

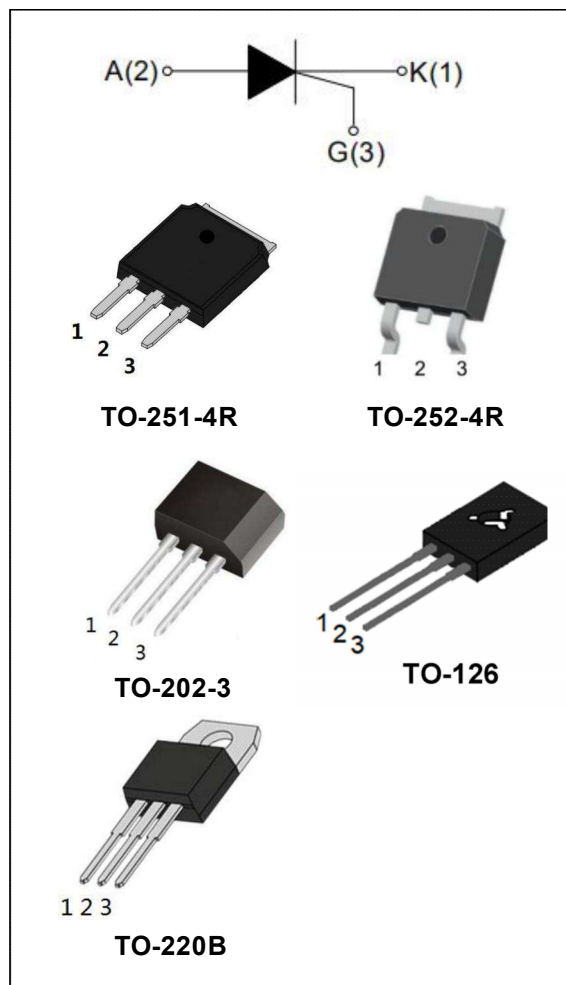
## X0405 4A Sensitive SCRs

### DESCRIPTION:

The X0405 SCR series provide high dv/dt rate with strong resistance to electromagnetic interface. They are especially recommended for use on straight hair, igniter etc.

### MAIN FEATURES:

| symbol            | value      | unit    |
|-------------------|------------|---------|
| $I_{T(RMS)}$      | 4          | A       |
| $I_{GT}$          | $\leq 200$ | $\mu A$ |
| $V_{DRM}/V_{RRM}$ | 600/800    | V       |



### ABSOLUTE MAXIMUM RATINGS:

| Parameter                                                           | Symbol       | Value   | Unit        |
|---------------------------------------------------------------------|--------------|---------|-------------|
| Storage junction temperature range                                  | $T_{stg}$    | -40~150 | $^{\circ}C$ |
| Operating junction temperature range                                | $T_j$        | -40~110 | $^{\circ}C$ |
| Repetitive peak off-state voltage ( $T_j=25^{\circ}C$ )             | $V_{DRM}$    | 600/800 | V           |
| Repetitive peak reverse voltage ( $T_j=25^{\circ}C$ )               | $V_{RRM}$    | 600/800 | V           |
| RMS on-state current                                                | $I_{T(RMS)}$ | 4       | A           |
| Non repetitive surge peak on-state current (full cycle, $F=50Hz$ )  | $I_{TSM}$    | 30      | A           |
| $R_t$ value for fusing ( $t_p=10ms$ )                               | $R_t$        | 4.5     | $A^2s$      |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ ) | $di/dt$      | 50      | $A/\mu s$   |
| Peak gate current                                                   | $I_{GM}$     | 1.2     | A           |



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|                                |             |     |   |
|--------------------------------|-------------|-----|---|
| Average gate power dissipation | $P_{G(AV)}$ | 0.2 | W |
| Peak gate power                | $P_{GM}$    | 2   | W |

