

## F08 Series 8A TRIACs

### FEATURES

- Glass Passivated Junctions
- High voltage and surge capability
- Low Thermal Resistance and Durability
- Triggering in all four quadrants

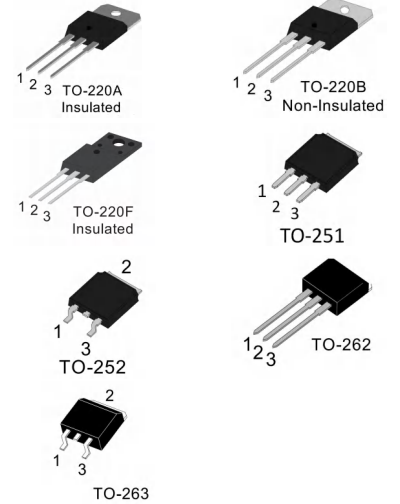
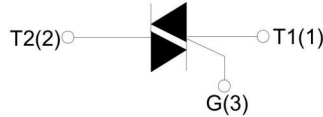
### APPLICATIONS

- Static relays
- Heating regulation
- In-duction motor starting circuits
- Phase control operation in light dimmers
- Motor speed controllers



### Parameters Summary

VD/VR:600/800V IT(RMS):8A IGT:5 to 10mA



### ABSOLUTE MAXIMUM RATINGS

| Parameter  | Symbol             | Value                  | Unit             |
|--|--------------------|------------------------|------------------|
| Storage junction temperature range   | T <sub>stg</sub>   | -40 ~ 150              | °C               |
| Operating junction temperature range                                       | T <sub>j</sub>     | -40 ~ 125              | °C               |
| Repetitive peak off-state voltage (T = 25°C)                               | V <sub>DRM</sub>   | 600/800                | V                |
| Repetitive peak reverse voltage (T = 25°C)                                 | V <sub>RRM</sub>   | 600/800                | V                |
| Non repetitive surge peak Off-state voltage                                | V <sub>DSM</sub>   | V <sub>DRM</sub> + 100 | V                |
| Non repetitive peak reverse voltage  | V <sub>RSM</sub>   | V <sub>RRM</sub> + 100 | V                |
| RMS on-state current   | TO-220A(TC=100°C)  | 8                      | A                |
|  | TO-220B(TC=107°C)  |                        |                  |
|  | TO-220F(TC=95°C)   |                        |                  |
|  | TO-251(TC=107°C)   |                        |                  |
|  | TO-252(TC=107°C)   |                        |                  |
|  | TO-262(TC=90°C)    |                        |                  |
|  | TO-263(TC=90°C)    |                        |                  |
| Non repetitive surge peak on-state current (180° conduction angle, F=50Hz) | I <sub>TSM</sub>   | 80                     | A                |
| I <sup>2</sup> t value for fusing (tp=10ms)                                | I <sup>2</sup> t   | 32                     | A <sup>2</sup> S |
| Critical rate of rise of on-state current (I = 2×IGT, tr ≤ 100 ns)         | di/dt              | 50                     | A/μS             |
| Peak gate current  | I <sub>GM</sub>    | 4                      | A                |
| Average gate power dissipation   | P <sub>G(AV)</sub> | 1                      | W                |

### Thermal Resistances

| Symbol   | Parameter             | Value         | Unit |
|----------|-----------------------|---------------|------|
| Rth(j-c) | Junction to case (AC) | TO-220A       | °C/W |
|          |                       | TO-220B       |      |
|          |                       | TO-220F       |      |
|          |                       | TO-252/TO-252 |      |
|          |                       | TO-262/TO-263 |      |

