

SB4040S 40A SCRs

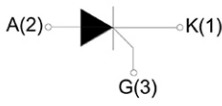


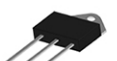
FEATURES

- High thermal conductivity performance
- High voltage capacity
- Very high current surge capability

APPLICATIONS

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

Parameters Summary

| | | |
|---|--|--|
|  | |  TO-220A Insulated  TO-220C  TO-3P Insulated |
|---|--|--|



| ABSOLUTE MAXIMUM RATINGS | | | |
|--|--------------|-----------------|------------------------|
| Parameter | Symbol | Value | Unit |
| Storage junction temperature range | T_{stg} | -40 ~ 150 | $^{\circ}\text{C}$ |
| Operating junction temperature range | T_j | -40 ~ 125 | $^{\circ}\text{C}$ |
| Repetitive peak off-state voltage | V_{DRM} | 1200/1600 | V |
| Repetitive peak reverse voltage | V_{RRM} | 1200/1600 | V |
| Non repetitive surge peak Off-state voltage | V_{DSM} | $V_{DRM} + 100$ | V |
| Non repetitive peak reverse voltage | V_{RSM} | $V_{RRM} + 100$ | V |
| Non repetitive surge peak on-state current | I_{TSM} | 420/490 | A |
| RMS on-state current (180° conduction angle) | $I_{T(RMS)}$ | 40 | A |
| Average on-state current (180° conduction angle) | $I_{T(AV)}$ | 25 | A |
| I^2t value for fusing ($t_p=10\text{ms}$) | I^2t | 880 | A^2S |
| Critical rate of rise of on-state current ($I = 2 \times I_{GT}$, $t_r \leq 100 \text{ ns}$) | di/dt | 150 | $\text{A}/\mu\text{S}$ |
| Peak gate current | I_{GM} | 4 | A |
| Peak gate power | PGM | 5 | W |

| Thermal Resistances | | | |
|---------------------|-----------------------|---------|------|
| Symbol | Parameter | Value | Unit |
| $R_{th(j-c)}$ | Junction to case (DC) | TO-220A | 1.2 |
| | | TO-220C | 0.8 |
| | | TO-3P | 0.7 |

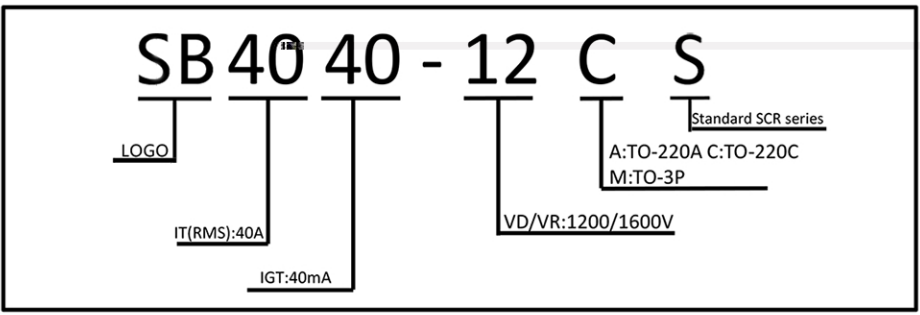
PERFORMED UNDER TEST CONDITIONS UNLESS OTHERWISE SPECIFIED

| Symbol | Parameter | Test Conditions | Value | Unit |
|-----------|-----------------------|---------------------------|-------|------|
| I_{TSM} | MAX. I _{TSM} | V _{GT} = 1.5 V | 1.5 | A |
| V_{GT} | MAX. V _{GT} | V _{DRM} = 1200 V | 1.5 | V |
| V_{DRM} | MAX. V _{DRM} | T _J = 25°C | 1200 | V |
| I_{TSM} | MAX. I _{TSM} | V _{GT} = 1.5 V | 1.5 | A |
| V_{GT} | MAX. V _{GT} | V _{DRM} = 1200 V | 1.5 | V |
| V_{DRM} | MAX. V _{DRM} | T _J = 25°C | 1200 | V |
| I_{TSM} | MAX. I _{TSM} | V _{GT} = 1.5 V | 1.5 | A |
| V_{GT} | MAX. V _{GT} | V _{DRM} = 1200 V | 1.5 | V |
| V_{DRM} | MAX. V _{DRM} | T _J = 25°C | 1200 | V |

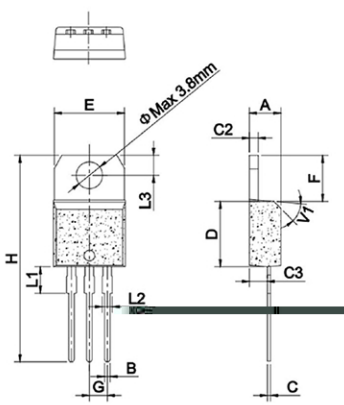
STATIC CHARACTERISTICS

| Symbol | Parameter | Test Conditions | Value | Unit |
|-----------|-----------------------|------------------------|-------|------|
| V_{TM} | ITM = 60A tp = 380µs | T _J = 25°C | 1.5 | V |
| I_{DRM} | MAX. I _{DRM} | T _J = 25°C | 1200 | V |
| I_{RRM} | MAX. I _{RRM} | T _J = 125°C | 1200 | V |