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

| Symbol   | Test Condition                                                                          | Value |      |     | Unit                   |
|----------|-----------------------------------------------------------------------------------------|-------|------|-----|------------------------|
|          |                                                                                         | MIN   | TYPE | MAX |                        |
| $I_{GT}$ | $V_D=12\text{V}, R_L=33\Omega$                                                          | -     | 50   | 200 | $\mu\text{A}$          |
| $V_{GT}$ |                                                                                         | -     | 0.6  | 0.8 | V                      |
| $V_{GD}$ | $V_D=V_{DRM} T_j=110^{\circ}\text{C}$<br>$R_L=3.3\text{k}\Omega$                        | 0.2   | -    | -   | V                      |
| $I_H$    | $I_T=50\text{mA}$                                                                       | -     | -    | 5   | mA                     |
| $I_L$    | $I_G=1.2I_{GT}$                                                                         | -     | -    | 6   | mA                     |
| $dV/dt$  | $V_D=0.66 \times V_{DRM} T_j=110^{\circ}\text{C}$<br>Gate open $R_{GK}=1\text{k}\Omega$ | 10    | -    | -   | $\text{V}/\mu\text{s}$ |

### STATIC CHARACTERISTICS

| Symbol    | Test Condition                                |                           |     | Value | Unit          |
|-----------|-----------------------------------------------|---------------------------|-----|-------|---------------|
| $V_{TM}$  | $I_{TM}=8\text{A}$ $t_p=380\mu\text{s}$       | $T_j=25^{\circ}\text{C}$  | MAX | 1.5   | V             |
| $I_{DRM}$ | $V_{DRM}=V_{RRM}$<br>$R_{GK}=1\text{k}\Omega$ | $T_j=25^{\circ}\text{C}$  | MAX | 5     | $\mu\text{A}$ |
| $I_{RRM}$ |                                               | $T_j=110^{\circ}\text{C}$ |     | 100   | $\mu\text{A}$ |

### THERMAL RESISTANCES

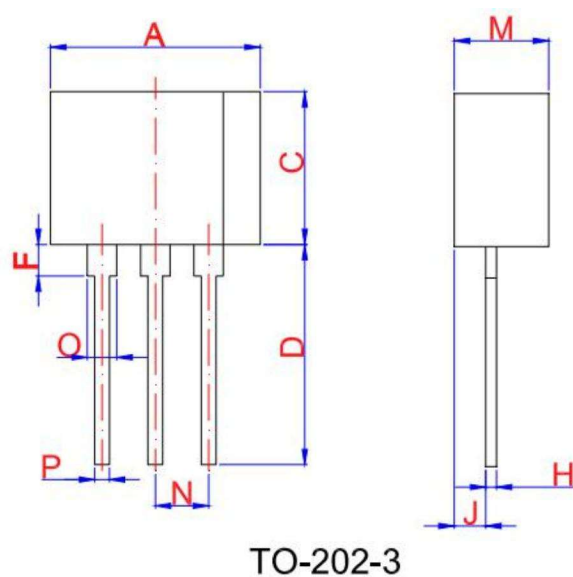
| Symbol        | Test Condition       |           | Value | Unit                        |
|---------------|----------------------|-----------|-------|-----------------------------|
| $R_{th(j-c)}$ | junction to case(AC) | TO-202-3  | 7.8   | $^{\circ}\text{C}/\text{W}$ |
|               |                      | TO-252-4R | 6.5   |                             |
|               |                      | TO-126    | 7.3   |                             |
|               |                      | TO-220B   | 3.0   |                             |

