



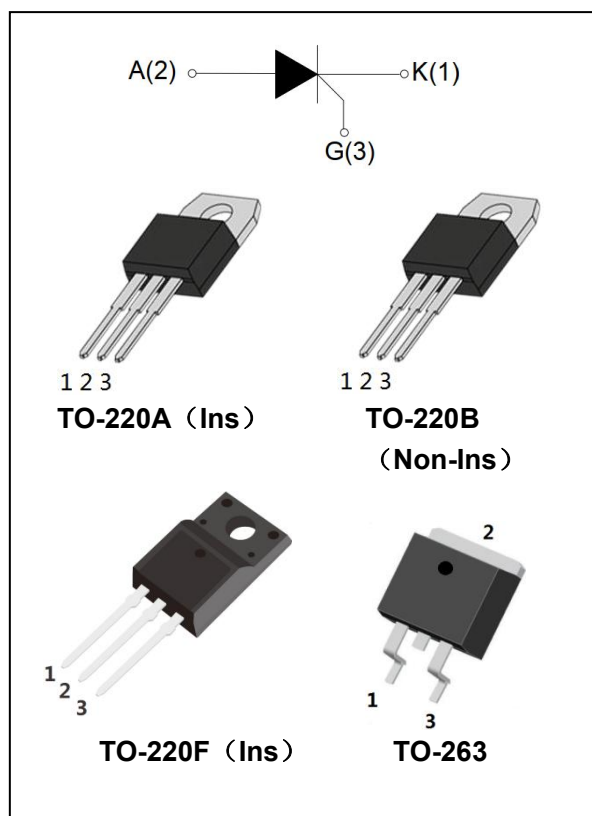
## BT153 Series 25A SCRs

### DESCRIPTION:

With high ability to withstand the shock loading of large current, BT153 series of silicon controlled rectifiers provide high dv/dt rate with strong resistance to electromagnetic interference. They are especially recommended for use on solid state relay, motorcycle, power charger, T-tools etc.

### MAIN FEATURES:

| symbol            | value   | unit |
|-------------------|---------|------|
| $I_{T(RMS)}$      | 25      | A    |
| $V_{DRM}/V_{RRM}$ | 600/800 | V    |
| $I_{GT}$          | 40      | mA   |



### ABSOLUTE MAXIMUM RATINGS:

| Parameter   | Symbol       | Value   | Unit                   |
|---|--------------|---------|------------------------|
| Storage junction temperature range                                  | $T_{stg}$    | -40~150 | °C                     |
| Operating junction temperature range                                | $T_j$        | -40~125 | °C                     |
| Repetitive peak off-state voltage ( $T_j=25^\circ\text{C}$ )        | $V_{DRM}$    | 600/800 | V                      |
| Repetitive peak reverse voltage ( $T_j=25^\circ\text{C}$ )          | $V_{RRM}$    | 600/800 | V                      |
| RMS on-state current  | $I_{T(RMS)}$ | 25      | A                      |
| Non repetitive surge peak on-state current (full cycle, F=50Hz)     | $I_{TSM}$    | 300     | A                      |
| $I^2t$ value for fusing ( $t_p=10\text{ms}$ )                       | $I^2t$       | 450     | $\text{A}^2\text{s}$   |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ ) | $di/dt$      | 50      | $\text{A}/\mu\text{s}$ |
| Peak gate current   | $I_{GM}$     | 4       | A                      |
| Average gate power dissipation                                      | $P_{G(AV)}$  | 1       | W                      |
| Peak gate power   | $P_{GM}$     | 5       | W                      |



