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## T822 2700-20-24

### Key Parameters

| | | |
|---|---|---|
| $V_{DRM}$ | 2000~2400 | V |
| $I_{T(AV)}$ | 2730 | A |
| $I_{TSM}$ | 45.0 | kA |
| $V_{TO}$ | 0.90 | V |
| $r_T$ | 0.137 | mΩ |

### Voltage Ratings

| Device Type | $V_{DRM}/V_{RRM}$(V) | Test Conditions |
|---|---|---|
| T822 2700-20 | 2000 | $T_{vj}$ = 125 °C |
| T822 2700-22 | 2200 | $I_{DRM}$ = 300 mA |
| T822 2700-24 | 2400 | $I_{RRM}$ = 300 mA |
| | | $V_{DM}=V_{DRM}$, $V_{RM}=V_{RRM}$ |
| | | $t_p$ = 10 ms |
| | | $V_{DSM} = V_{DRM}$ |
| | | $V_{RSM} = V_{RRM}$ + 100 |

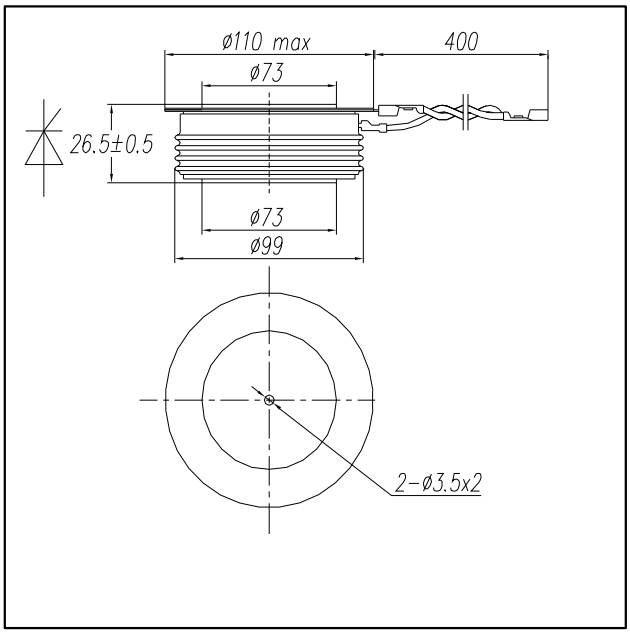
### Applications

- Traction drive
- Motor drive
- Industry converter

### Features

- Double-side cooling
- High power capability
- Low loss

### Outline




### Thermal & Mechanical Data

| Symb. | Parameter | Min | Type | Max | Unit |
|---|---|---|---|---|---|
| $R_{thjc}$ | Thermal Resistance Junction to Case | - | - | 0.01 | K / W |
| $R_{thcs}$ | Thermal Resistance Case ro Heatsink | - | - | 0.003 | K / W |
| $T_{vj}$ | Junction Temperature | -40 | - | 125 | °C |
| $T_{stg}$ | Storage Temperature | -40 | - | 140 | °C |
| $F$ | Mounting Force | - | 56 | - | kN |
| $m$ | Weight | - | 1.44 | - | kg |

### Current Ratings

| Symb. | Parameter | Test Conditions | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{T(AV)}$ | Mean On-State Current | Half Sine Wave, $T_C$=70 °C | - | - | 2730 | A |
| $I_{T(RMS)}$ | RMS On-State Current | $T_C$ =70 °C | - | - | 4286 | A |
| $I_{TSM}$ | Surge (non-repetitive) On-State Current | 10ms, Half Sine Wave, $T_C$ =125 °C, $V_R$ = 0 | - | - | 45.0 | kA |
| $I^2t$ | Limiting load integral | Sine Wave, 10ms | - | - | 1013 | $10^4A^2s$ |

## T822 2700-20-24

### Characteristics

| Symb. | Parameter | Test Conditions | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{TM}$ | Peak on-state voltage | $T_{vj}$ = 125 °C, $I_{TM}$ = 3000 A | - | - | 1.31 | V |
| $I_{DRM}$ | Forward leakage current | $T_{vj}$ = 125 °C, $V_{DRM}$ | - | - | 300 | mA |
| $I_{RRM}$ | Reverse leakage current | $T_{vj}$ = 125 °C, $V_{RRM}$ | - | - | 300 | mA |
| $V_{TO}$ | Threshold voltage | $T_{vj}$ = 125 °C | - | - | 0.90 | V |
| $r_T$ | Slope resistance | $T_{vj}$ = 125 °C | - | - | 0.137 | mΩ |
| $I_H$ | Holding current | $T_{vj}$ = 25 °C | - | - | 200 | mA |
| $I_L$ | Latching current | $T_{vj}$ = 25 °C | - | - | 1000 | A |