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### ORDERING INFORMATION

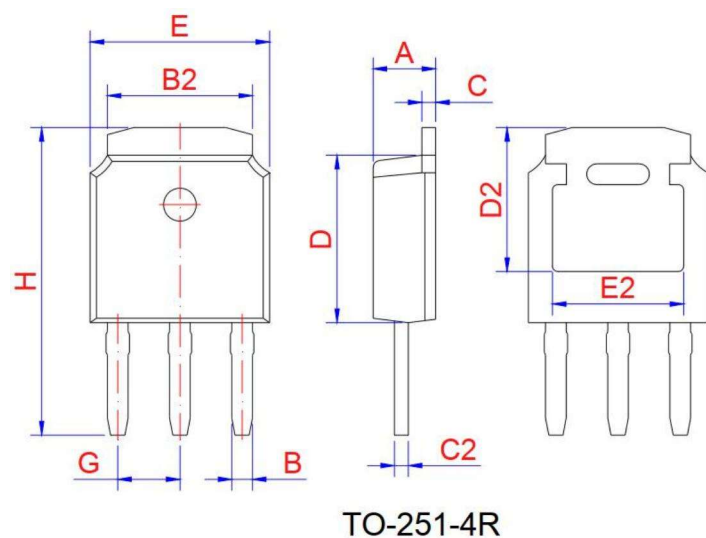
|     |   |    |    |                            |                                                             |
|-----|---|----|----|----------------------------|-------------------------------------------------------------|
| SCR | X | 04 | 05 | M                          | F                                                           |
|     |   |    |    |                            | Q:TO-126<br>F:TO-202-3<br>B:TO-220B<br>H:TO-251<br>K:TO-252 |
|     |   |    |    | M: 600V                    | N: 800V                                                     |
|     |   |    |    | 05: $I_{GT} \leq 200\mu A$ |                                                             |
|     |   |    |    |                            | $I_{T(RMS)}: 4A$                                            |

### PACKAGE MECHANICAL DATA

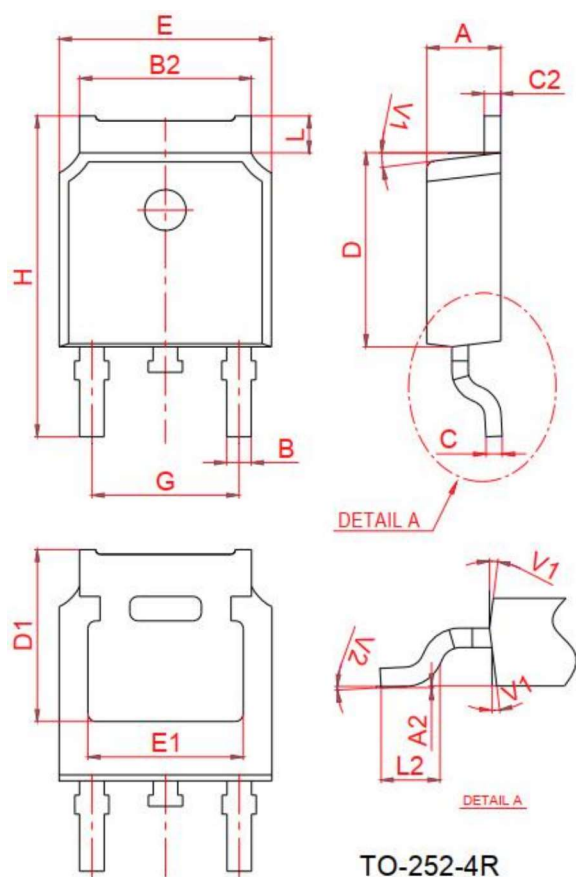


| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 9.30        |      | 9.90  | 0.366  |       | 0.39  |
| C    | 7.00        |      | 7.60  | 0.276  |       | 0.299 |
| D    | 10.5        |      | 11.50 | 0.413  |       | 0.453 |
| F    | 1.50        |      | 2.50  | 0.059  |       | 0.098 |
| H    | 0.45        |      | 0.55  | 0.018  |       | 0.022 |
| J    | 1.50        |      | 1.90  | 0.059  |       | 0.075 |
| M    | 4.40        |      | 4.70  | 0.173  |       | 0.185 |
| N    | 2           | 2.54 |       |        | 0.100 |       |
| O    | 1.20        |      | 1.50  | 0.047  |       | 0.059 |
| P    | 0.60        |      | 0.80  | 0.024  |       | 0.031 |