| ELECTRICAL CHARACTERISTICS (T=25°C unless otherwise specified) |  |          |     |       |     |            |
|--|--|----------|-----|-------|-----|------------|
| Symbol   | Test Condition                               | Quadrant |     | Value |     | Unit       |
|  |  |          |     | 05    | 10  |            |
| $I_{GT}$   | $V_D=12V$                                    | I-II-III | MAX | 5     | 10  | mA         |
|  |  | IV       |     | 10    | 25  |            |
| $V_{GT}$   |  | ALL      | MAX | 1.3   |     | V          |
| $V_{GD}$   | $V_D=V_{DRM}$ $T_j=125^\circ C$              | ALL      | MIN | 0.2   |     | V          |
| $I_L$  | $I_G=1.2I_{GT}$                              | I-III    | MAX | 5     | 20  | mA         |
|  |  | II-IV    |     | 10    | 35  |            |
| $I_H$  | $I_T=200mA$                                  |          | MAX | 5     | 20  | mA         |
| $dV/dt$  | $V_D=2/3V_{DRM}$ Gate Open $T_j=125^\circ C$ |          | MIN | 15    | 100 | V/ $\mu s$ |

| STATIC CHARACTERISTICS |                             |                   |              |         |
|------------------------|-----------------------------|-------------------|--------------|---------|
| Symbol                 | Parameter                   |                   | Value(MAX. ) | Unit    |
| $V_{TM}$               | $I_{TM}=11A$ $t_p=380\mu s$ | $T_j=25^\circ C$  | 1.55         | V       |
| $I_{DRM}$              | $V_D=V_{DRM}$ $V_R=V_{RRM}$ | $T_j=25^\circ C$  | 5            | $\mu A$ |
| $I_{RRM}$              |                             | $T_j=125^\circ C$ | 1            | mA      |

### Ordering Information Scheme

# F 08 35 - 8 A

F:4Q

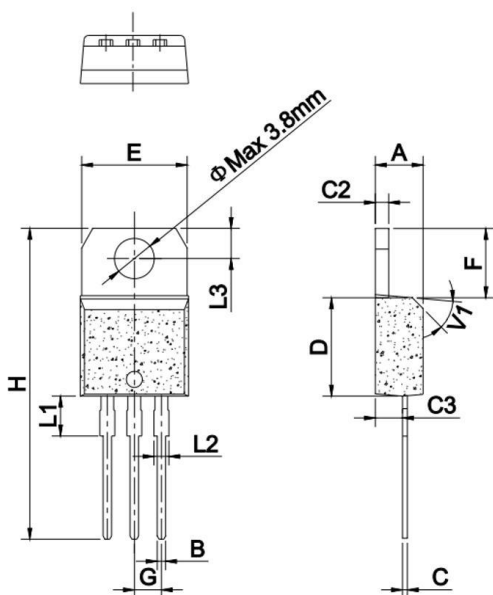
$I_T(RMS):8A$

05: $I_{GT}\leq 5mA$   
10: $I_{GT}\leq 10mA$

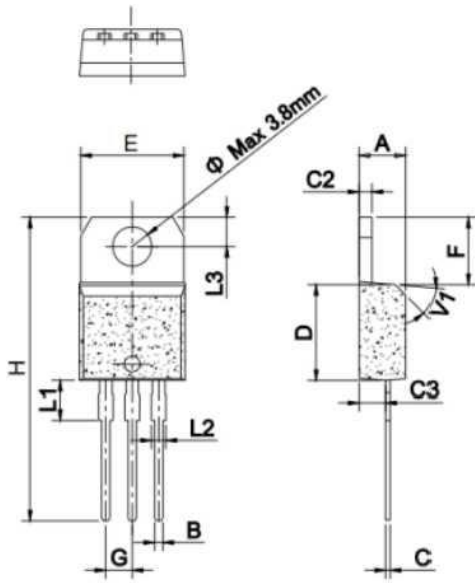
A:TO-220A B:TO-220B  
F:TO-220F H:TO-251  
D:TO-252 Z:SOT-263

