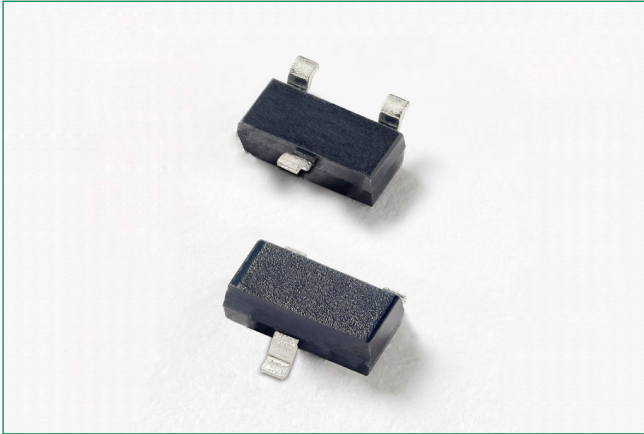


SxX8BBS Series

EV Series 0.8 Amp Sensitive SCRs

HF **RoHS****Main Features**

| Symbol | Value | Unit |
|-------------------|-------|---------|
| $I_{T(RMS)}$ | 0.8 | A |
| V_{DRM}/V_{RRM} | 600 | V |
| I_{GT} | 200 | μ A |

Description

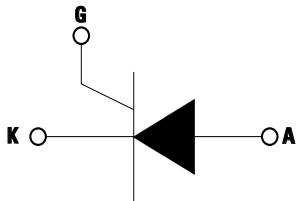
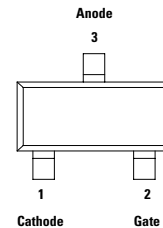
This new sensitive SCR component series offers 600V V_{DRM} and 0.8A $I_{T(RMS)}$ capability in the smallest package size in the industry, SOT23. It is specifically designed for GFCI (Ground Fault Circuit Interrupter) applications. All SCRs junctions are glass-passivated to ensure long term reliability and parametric stability.

Features

- Very compact SOT23 SMT package
- Surge current capability up to 12A @ 60Hz
- Blocking voltage (V_{DRM}/V_{RRM}) capability - up to 600V
- High dv/dt noise immunity
- Improved turn-off time (t_q) < 25 μ sec
- Sensitive gate for direct microprocessor interface
- RoHS compliant and Halogen-Free

Applications

The SxX8BBS series is specifically designed for GFCI (Ground Fault Circuit Interrupter) and applications.

Schematic Symbol**Pin out****Absolute Maximum Ratings**

| Symbol | Parameter | Value | Unit | |
|-------------------|---|--------------------------|---------------------------|-----------------------------|
| V_{DSM}/V_{RSM} | Peak non-repetitive blocking voltage | Pw=100 μ s | 700 V | |
| $I_{T(RMS)}$ | RMS on-state current (full sine wave) | $T_c = 80^\circ\text{C}$ | 0.8 A | |
| $I_{T(AV)}$ | Average on-state current | $T_c = 80^\circ\text{C}$ | 0.51 A | |
| I_{TSM} | Non repetitive surge peak on-state current (Single cycle, T_j initial = 25 $^\circ\text{C}$) | f= 50Hz | 10 A | |
| | | f= 60Hz | 12 A | |
| I^2t | I^2t Value for fusing | $t_p = 10$ ms | f= 50 Hz | 0.5 A ² s |
| | | $t_p = 8.3$ ms | f= 60 Hz | 0.6 A ² s |
| di/dt | Critical rate of rise of on-state current $I_G = 10$ mA | 60 Hz | $T_j = 125^\circ\text{C}$ | 80 A/ μ s |
| I_{GM} | Peak Gate Current | $t_p = 20$ μ s | $T_j = 125^\circ\text{C}$ | 1.0 A |
| $P_{G(AV)}$ | Average gate power dissipation | — | $T_j = 125^\circ\text{C}$ | 0.1 W |
| T_{stg} | Storage junction temperature range | — | — | -40 to 150 $^\circ\text{C}$ |
| T_j | Operating junction temperature range | — | — | -40 to 125 $^\circ\text{C}$ |

