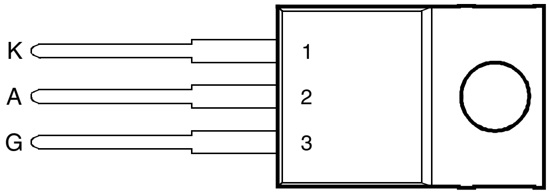
TIC116 SERIES
SILICON CONTROLLED RECTIFIERS

- **8 A Continuous On-State Current**
- **80 A Surge-Current**
- **Glass Passivated Wafer**
- **400 V to 800 V Off-State Voltage**
- **Max I_{GT} of 20 mA**

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDC1ACA

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

RATING		SYMBOL	VALUE	UNIT
Repetitive peak off-state voltage	TIC116D	V_{DRM}	400	V
	TIC116M		600	
	TIC116S		700	
	TIC116N		800	
Repetitive peak reverse voltage	TIC116D	V_{RRM}	400	V
	TIC116M		600	
	TIC116S		700	
	TIC116N		800	
Continuous on-state current at (or below) 70°C case temperature (see Note 1)		$I_{T(RMS)}$	8	A
Average on-state current (180° conduction angle) at (or below) 70°C case temperature (see Note 2)		$I_{T(AV)}$	5	A
Surge on-state current at (or below) 25°C case temperature (see Note 3)		I_{TM}	80	A
Peak positive gate current (pulse width ≤ 300 µs)		I_{GM}	3	A
Peak gate power dissipation (pulse width ≤ 300 µs)		P_{GM}	5	W
Average gate power dissipation (see Note 4)		$P_{G(AV)}$	1	W
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 for continuous dc operation with resistive load. Above 70°C derate linearly to zero at 110°C.
2. This value may be applied continuously under single phase 50 Hz half-sine-wave operation with resistive load. Above 70°C derate linearly to zero at 110°C.
3. This value applies for one 50 Hz half-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.
4. This value applies for a maximum averaging time of 20 ms.

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} T_C = 110°C			2	mA
I_{RRM}	Repetitive peak reverse current	V_R = rated V_{RRM} $I_G = 0$ T_C = 110°C			2	mA
I_{GT}	Gate trigger current	V_{AA} = 12 V R_L = 100 Ω $t_{p(g)} \geq 20$ µs		8	20	mA
V_{GT}	Gate trigger voltage	V_{AA} = 12 V R_L = 100 Ω T_C = - 40°C $t_{p(g)} \geq 20$ µs			2.5	V
		V_{AA} = 12 V R_L = 100 Ω $t_{p(g)} \geq 20$ µs		0.8	1.5	
		V_{AA} = 12 V R_L = 100 Ω T_C = 110°C $t_{p(g)} \geq 20$ µs	0.2			
I_H	Holding current	V_{AA} = 12 V T_C = - 40°C Initiating I_T = 100 mA			100	mA
		V_{AA} = 12 V Initiating I_T = 100 mA			40	
V_T	On-state voltage	I_T = 8 A (see Note 5)			1.7	V
dv/dt	Critical rate of rise of off-state voltage	V_D = rated V_D $I_G = 0$ T_C = 110°C		400		V/µs

NOTE 5: This parameter must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 2 %. Voltage sensing-contacts, separate from the current carrying contacts, are located within 3.2 mm from the device body.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			3	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			62.5	°C/W

THERMAL INFORMATION

AVERAGE ON-STATE CURRENT DERATING CURVE

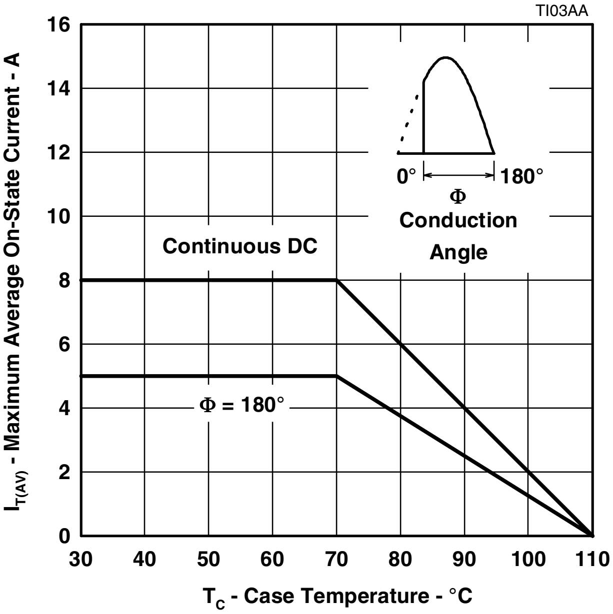


Figure 1.