### Dynamic Parameters

| Symb. | Parameter | Test Conditions | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| $dv/dt$ | Critical rate of rise of off-state voltage | $T_{vj}$ = 125 °C, 0.67$V_{DRM}$ | 1000 | - | - | V/μs |
| $di/dt$ | Critical rate of rise of on-state current | $T_{vj}$ =125°C, $V_{DM}$ =0.67$V_{DRM}$, $I_{TM}$ =3000A<br>$I_{FG}$ = 2 A, $t$r = 0.5 μs, f = 50 Hz | - | - | 200 | A/μs |
| $t_d$ | Delay time | $T_{vj}$ = 25 °C, $V_{DM}$ = 0.5$V_{DRM}$, $I_{TM}$ = 4000 A<br>$I_{FG}$ = 2 A, $t$r = 0.5 μs | - | - | 3.0 | μs |
| $t_q$ | Turn-off time | $T_{vj}$=125°C, $V_{DM}$=0.67$V_{DRM}$, $dv$/dt=20V/μs, $V_R$=200V<br>$di_T$/ dt = -10 A/μs, $I_T$ = 4000 A | - | 500 | - | μs |
| $Q_{rr}$ | Recovery Charge | $T_{vj}$ = 125°C, $di_T$/ $dt$ = -10A / μs, $V_R$ = 200V,<br>$I_T$ = 4000A | - | - | 3700 | μC |
| $I_{rr}$ | Reverse recovery current | | - | - | 185 | A |

### Gate Parameters

| Symb. | Parameter | Test Conditions | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{GT}$ | Gate trigger current | $T_{vj}$ = 25 °C | - | - | 300 | mA |
| $V_{GT}$ | Gate trigger voltage | $T_{vj}$ = 25 °C | - | - | 3.0 | V |
| $I_{GD}$ | Gate non-trigger current | $T_{vj}$ = 125 °C, $V_D$ = 0.4$V_{DRM}$ | 10 | - | - | mA |
| $V_{GD}$ | Gate non-trigger voltage | $T_{vj}$ = 125 °C, $V_D$ = 0.4$V_{DRM}$ | 0.3 | - | - | V |
| $V_{FGM}$ | Peak forward gate voltage | | - | - | 12 | V |
| $V_{RGM}$ | Peak reverse gate voltage | | - | - | 5 | V |
| $I_{FGM}$ | Peak forward gate current | | - | - | 4 | A |
| $P_{GM}$ | Gate power losses | | - | - | 20 | W |
| $P_{G(AV)}$ | Gate power losses (mean) | | - | - | 4 | W |

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### Max. on-state characteristic model

$$V_T = A + B \cdot \ln(I_T) + C \cdot I_T + D \cdot \sqrt{I_T}$$

| | 25 °C | 125 °C |
|---|---|---|
| A | 1.32588 | 1.1623 |
| B | -0.0997938 | -0.120087 |
| C | 0.000023840 | 0.000017009 |
| D | 0.0130482 | 0.0187844 |

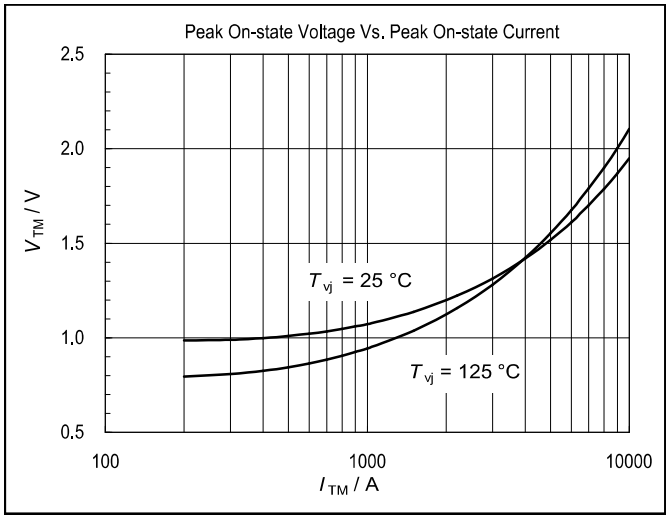


Fig1. Peak On-state Voltage Vs. Peak On-state Current

### Transient thermal impedance function (double side cooled)

$$R_{thjc}(t) = \sum_{i=1}^{n} R_{thi} \cdot \left(1 - e^{-\frac{t}{\tau_i}}\right)$$

| i | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $R_{thi}$ (K/kW) | 6.22 | 2.465 | 0.723 | 0.607 |
| $\tau_i$ (s) | 1.23 | 0.235 | 0.061 | 0.0092 |

