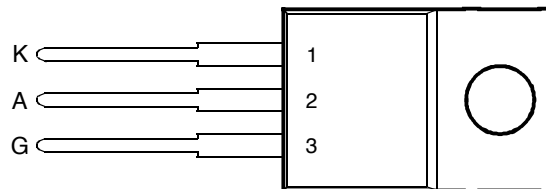


- 5 A Continuous On-State Current
- 20 A Surge-Current
- Glass Passivated Wafer
- 400 V to 800 V Off-State Voltage
- Max  $I_{GT}$  of 1 mA



This series is obsolete and not recommended for new designs.

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 (see Note 1)                                                    | TIC108D | $V_{DRM}$    | 400         | V    |
|                                                                                                   | TIC108M |              | 600         |      |
|                                                                                                   | TIC108S |              | 700         |      |
|                                                                                                   | TIC108N |              | 800         |      |
| Repetitive peak reverse voltage                                                                   | TIC108D | $V_{RRM}$    | 400         | V    |
|                                                                                                   | TIC108M |              | 600         |      |
|                                                                                                   | TIC108S |              | 700         |      |
|                                                                                                   | TIC108N |              | 800         |      |
| Continuous on-state current at (or below) 80°C case temperature (see Note 2)                      |         | $I_{T(RMS)}$ | 5           | A    |
| Average on-state current (180° conduction angle) at (or below) 80°C case temperature (see Note 3) |         | $I_{T(AV)}$  | 3.2         | A    |
| Surge on-state current (see Note 4)                                                               |         | $I_{TSM}$    | 20          | A    |
| Peak positive gate current (pulse width $\leq 300 \mu s$ )                                        |         | $I_{GM}$     | 0.2         | A    |
| Peak gate power dissipation (pulse width $\leq 300 \mu s$ )                                       |         | $P_{GM}$     | 1.3         | W    |
| Average gate power dissipation (see Note 5)                                                       |         | $P_{G(AV)}$  | 0.3         | 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 when the gate-cathode resistance  $R_{GK} = 1 \text{ k}\Omega$ .
2. These values apply for continuous dc operation with resistive load. Above 80°C derate linearly to zero at 110°C.
3. This value may be applied continuously under single phase 50 Hz half-sine-wave operation with resistive load. Above 80°C derate linearly to zero at 110°C.
4. 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.
5. This value applies for a maximum averaging time of 20 ms.

**PRODUCT INFORMATION**

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

| PARAMETER |                                            | TEST CONDITIONS                  |                              |                                | MIN | TYP | MAX | UNIT             |
|-----------|--------------------------------------------|----------------------------------|------------------------------|--------------------------------|-----|-----|-----|------------------|
| $I_{DRM}$ | Repetitive peak off-state current          | $V_D = \text{rated } V_{DRM}$    | $R_{GK} = 1 \text{ k}\Omega$ | $T_C = 110^\circ\text{C}$      |     |     | 400 | $\mu\text{A}$    |
| $I_{RRM}$ | Repetitive peak reverse current            | $V_R = \text{rated } V_{RRM}$    | $I_G = 0$                    | $T_C = 110^\circ\text{C}$      |     |     | 1   | mA               |
| $I_{GT}$  | Gate trigger current                       | $V_{AA} = 12 \text{ V}$          | $R_L = 100 \Omega$           | $t_{p(g)} \geq 20 \mu\text{s}$ | 0.2 | 0.5 | 1   | mA               |
| $V_{GT}$  | Gate trigger voltage                       | $V_{AA} = 12 \text{ V}$          | $R_L = 100 \Omega$           | $T_C = -40^\circ\text{C}$      |     |     | 1.2 | V                |
|           |                                            | $t_{p(g)} \geq 20 \mu\text{s}$   | $R_{GK} = 1 \text{ k}\Omega$ |                                |     |     |     |                  |
|           |                                            | $V_{AA} = 12 \text{ V}$          | $R_L = 100 \Omega$           | $T_C = 110^\circ\text{C}$      | 0.4 | 0.6 | 1   |                  |
| $I_H$     | Holding current                            | $t_{p(g)} \geq 20 \mu\text{s}$   | $R_{GK} = 1 \text{ k}\Omega$ |                                | 0.2 |     |     | mA               |
|           |                                            | $V_{AA} = 12 \text{ V}$          | $R_{GK} = 1 \text{ k}\Omega$ | $T_C = -40^\circ\text{C}$      |     | 3.5 | 15  |                  |
| $I_H$     | Holding current                            | Initiating $I_T = 20 \text{ mA}$ |                              |                                |     | 2   | 10  | mA               |
|           |                                            | $V_{AA} = 12 \text{ V}$          | $R_{GK} = 1 \text{ k}\Omega$ |                                |     |     |     |                  |
| $V_T$     | On-state voltage                           | $I_T = 5 \text{ A}$              | (see Note 6)                 |                                |     | 1.3 | 1.7 | V                |
| dv/dt     | Critical rate of rise of off-state voltage | $V_D = \text{rated } V_D$        | $R_{GK} = 1 \text{ k}\Omega$ | $T_C = 110^\circ\text{C}$      |     | 20  |     | V/ $\mu\text{s}$ |