## X0405 4A Sensitive SCRs

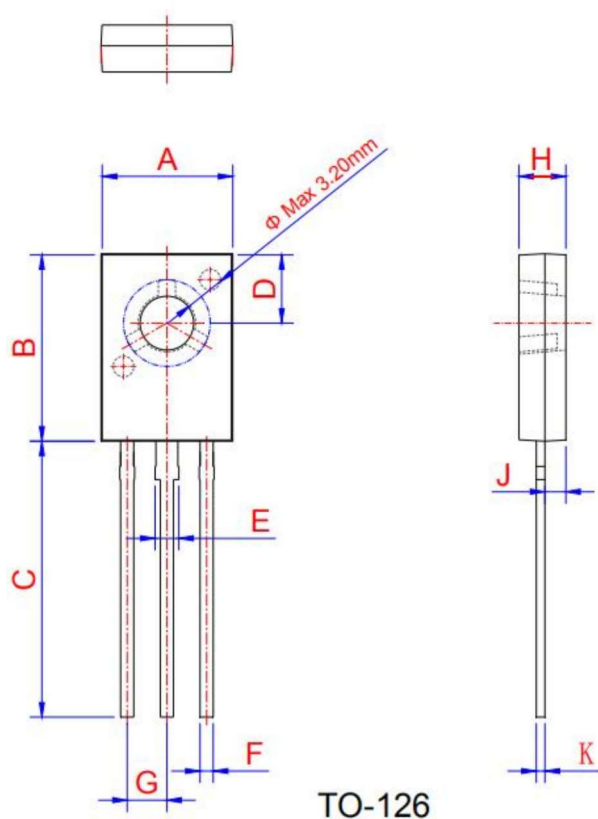


| Ref. | Dimensions  |       |       |          |       |       |
|------|-------------|-------|-------|----------|-------|-------|
|      | Millimeters |       |       | Inches   |       |       |
|      | Min.        | Typ.  | Max.  | Min.     | Typ.  | Max.  |
| A    | 2.10        | 2.30  | 2.50  | 0.083    | 0.091 | 0.098 |
| B    | 0.66        | 0.76  | 0.86  | 0.026    | 0.030 | 0.034 |
| B2   | 5.15        | 5.33  | 5.48  | 0.203    | 0.210 | 0.216 |
| C    | 0.44        | 0.51  | 0.58  | 0.017    | 0.020 | 0.023 |
| C2   | 0.44        | 0.51  | 0.58  | 0.017    | 0.020 | 0.023 |
| D    | 5.90        | 6.10  | 6.30  | 0.232    | 0.240 | 0.248 |
| D2   | 5.30REF     |       |       | 0.209REF |       |       |
| E    | 6.40        | 6.60  | 6.80  | 0.252    | 0.260 | 0.268 |
| E2   | 4.83REF     |       |       | 0.190REF |       |       |
| G    | 2.19        | 2.29  | 2.39  | 0.086    | 0.090 | 0.094 |
| H    | 10.60       | 11.20 | 11.80 | 0.417    | 0.441 | 0.465 |