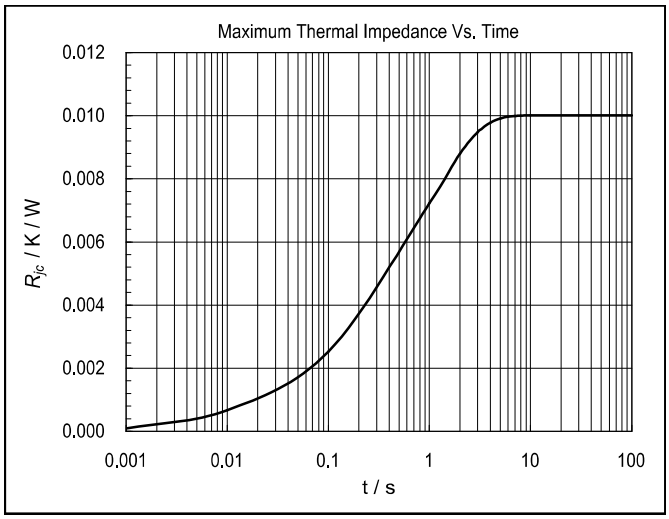


Fig2. Maximum Thermal Impedance Vs. Time

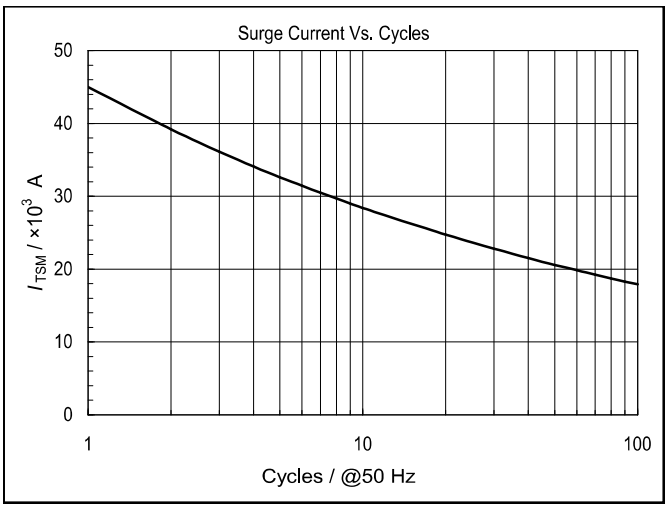


Fig3. Surge Current Vs. Cycles

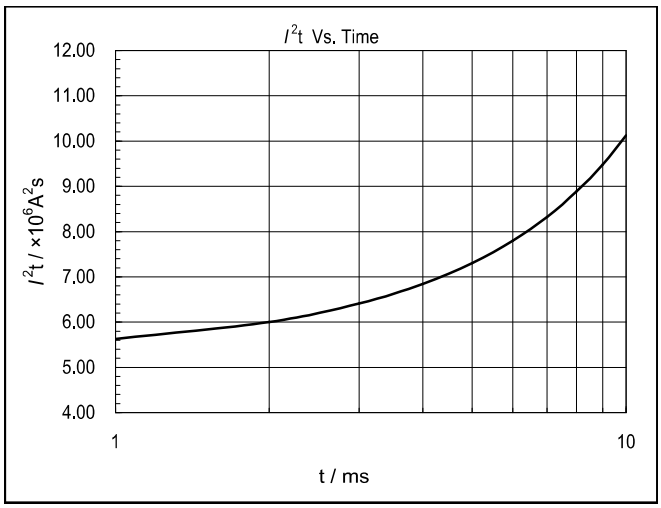


Fig4. $I^2t$ Vs. Time

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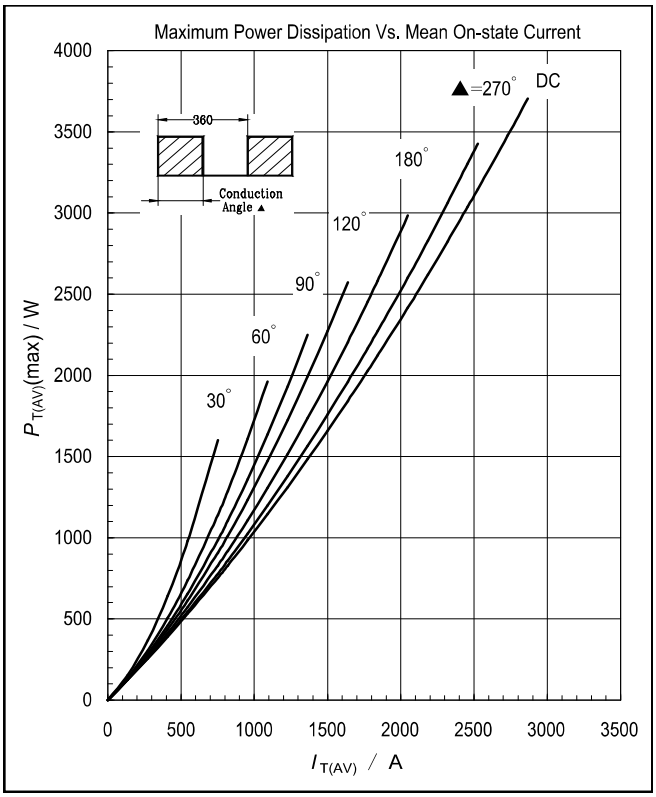