6: $V_D/V_R\geq 600V$   
8: $V_D/V_R\geq 800V$

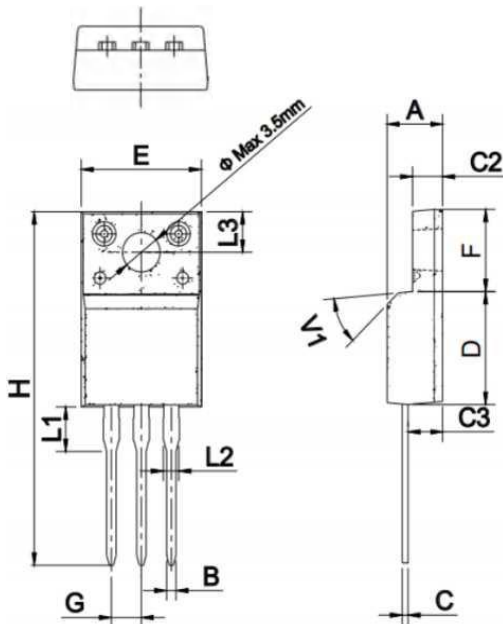
### TO-220A Package Mechanical Data



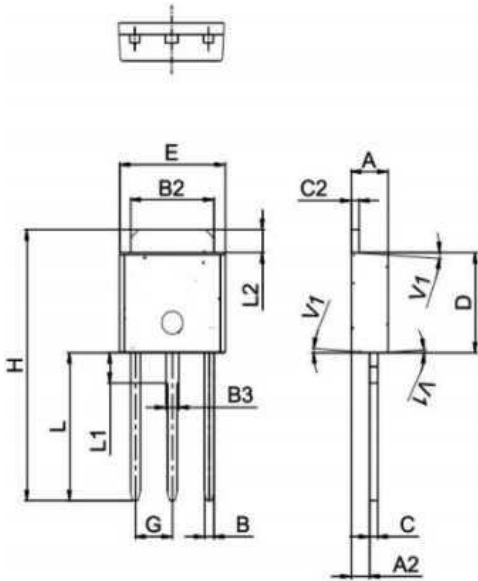
| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.40        |      | 4.60 | 0.173  |       | 0.181 |
| B    | 0.61        |      | 0.88 | 0.024  |       | 0.035 |
| C    | 0.46        |      | 0.70 | 0.018  |       | 0.028 |
| C2   | 1.21        |      | 1.32 | 0.048  |       | 0.052 |
| C3   | 2.40        |      | 2.72 | 0.094  |       | 0.107 |
| D    | 8.60        |      | 9.70 | 0.339  |       | 0.382 |
| E    | 9.80        |      | 10.4 | 0.386  |       | 0.409 |
| F    | 6.55        |      | 6.95 | 0.258  |       | 0.274 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.75 |      |        | 0.148 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   | 2.65        |      | 2.95 | 0.104  |       | 0.116 |
| V1   |             | 45°  |      |        | 45°   |       |

**TO-220B Package Mechanical Data**


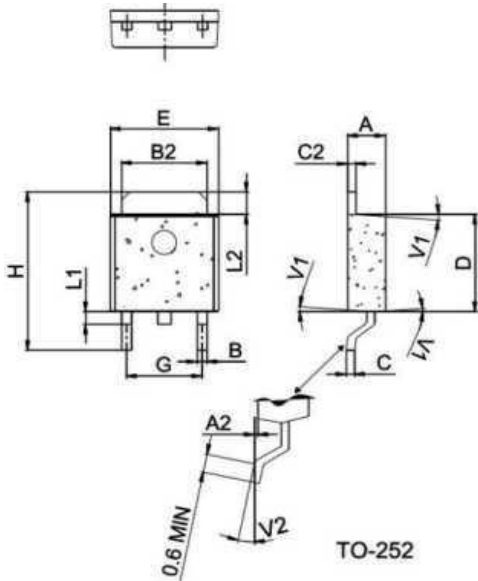
| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.10        |      | 4.30 | 0.173  |       | 0.181 |
| B    | 0.61        |      | 0.88 | 0.024  |       | 0.035 |
| C    | 0.46        |      | 0.70 | 0.018  |       | 0.028 |
| C2   | 1.21        |      | 1.32 | 0.048  |       | 0.052 |
| C3   | 2.40        |      | 2.72 | 0.094  |       | 0.107 |
| D    | 8.60        |      | 9.70 | 0.339  |       | 0.382 |
| E    | 9.60        |      | 10.4 | 0.378  |       | 0.409 |
| F    | 6.25        |      | 7.05 | 0.244  |       | 0.260 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             |      |      |        | 0.148 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   | 2.65        |      | 2.95 | 0.104  |       | 0.116 |
| V1   |             | 45   |      |        | 45    |       |