**BT153 Series 25A SCRs**

**ELECTRICAL CHARACTERISTICS** ( $T_j=25^\circ\text{C}$  unless otherwise specified)

| Parameter | Test Condition  | MIN | TYPE | MAX | Unit             |
|-----------|---|-----|------|-----|------------------|
| $I_{GT}$  | $V_D=12\text{V}, R_L=33\Omega$                              | -   | 5    | 40  | mA               |
| $V_{GT}$  |   | -   | 0.8  | 1.5 | V                |
| $V_{GD}$  | $V_D=V_{DRM} T_j=110^\circ\text{C}$                         | 0.2 | -    | -   | V                |
| $I_H$     | $I_T=500\text{mA}$  | -   | -    | 80  | mA               |
| $I_L$     | $I_G=1.2I_{GT}$   | -   | -    | 90  | mA               |
| dV/dt     | $V_D=2/3 \times V_{DRM} T_j=125^\circ\text{C}$<br>Gate open | 200 | -    | -   | V/ $\mu\text{s}$ |

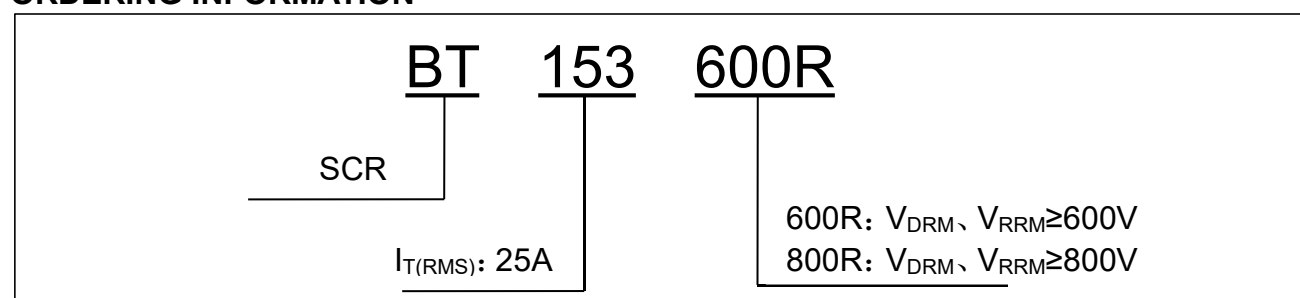
**STATIC CHARACTERISTICS**

| Symbol                 | Test Condition        |                      |                         | Value | Unit |               |
|------------------------|-----------------------|----------------------|-------------------------|-------|------|---------------|
| $V_{TM}$               | $I_{TM}=50\text{A}$   | $t_p=380\mu\text{s}$ | $T_j=25^\circ\text{C}$  | MAX   | 1.55 | V             |
| $I_{DRM}$<br>$I_{RRM}$ | $V_D=V_{DRM}=V_{RRM}$ |                      | $T_j=25^\circ\text{C}$  | MAX   | 10   | $\mu\text{A}$ |
|                        |                       |                      | $T_j=125^\circ\text{C}$ |       | 4    | mA            |

**THERMAL RESISTANCES**

| Symbol        | Test Condition       |                  | Value | Unit               |
|---------------|----------------------|------------------|-------|--------------------|
| $R_{th(j-c)}$ | junction to case(AC) | TO-220(Ins)      | 1.7   | $^\circ\text{C/W}$ |
|               |                      | TO-220B(Non-Ins) | 1.0   |                    |
|               |                      | TO-220F          | 1.8   |                    |
|               |                      | TO-263           | 1.9   |                    |

