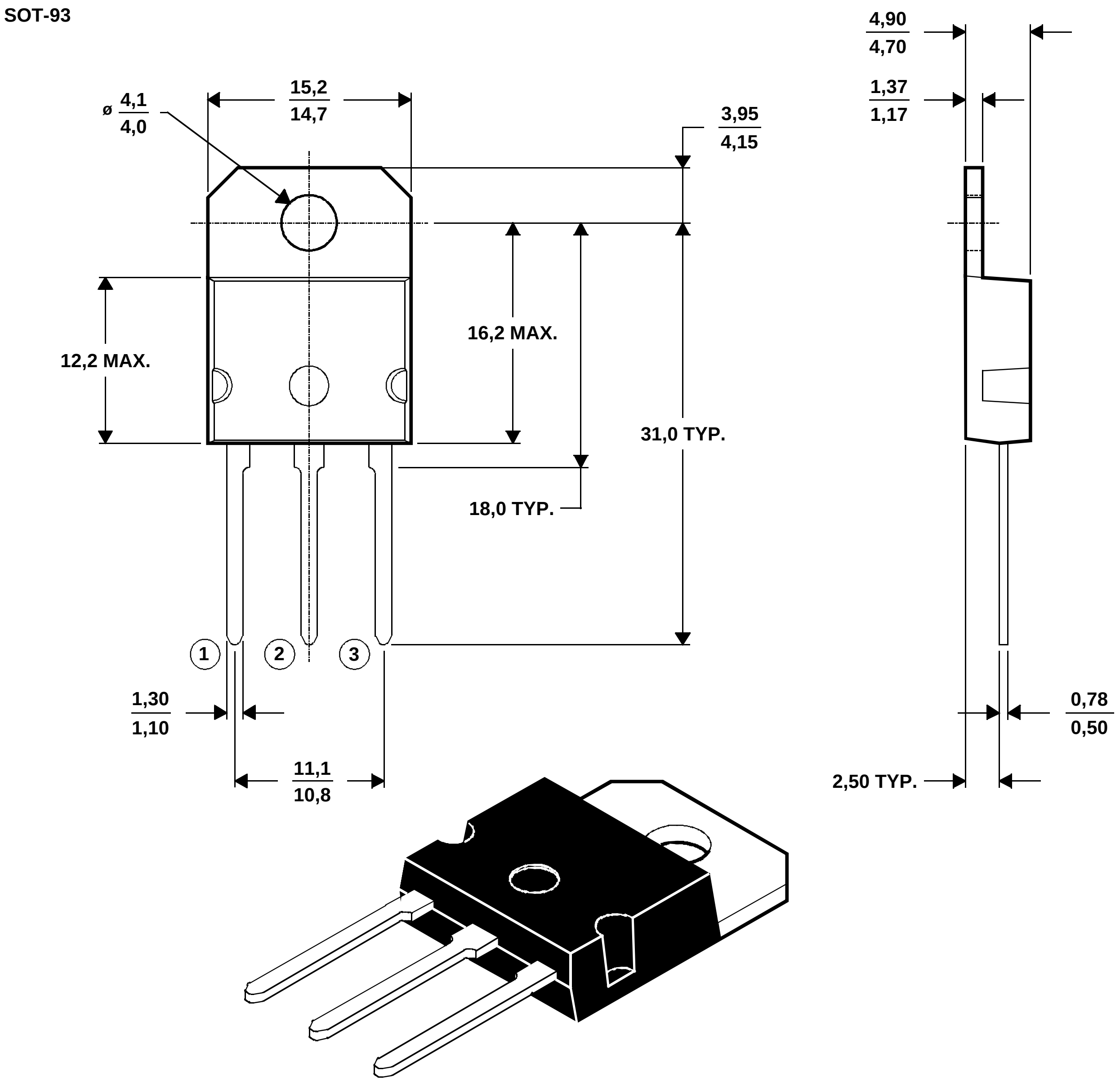


Figure 5.

MECHANICAL DATA

SOT-93
3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



ALL LINEAR DIMENSIONS IN MILLIMETERS

NOTE A: The centre pin is in electrical contact with the mounting tab.

MDXXAW

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