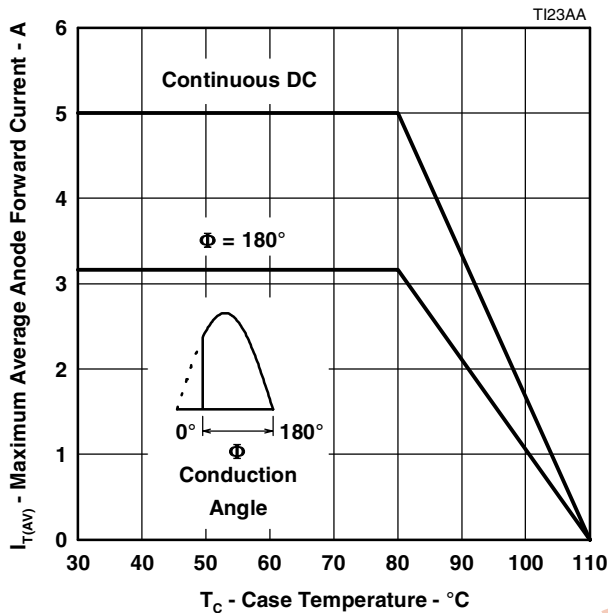
NOTE 6: This parameter must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ . Voltage sensing-contacts, separate from the current carrying contacts, are located within 3.2 mm from the device body.

**thermal characteristics**

| PARAMETER       |                                         | MIN | TYP | MAX  | UNIT               |
|-----------------|-----------------------------------------|-----|-----|------|--------------------|
| $R_{\theta JC}$ | Junction to case thermal resistance     |     |     | 3.5  | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Junction to free air thermal resistance |     |     | 62.5 | $^\circ\text{C/W}$ |