**ORDERING INFORMATION**

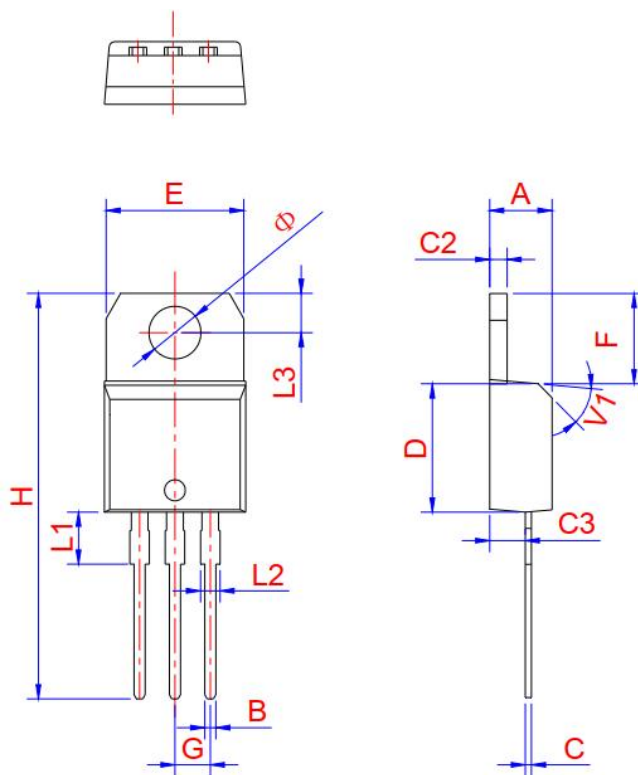




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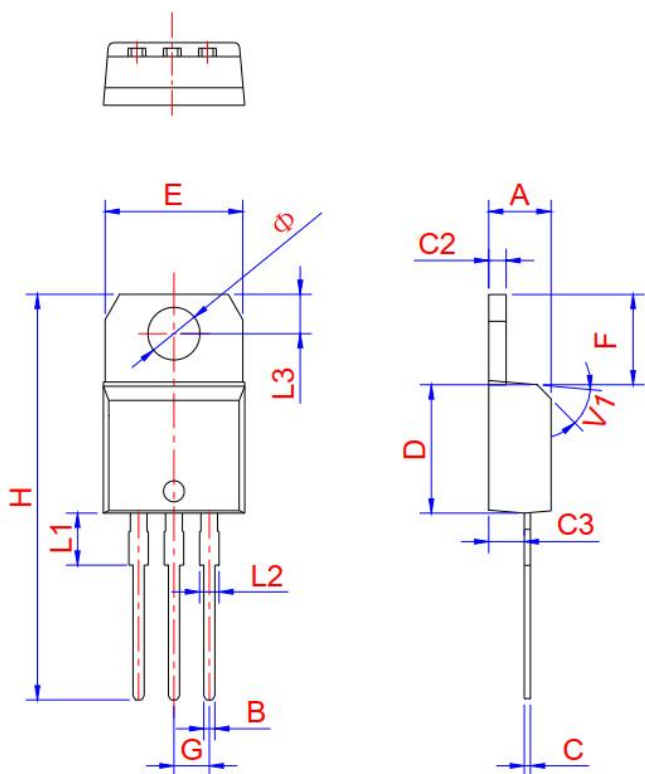
## BT153 Series 25A SCRs

### PACKAGE MECHANICAL DATA



TO-220A Ins

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.4         | 4.47 | 4.6  | 0.173  | 0.176 | 0.181 |
| B    | 0.61        |      | 0.88 | 0.024  |       | 0.035 |
| C    | 0.46        | 0.50 | 0.7  | 0.018  | 0.02  | 0.028 |
| C2   | 1.21        | 1.27 | 1.32 | 0.048  | 0.050 | 0.052 |
| C3   | 2.4         |      | 2.72 | 0.094  |       | 0.107 |
| D    | 8.6         |      | 9.7  | 0.339  |       | 0.382 |
| E    | 9.8         |      | 10.4 | 0.386  |       | 0.409 |
| F    | 6.55        |      | 6.95 | 0.258  |       | 0.274 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28          |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.75 |      |        | 0.148 |       |
| L2   | 1.14        |      | 1.7  | 0.045  |       | 0.067 |
| L3   | 2.65        |      | 2.95 | 0.104  |       | 0.116 |
| V1   |             | 45°  |      |        | 45°   |       |
| Φ    | 3.7         | 3.75 | 3.8  | 0.145  | 0.147 | 0.149 |