Fig5. Maximum Power Dissipation Vs. Mean On-state Current

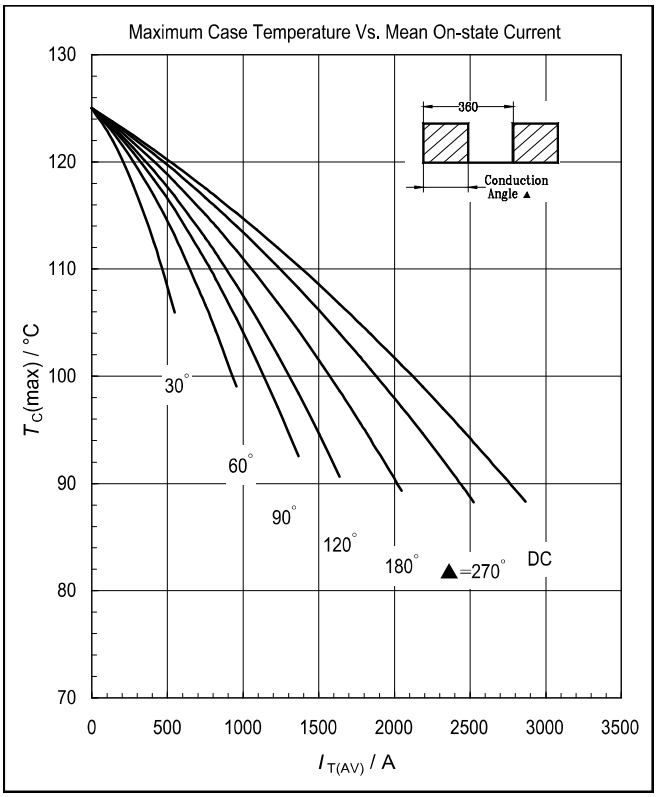


Fig6. Maximum Case Temperature Vs. Mean On-state Current

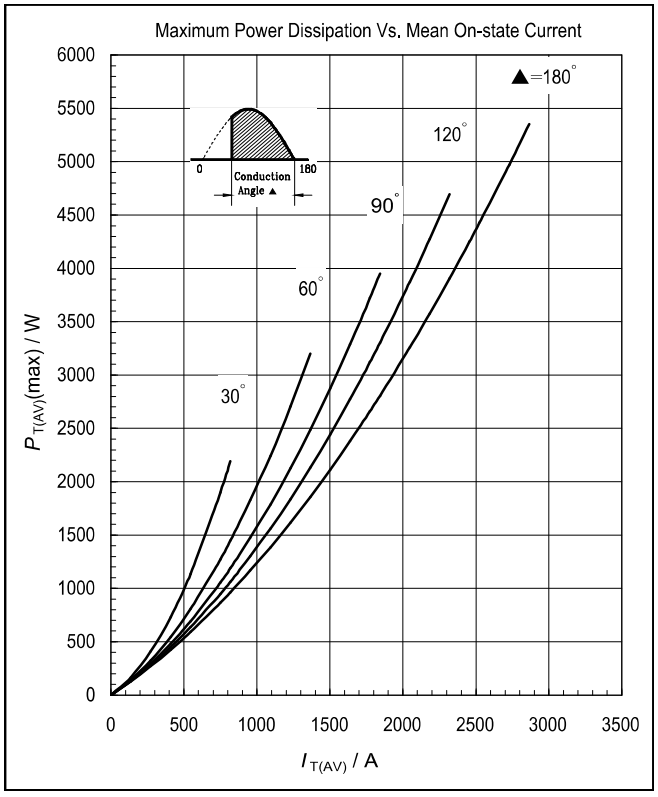