Ordering Information Scheme



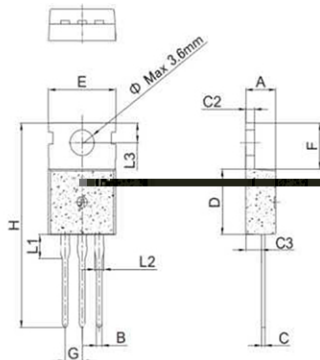
TO-220A Package Mechanical Data



Dimensions

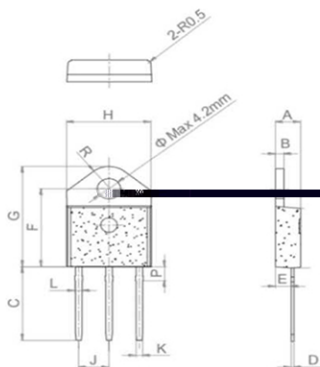
| Symbol | Value | Value | Value |
|--------|-------|-------|-------|
| A | 1.40 | 0.173 | 0.18 |
| B | 0.45 | 0.018 | 0.02 |
| C | 1.30 | 0.051 | 0.05 |
| D | 3.20 | 0.007 | 0.102 |
| E | 5.90 | 0.230 | 0.330 |
| F | 0.50 | 0.019 | 0.406 |
| G | 0.50 | 0.019 | 0.073 |
| H | 0.50 | 0.019 | 0.073 |
| L1 | 0.50 | 0.019 | 0.073 |
| L2 | 0.50 | 0.019 | 0.073 |
| L3 | 0.50 | 0.019 | 0.073 |

TO-220C Package Mechanical Data



| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.70 | | 0.90 | 0.028 | | 0.035 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.30 | | 1.48 | 0.051 | | 0.059 |
| C3 | 2.20 | | 2.60 | 0.087 | | 0.102 |
| D | 8.50 | | 9.50 | 0.335 | | 0.374 |
| E | 9.90 | | 10.3 | 0.390 | | 0.406 |
| F | 6.30 | | 6.90 | 0.248 | | 0.272 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.39 | | | 0.133 | |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| e | | 3.6 | | | 0.142 | |

TO-3P Package Mechanical Data



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 1.40 | | 1.60 | 0.055 | | 0.062 |
| C | 15.48 | | 15.88 | 0.609 | | 0.625 |
| C2 | 0.50 | | 0.70 | 0.019 | | 0.027 |
| C3 | 2.70 | | 2.90 | 0.106 | | 0.114 |
| D | 15.52 | | 16.52 | 0.611 | | 0.650 |
| E | 20.27 | | 20.67 | 0.798 | | 0.813 |
| F | 15.15 | | 15.35 | 0.590 | | 0.604 |
| G | | 5.45 | | | 0.214 | |
| H | 1.10 | | 1.30 | 0.043 | | 0.051 |
| L1 | 1.15 | | 1.35 | 0.045 | | 0.053 |
| L2 | 2.68 | | 3.08 | 0.105 | | 0.121 |
| L3 | | 4.20 | | | 0.165 | |
| e | 4.40 | | 4.60 | 0.173 | | 0.181 |

FIG.1 Maximum power dissipation versus on-state current

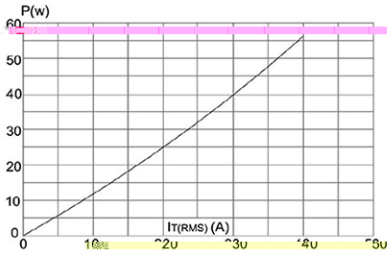


FIG.2: on-state current versus case temperature

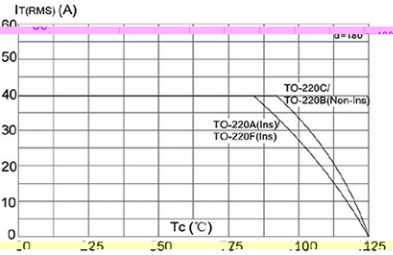


FIG.3: Surge peak on-state current versus number of cycles

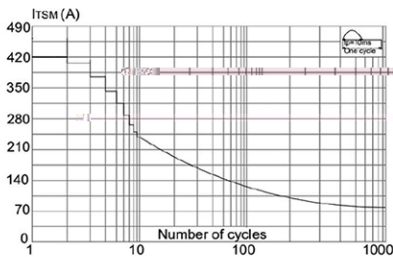


FIG.4: On-state characteristics (maximum values)

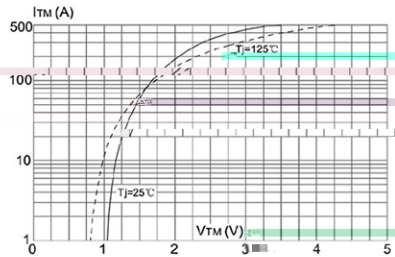


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10\text{ms}$, and corresponding value of $I_2 t (di/dt < 50\text{A}/\mu\text{s})$

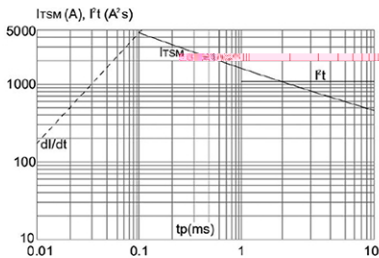


FIG.6: Relative variations of gate trigger current holding current and latching current versus junction temperature