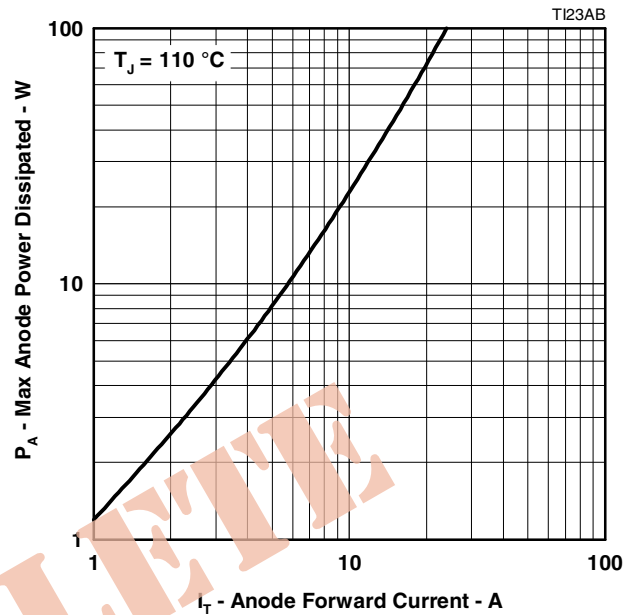
**THERMAL INFORMATION**

**AVERAGE ANODE ON-STATE CURRENT  
DERATING CURVE**



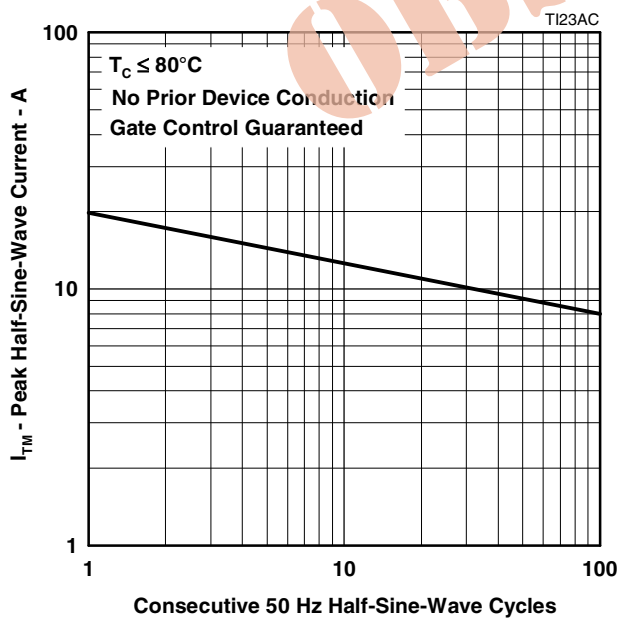
**Figure 1.**

**MAX ANODE POWER DISSIPATED  
vs  
ANODE ON-STATE CURRENT**



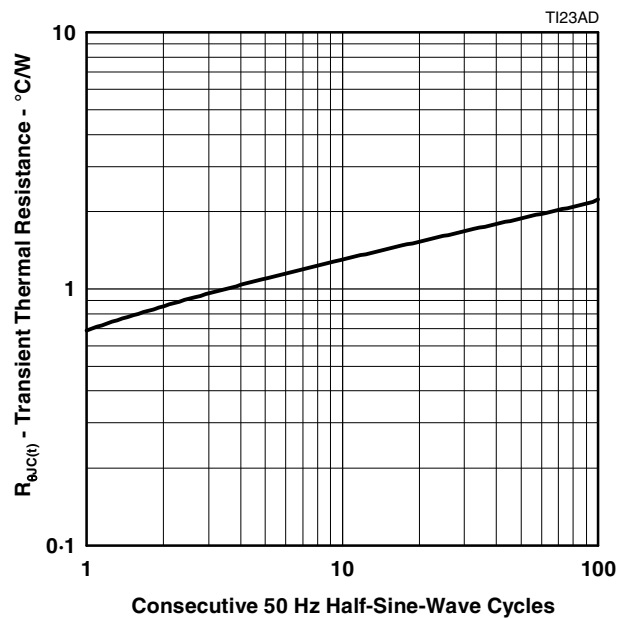
**Figure 2.**

**SURGE ON-STATE CURRENT  
vs  
CYCLES OF CURRENT DURATION**



**Figure 3.**

**TRANSIENT THERMAL RESISTANCE  
vs  
CYCLES OF CURRENT DURATION**



**Figure 4.**

**PRODUCT INFORMATION**

TYPICAL CHARACTERISTICS

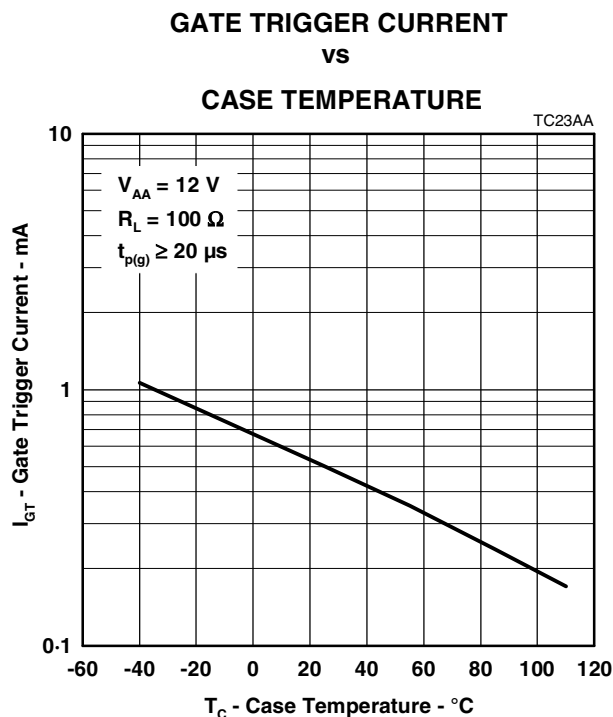


Figure 5.