Fig7. Maximum Power Dissipation Vs. Mean On-state Current

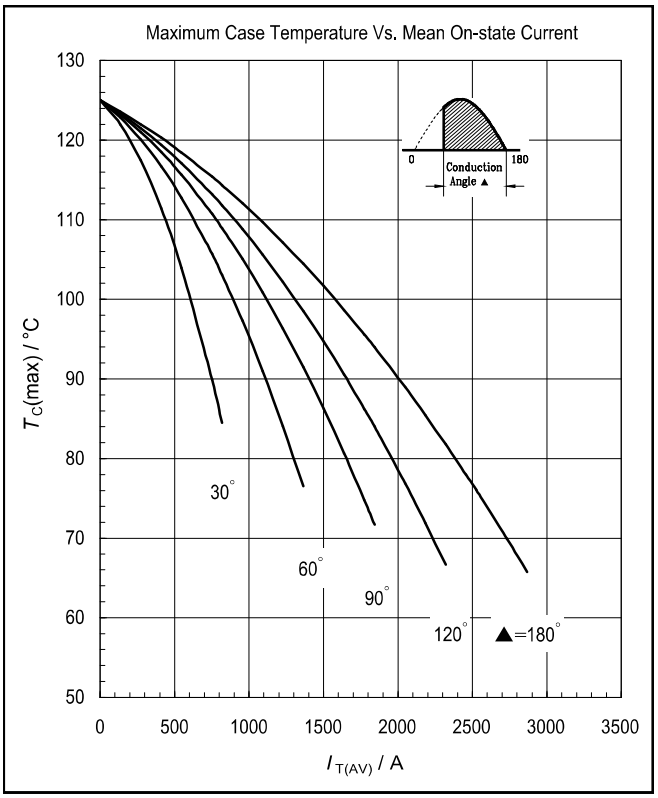


Fig8. Maximum Case Temperature Vs. Mean On-state Current

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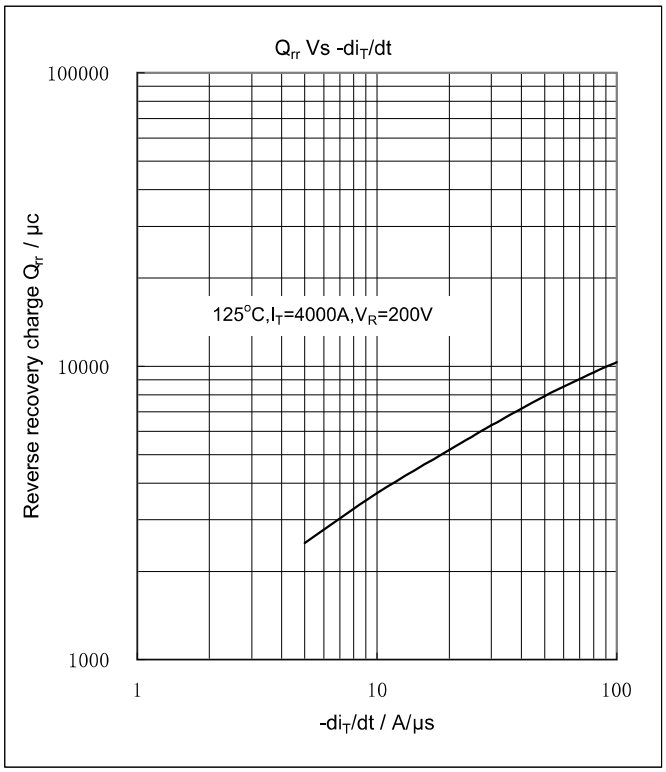