**TO-220F Package Mechanical Data**


| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.50        |      | 4.90 | 0.177  |       | 0.193 |
| B    | 0.74        | 0.80 | 0.83 | 0.029  | 0.031 | 0.033 |
| C    | 0.47        |      | 0.65 | 0.019  |       | 0.026 |
| C2   | 2.50        |      | 3.10 | 0.096  |       | 0.108 |
| C3   | 2.40        |      | 2.80 | 0.102  |       | 0.118 |
| D    | 8.60        |      | 8.90 | 0.346  |       | 0.366 |
| E    | 9.80        |      | 10.4 | 0.386  |       | 0.410 |
| F    | 6.70        |      | 7.50 | 0.252  |       | 0.268 |
| G    |             | 2.54 |      |        | 0.1   |       |
| H    | 28.0        |      | 29.8 | 1.102  |       | 1.173 |
| L1   |             | 3.63 |      |        | 0.143 |       |
| L2   | 1.14        |      | 1.70 | 0.045  |       | 0.067 |
| L3   |             | 3.30 |      |        | 0.130 |       |
| V1   |             | 45°  |      |        | 45°   |       |

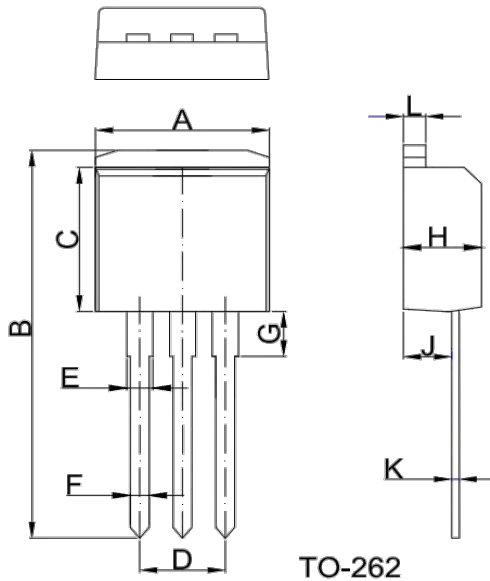
**TO-251 Package Mechanical Data**


| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 2.20        |      | 2.40  | 0.086  |      | 0.095 |
| A2   | 0.90        |      | 1.50  | 0.035  |      | 0.059 |
| B    | 0.55        |      | 0.65  | 0.022  |      | 0.026 |
| B2   | 5.10        |      | 5.40  | 0.200  |      | 0.213 |
| B3   | 0.76        |      | 0.85  | 0.030  |      | 0.033 |
| C    | 0.45        |      | 0.62  | 0.018  |      | 0.024 |
| C2   | 0.66        |      | 0.94  | 0.025  |      | 0.037 |
| D    | 6.00        |      | 6.20  | 0.236  |      | 0.244 |
| E    | 6.40        |      | 6.70  | 0.252  |      | 0.264 |
| G    |             | 2.30 |       |        |      |       |
| H    | 15.25       |      | 15.65 | 0.600  |      | 0.616 |
| L    | 7.8         |      | 8.8   | 0.307  |      | 0.346 |
| L1   | 1.50        |      | 1.90  | 0.059  |      | 0.075 |
| L2   | 1.10        |      | 1.50  | 0.043  |      | 0.059 |
| V1   |             | 4    |       |        | 4    |       |