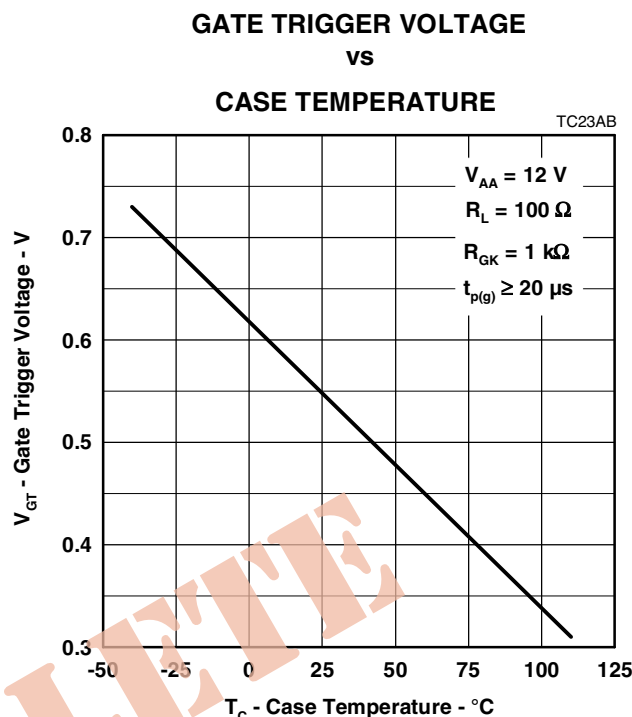


Figure 6.

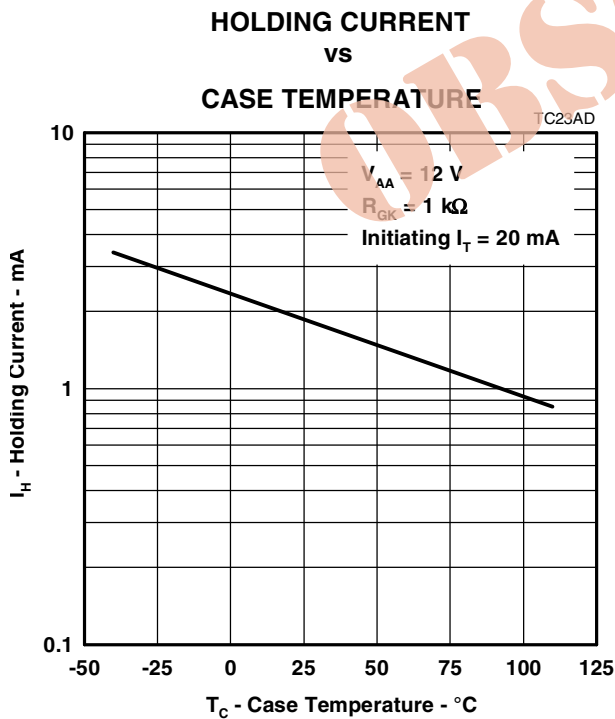


Figure 7.

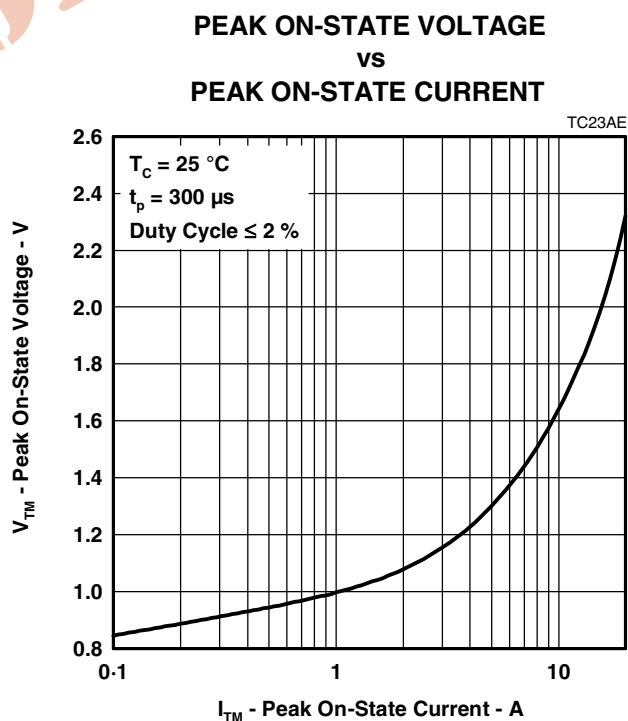


Figure 8.

**PRODUCT INFORMATION**

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