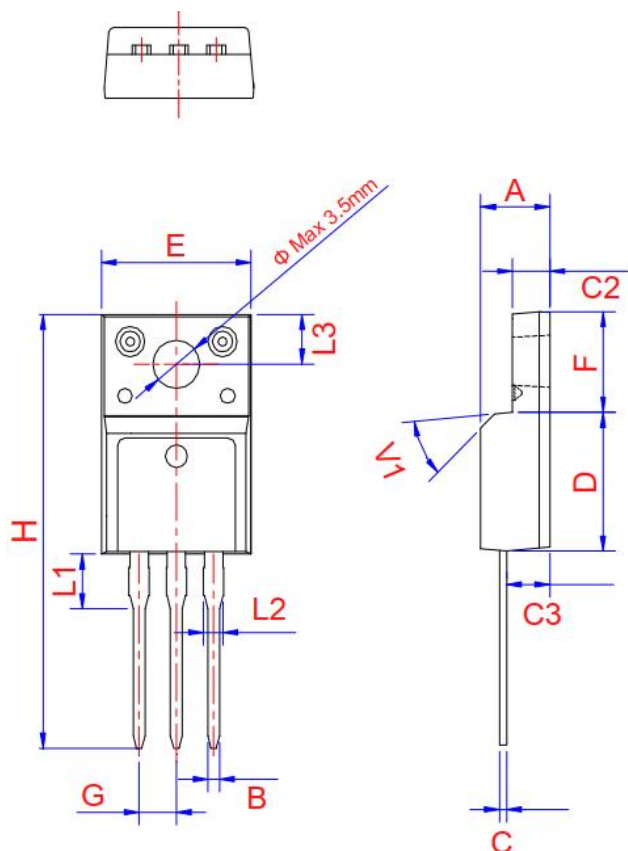


TO-220B Non-Ins

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.4         | 4.47 | 4.6  | 0.173  | 0.176 | 0.181 |
| B    | 0.61        |      | 0.88 | 0.024  |       | 0.035 |
| C    | 0.46        | 0.50 | 0.7  | 0.018  | 0.02  | 0.028 |
| C2   | 1.21        | 1.27 | 1.32 | 0.048  | 0.050 | 0.052 |
| C3   | 2.4         |      | 2.72 | 0.094  |       | 0.107 |
| D    | 8.6         |      | 9.7  | 0.339  |       | 0.382 |
| E    | 9.8         |      | 10.4 | 0.386  |       | 0.409 |
| F    | 6.55        |      | 6.95 | 0.258  |       | 0.274 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28          |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.75 |      |        | 0.148 |       |
| L2   | 1.14        |      | 1.7  | 0.045  |       | 0.067 |
| L3   | 2.65        |      | 2.95 | 0.104  |       | 0.116 |
| V1   |             | 45°  |      |        | 45°   |       |
| Φ    | 3.7         | 3.75 | 3.8  | 0.145  | 0.147 | 0.149 |