**TO-252 Package Mechanical Data**


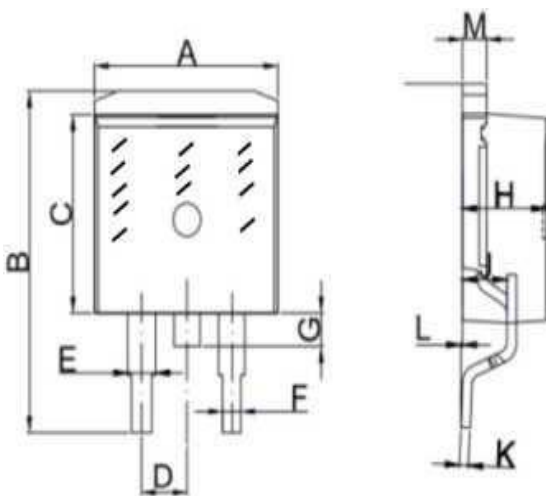
| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 2.20        |      | 2.40  | 0.086  |      | 0.095 |
| A2   | 0.03        |      | 0.23  | 0.001  |      | 0.009 |
| B    | 0.55        |      | 0.65  | 0.022  |      | 0.026 |
| B2   | 5.10        |      | 5.40  | 0.200  |      | 0.213 |
| C    | 0.45        |      | 0.62  | 0.018  |      | 0.024 |
| C2   | 0.71        |      | 0.99  | 0.019  |      | 0.024 |
| D    | 6.00        |      | 6.20  | 0.236  |      | 0.244 |
| E    | 6.40        |      | 6.70  | 0.252  |      | 0.264 |
| G    | 4.40        |      | 4.70  | 0.173  |      | 0.185 |
| H    | 9.35        |      | 10.60 | 0.368  |      | 0.417 |
| L1   | 1.30        |      | 1.70  | 0.051  |      | 0.067 |
| L2   | 1.37        |      | 1.50  | 0.054  |      | 0.059 |
| V1   |             | 4    |       |        |      |       |
| V2   | 0           |      | 8     | 0      |      | 8     |

### TO-262 Package Mechanical Data



| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 9.95        |      | 10.20 | 0.392  |      | 0.402 |
| B    | 23.25       |      | 23.45 | 0.915  |      | 0.923 |
| C    | 8.90        |      | 9.10  | 0.35   |      | 0.358 |
| D    | 2.50        |      | 2.60  | 0.098  |      | 0.102 |
| E    | 1.20        |      | 1.35  | 0.047  |      | 0.053 |
| F    | 0.80        |      | 0.85  | 0.031  |      | 0.033 |
| G    | 3.30        |      | 3.60  | 0.130  |      | 0.142 |
| H    | 4.45        |      | 4.55  | 0.175  |      | 0.179 |
| J    | 2.50        |      | 2.70  | 0.098  |      | 0.106 |
| K    | 0.38        |      | 0.42  | 0.015  |      | 0.017 |
| L    | 1.25        |      | 1.29  | 0.049  |      | 0.051 |

### SOT-263 Package Mechanical Data



| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 9.90        |      | 10.5  | 0.390  |       | 0.402 |
| B    | 14.70       |      | 15.80 | 0.579  |       | 0.622 |
| C    | 8.8         |      | 9.2   | 0.37   |       | 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        |      | 4.70  | 0.173  |       | 0.185 |
| J    | 2.30        |      | 2.70  | 0.091  |       | 0.106 |
| K    | 0.38        |      | 0.55  | 0.015  |       | 0.022 |
| L    | 0           |      | 0.25  | 0      | 0.004 | 0.010 |
| M    | 1.25        |      | 1.35  | 0.049  |       | 0.053 |