Fig9. Reverse recovery charge Vs. $-di_T/dt$

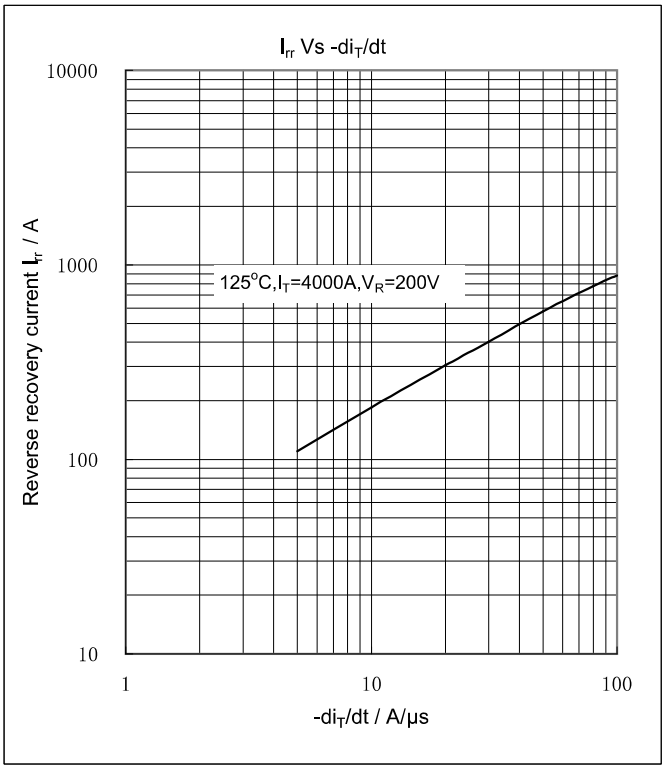


Fig10. Reverse recovery current Vs. $-di_T/dt$

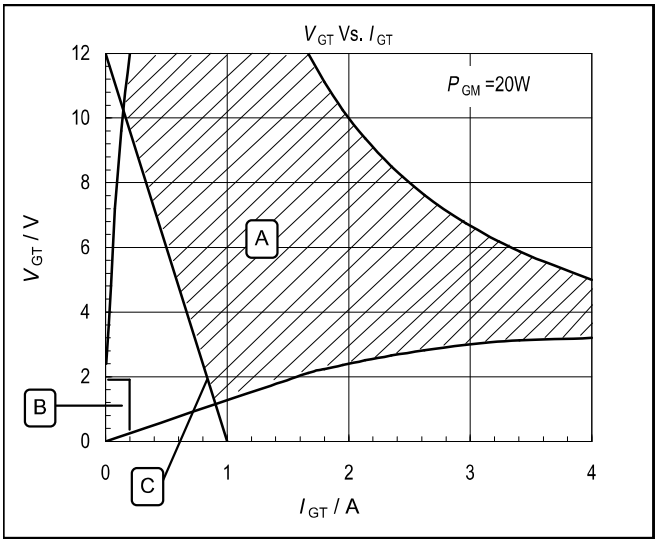


Fig11. $V_{GT}$ Vs. $I_{GT}$

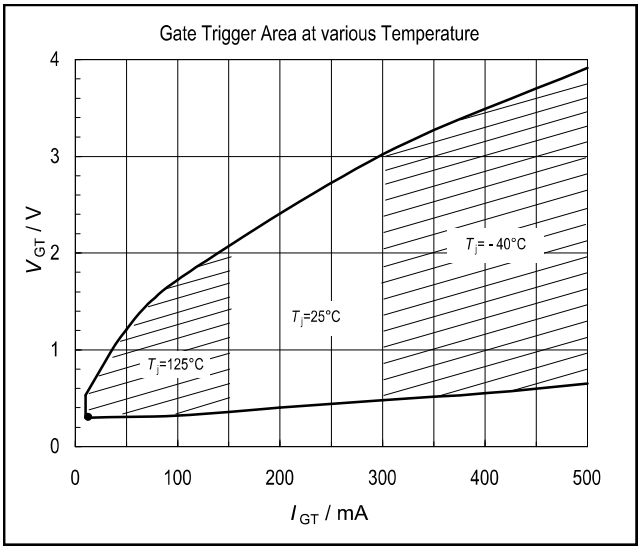


Fig12. Gate Trigger Area at various Temperature

A is Recommended Triggering Area.

B is Unreliable Triggering Area.

C is Recommended Gate Load Line.