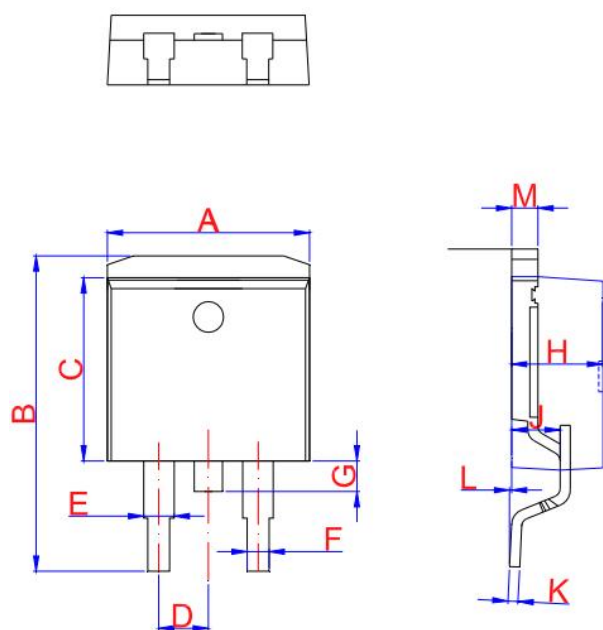


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TO-220F Ins

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.5         |      | 4.9  | 0.177  |       | 0.193 |
| B    | 0.74        | 0.8  | 0.83 | 0.029  | 0.031 | 0.033 |
| C    | 0.47        |      | 0.65 | 0.019  |       | 0.026 |
| C2   | 2.45        |      | 2.75 | 0.096  |       | 0.108 |
| C3   | 2.6         |      | 3    | 0.102  |       | 0.118 |
| D    | 8.8         |      | 9.3  | 0.346  |       | 0.366 |
| E    | 9.8         |      | 10.4 | 0.386  |       | 0.41  |
| F    | 6.4         |      | 6.8  | 0.252  |       | 0.268 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28          |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.63 |      |        | 0.148 |       |
| L2   | 1.14        |      | 1.7  | 0.045  |       | 0.067 |
| L3   | 2.65        | 3.3  | 0    |        | 0.13  | 0.116 |
| V1   |             | 45°  |      |        | 45°   |       |



TO-263

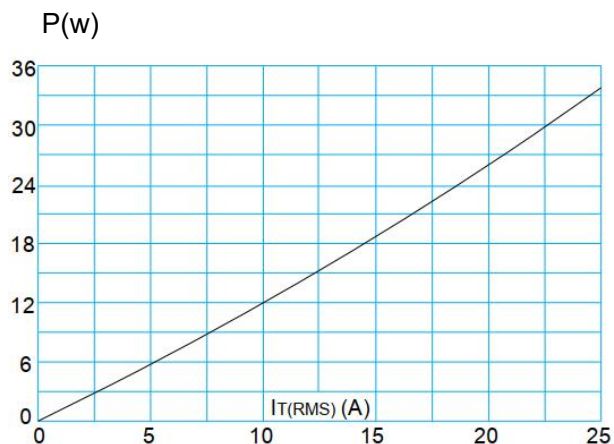
| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 9.9         |      | 10.3 | 0.390  |       | 0.406 |
| B    | 14.7        |      | 15.8 | 0.579  |       | 0.622 |
| C    | 8.5         |      | 8.9  | 0.370  |       | 0.378 |
| D    |             | 2.54 |      |        | 0.100 |       |
| E    | 1.20        |      | 1.40 | 0.047  |       | 0.055 |
| F    | 0.75        |      | 0.85 | 0.029  |       | 0.033 |
| G    |             |      | 1.75 |        |       | 0.069 |
| H    | 4.40        | 4.60 | 4.80 | 0.173  | 0.181 | 0.189 |
| J    | 2.40        | 2.60 | 2.80 | 0.094  | 0.102 | 0.110 |
| L    | 0           | 0.1  | 0.25 | 0      | 0.004 | 0.010 |
| M    | 1.17        | 1.27 | 1.37 | 0.046  | 0.05  | 0.054 |



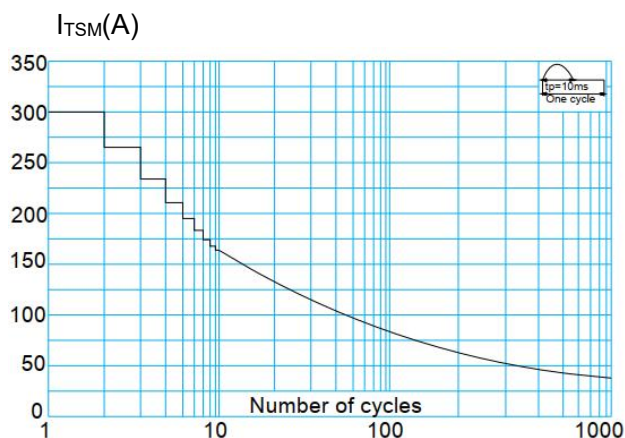
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**FIG.1:** Maximum power dissipation versus RMS on-state current