FIG.1 Maximum power dissipation versus on-state current

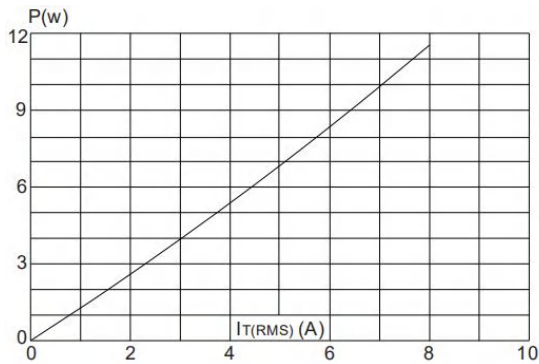


FIG.2: on-state current versus case temperature

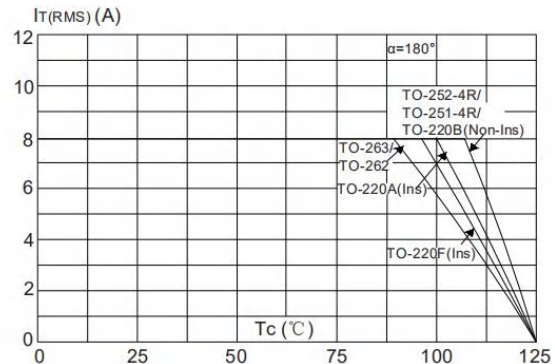


FIG.3: Surge peak on-state current versus number of cycles

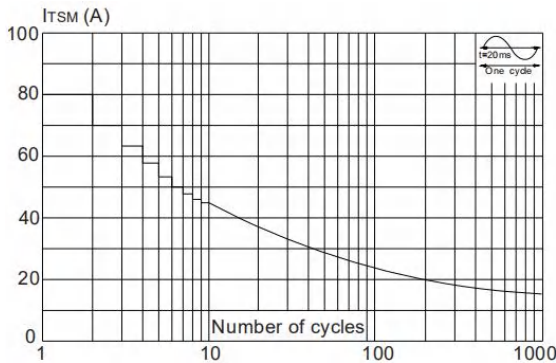


FIG.4: On-state characteristics (maximum values)

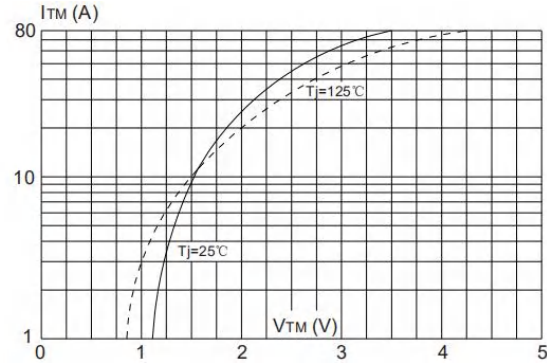


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10ms$ , and corresponding value of  $I_2 t$  ( $di/dt < 50A/\mu s$ )

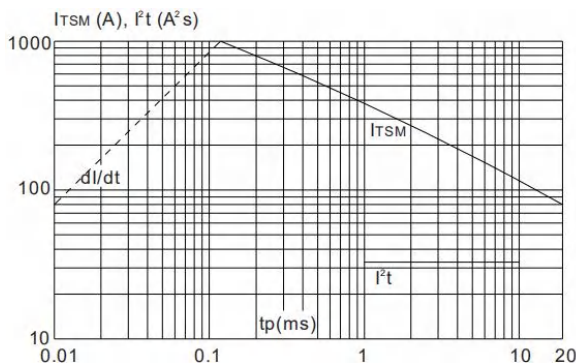
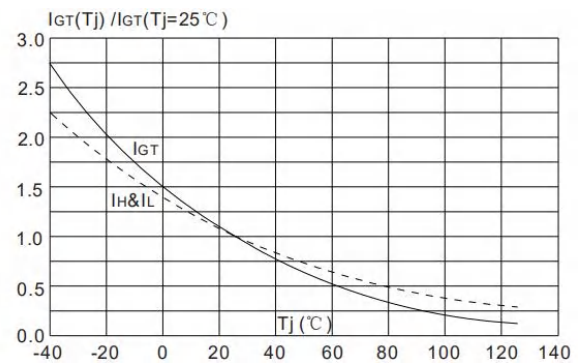


FIG.6: Relative variations of gate trigger current holding current and latching current versus junction temperature



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