MAX ANODE POWER LOSS vs ON-STATE CURRENT

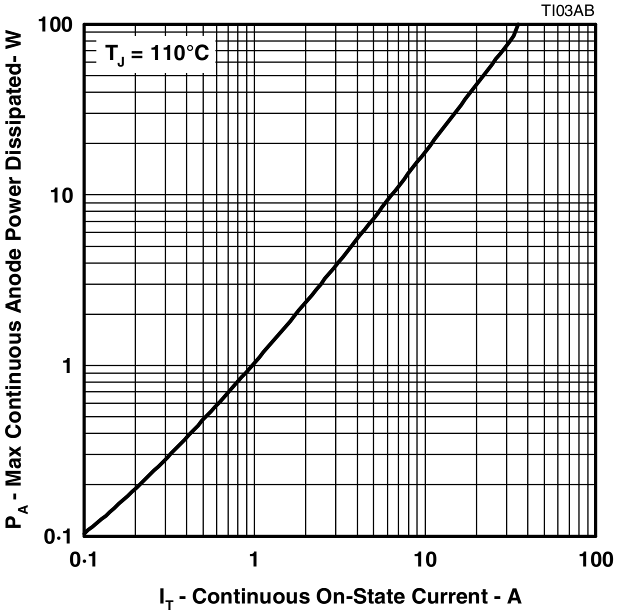


Figure 2.

SURGE ON-STATE CURRENT vs CYCLES OF CURRENT DURATION

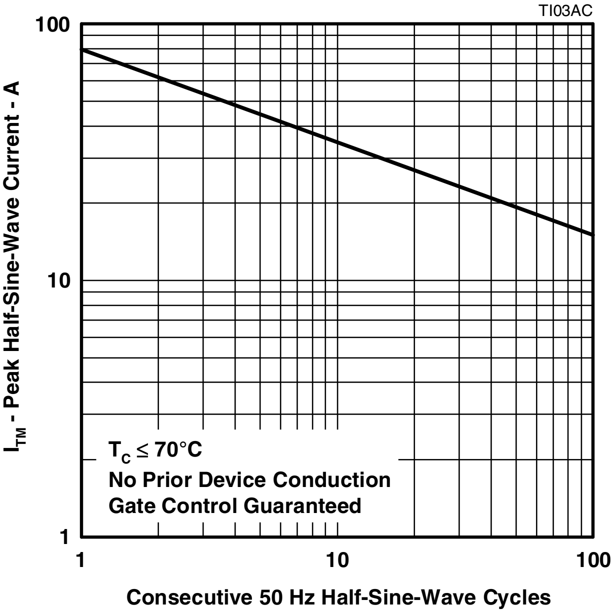


Figure 3.

TRANSIENT THERMAL RESISTANCE vs CYCLES OF CURRENT DURATION

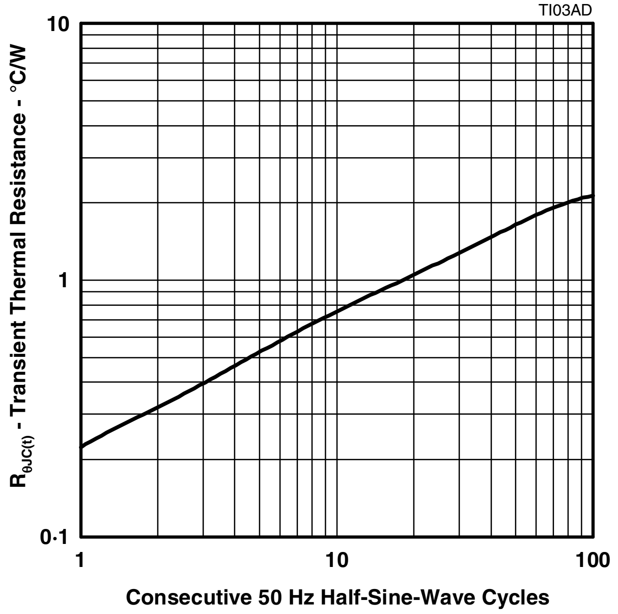


Figure 4.

TYPICAL CHARACTERISTICS

GATE TRIGGER CURRENT vs CASE TEMPERATURE

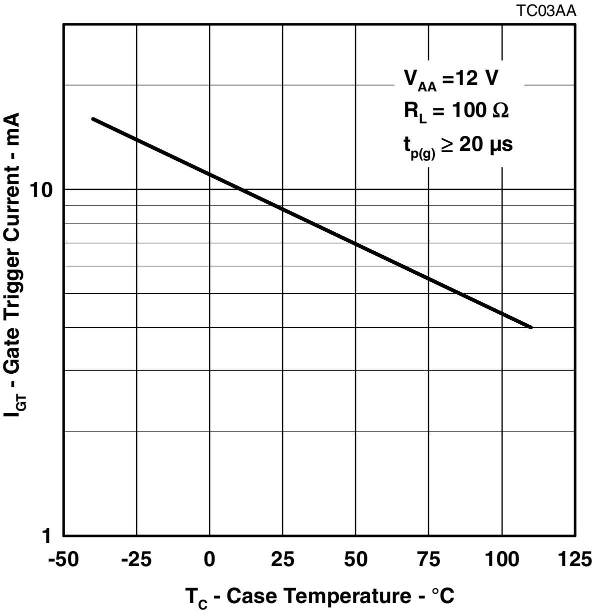


Figure 5.