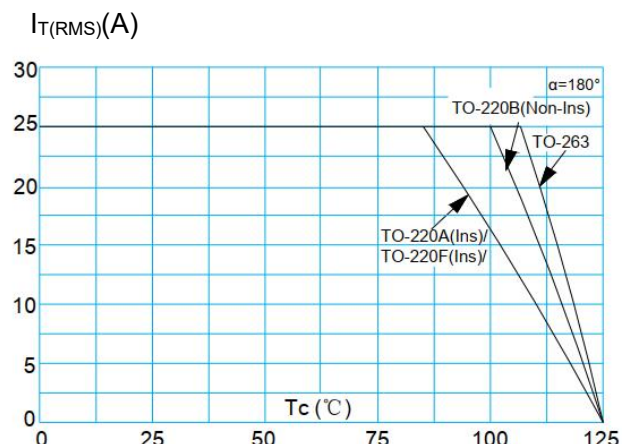
**FIG.3:** Surge peak on-state current versus number of cycles



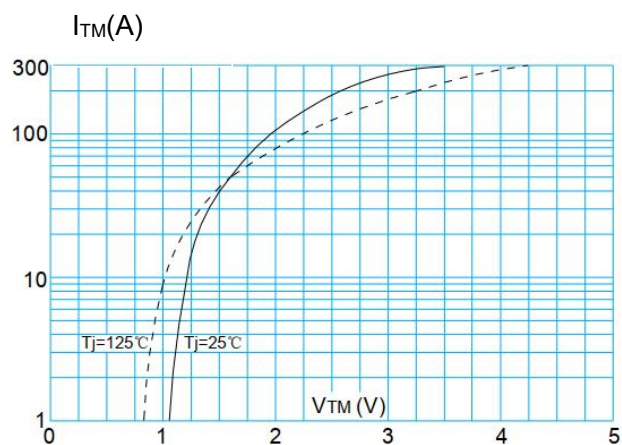
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2t$  ( I - II -III:  $dI/dt < 50\text{A}/\mu\text{s}$ ; IV:  $dI/dt < 10\text{A}/\mu\text{s}$  )

$$I_{TSM}(A), I^2t (A^2s)$$

**FIG.2:** RMS on-state current versus case temperature



**FIG.4:** On-state characteristics (maximum values)



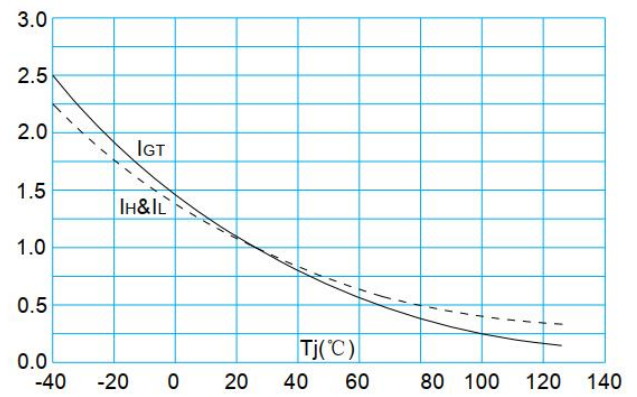
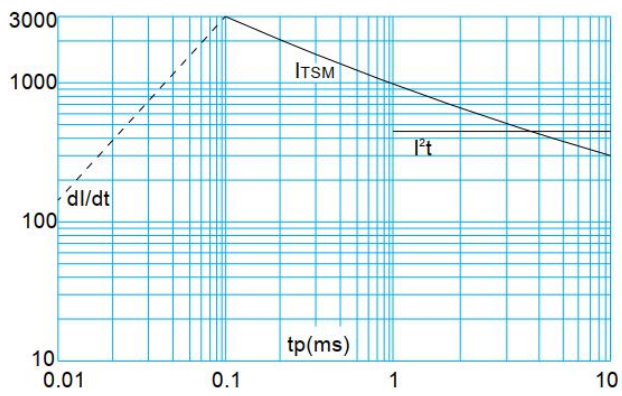
**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature

$$I_{GT}, I_H, I_L(T_j) / I_{GT}, I_H, I_L(T_j=25^\circ\text{C})$$



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