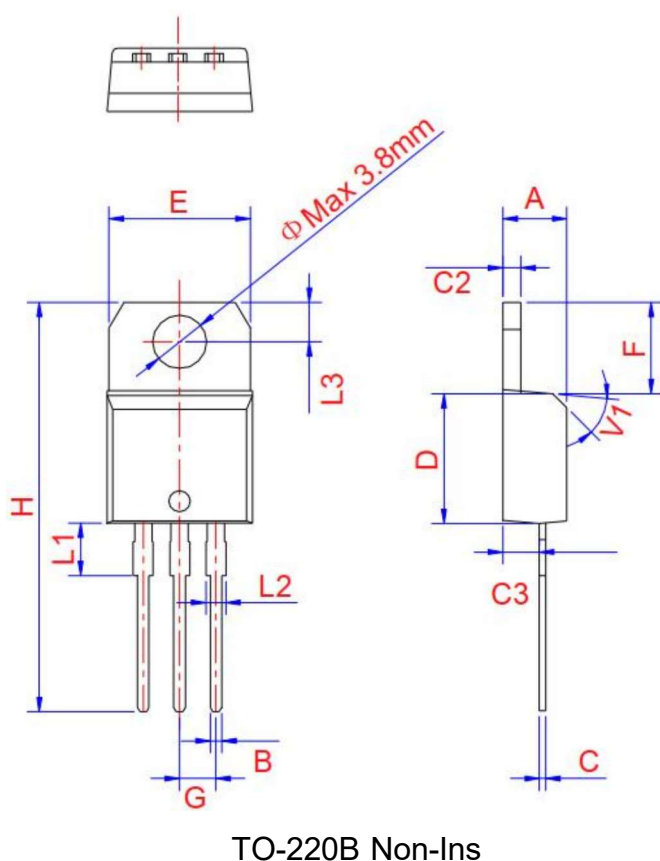


| Ref. | Dimensions  |      |       |          |      |       |
|------|-------------|------|-------|----------|------|-------|
|      | Millimeters |      |       | Inches   |      |       |
|      | Min.        | Typ. | Max.  | Min.     | Typ. | Max.  |
| A    | 2.2         |      | 2.4   | 0.087    |      | 0.094 |
| A2   | 0           |      | 0.1   | 0        |      | 0.004 |
| B    | 0.66        |      | 0.86  | 0.026    |      | 0.034 |
| B2   | 5.1         |      | 5.46  | 0.201    |      | 0.215 |
| C    | 0.46        |      | 0.58  | 0.018    |      | 0.023 |
| C2   | 0.44        |      | 0.58  | 0.017    |      | 0.023 |
| D    | 5.9         |      | 6.3   | 0.232    |      | 0.248 |
| D1   | 5.30REF     |      |       | 0.211REF |      |       |
| E    | 6.4         |      | 6.8   | 0.252    |      | 0.268 |
| E1   | 4.63        |      |       | 0.182    |      |       |
| G    | 4.372       |      | 4.772 | 0.172    |      | 0.188 |
| H    | 9.8         |      | 10.4  | 0.386    |      | 0.409 |
| L    | 1.09        |      | 1.21  | 0.043    |      | 0.048 |
| L2   | 1.35        |      | 1.65  | 0.053    |      | 0.065 |
| V1   |             | 7°   |       |          | 7°   |       |
| V2   | 0°          |      | 6°    | 0°       |      | 6°    |

## X0405 4A Sensitive SCRs



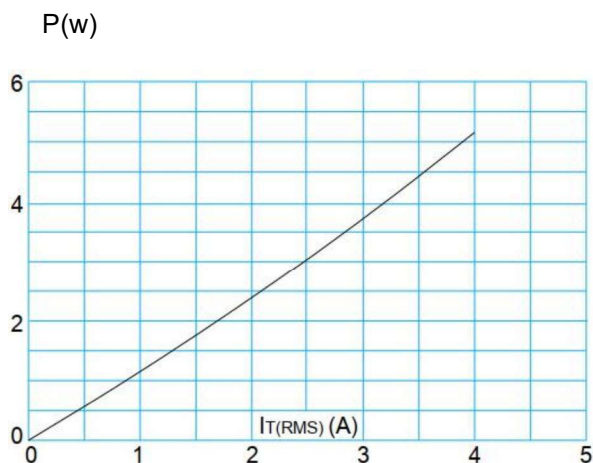
| Ref. | Dimensions  |      |      |        |      |       |
|------|-------------|------|------|--------|------|-------|
|      | Millimeters |      |      | Inches |      |       |
|      | Min.        | Typ. | Max. | Min.   | Typ. | Max.  |
| A    | 7.4         |      | 7.8  | 0.291  |      | 0.307 |
| B    | 10.6        |      | 11.2 | 0.417  |      | 0.441 |
| C    | 15.3        |      | 16.3 | 0.602  |      | 0.642 |
| D    | 3.9         |      | 4.1  | 0.154  |      | 0.161 |
| E    | 1.17        |      | 1.47 | 0.046  |      | 0.058 |
| F    | 0.66        |      | 0.86 | 0.026  |      | 0.034 |
| G    |             | 2.29 |      |        | 0.09 |       |
| H    | 2.5         |      | 2.9  | 0.098  |      | 0.114 |
| K    | 0.45        |      | 0.6  | 0.018  |      | 0.024 |