GATE TRIGGER VOLTAGE vs CASE TEMPERATURE

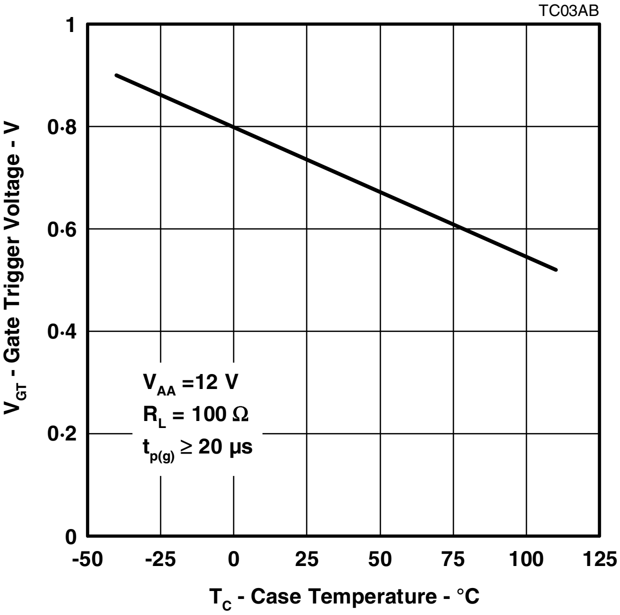


Figure 6.

HOLDING CURRENT vs CASE TEMPERATURE

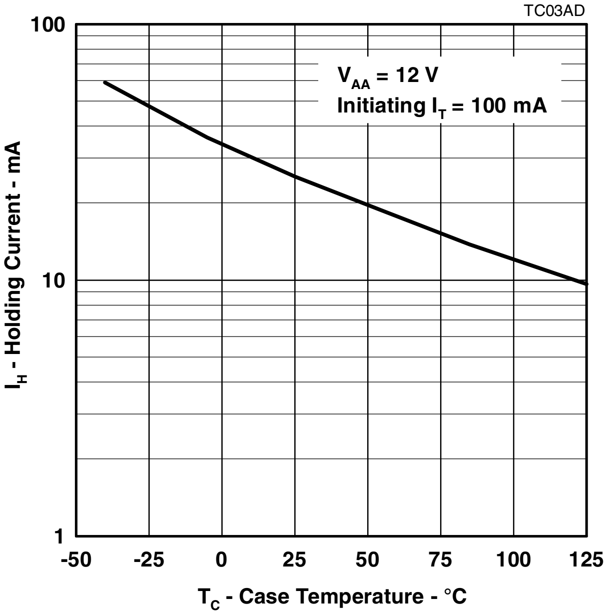


Figure 7.

PEAK ON-STATE VOLTAGE vs PEAK ON-STATE CURRENT

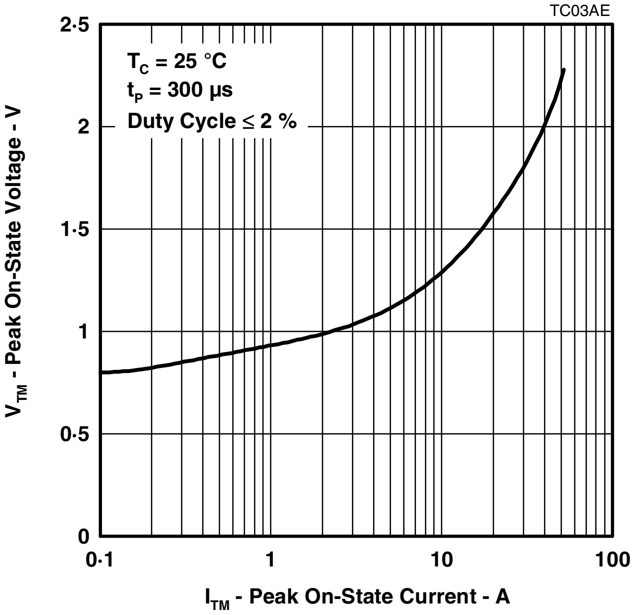


Figure 8.