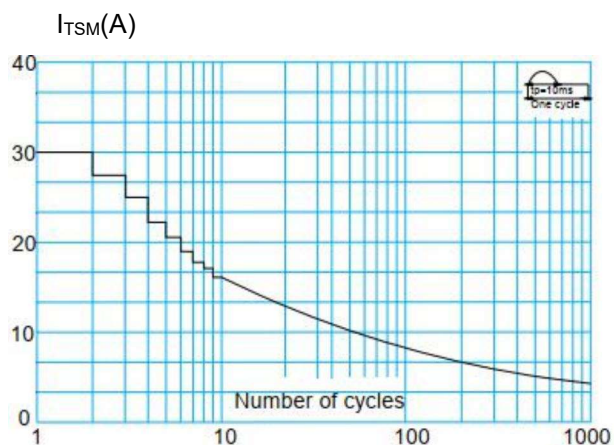
| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.4         | 4.47 | 4.6  | 0.173  | 0.176 | 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    | 6.4         |      | 6.8  | 0.252  |       | 0.267 |
| 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°   |       |

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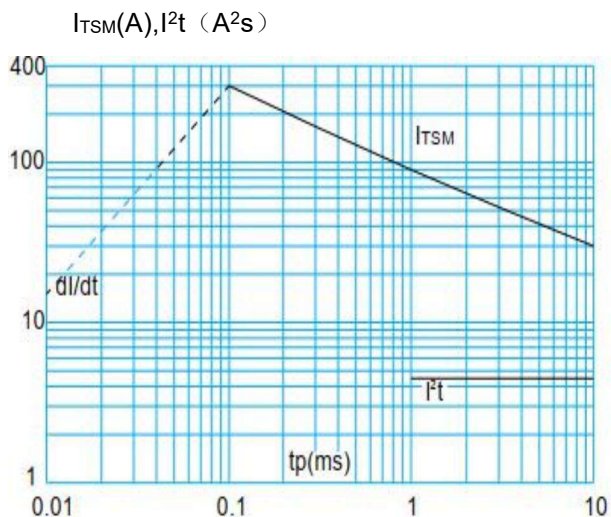
**FIG.1:** Maximum power dissipation versus RMS on-state current



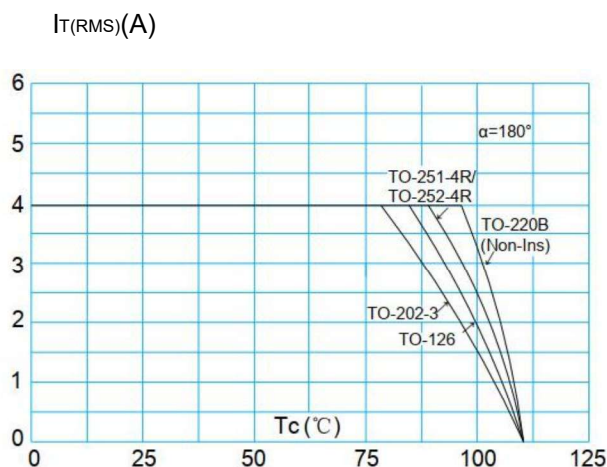
**FIG.3:** Surge peak on-state current versus number of cycles



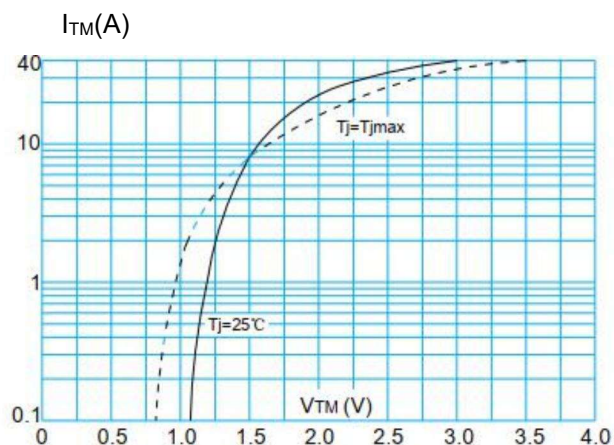
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2 t$  ( $di/dt < 50\text{A}/\mu\text{s}$ )



**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