SxX8BBS Series

EV Series 0.8 Amp Sensitive SCRs

Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Description | Test Conditions | Limit | Value | Unit |
|-----------|--|---|-------|-------|------------------|
| I_{GT} | DC Gate Trigger Current | $V_D = 6V, R_L = 100 \Omega$ | MIN. | 50 | μA |
| | | | MAX. | 200 | μA |
| V_{GT} | DC Gate Trigger Voltage | $V_D = 6V, R_L = 100 \Omega$ | MAX. | 0.8 | V |
| V_{GRM} | Peak Reverse Gate Voltage | $I_{RG} = 10\mu\text{A}$ | MIN. | 8 | V |
| I_H | Holding Current | Initial Current = 20mA | MAX. | 10 | mA |
| (dv/dt)s | Critical Rate-of-Rise of Off-State Voltage | $T_J = 125^\circ\text{C}$ $V_D = 67\%V_{DRM}/V_{RRM}$ Exp. Waveform, $R_{GK} = 1 \text{ k}\Omega$ | MIN. | 50 | V/ μs |
| V_{GD} | Gate Non-Trigger Voltage | $V_D = V_{DRM}, R_{GK} = 1 \text{ k}\Omega$ $T_J = 125^\circ\text{C}$ | MIN. | 0.2 | V |
| t_q | Turn-Off Time | $I_T = 0.5\text{A}$ | MAX. | 25 | μs |
| t_{gt} | Turn-On Time | $I_G = 10\text{mA}, P_w = 15\mu\text{sec}$ $I_T = 1.6\text{A(pk)}$ | TYP. | 2.0 | μs |

Static Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Description | Test Conditions | Limit | Value | Unit |
|-------------------|-----------------------|-----------------------------|-------|-------|---------------|
| V_{TM} | Peak On-State Voltage | $I_{TM} = 1.6\text{A (pk)}$ | MAX. | 1.70 | V |
| I_{DRM}/I_{RRM} | V_{DRM}/V_{RRM} | $T_J = 25^\circ\text{C}$ | MAX. | 5 | μA |
| | | $T_J = 125^\circ\text{C}$ | MAX. | 100 | μA |

Thermal Resistances

| Symbol | Description | Value | Unit |
|------------------|-----------------------|-------|--------------------|
| $R_{\Theta(JC)}$ | Junction to case (AC) | 45 | $^\circ\text{C/W}$ |
| $R_{\Theta(JA)}$ | Junction to ambient | 220 | $^\circ\text{C/W}$ |

Figure 1:
Normalized DC Gate Trigger Current vs.
Junction Temperature

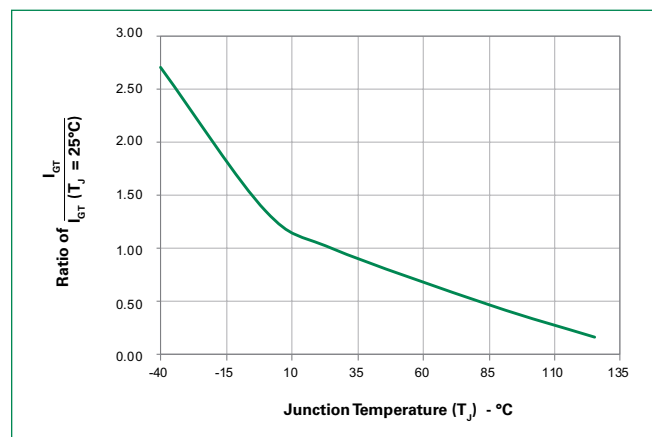
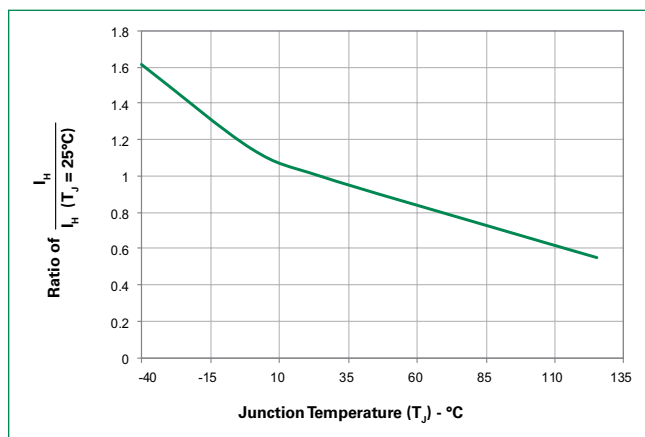


Figure 2:
Normalized DC Holding Current vs.
Junction Temperature



SxX8BBS Series

EV Series 0.8 Amp Sensitive SCRs

Figure 3:

Normalized DC Gate Trigger Voltage vs. Junction Temperature

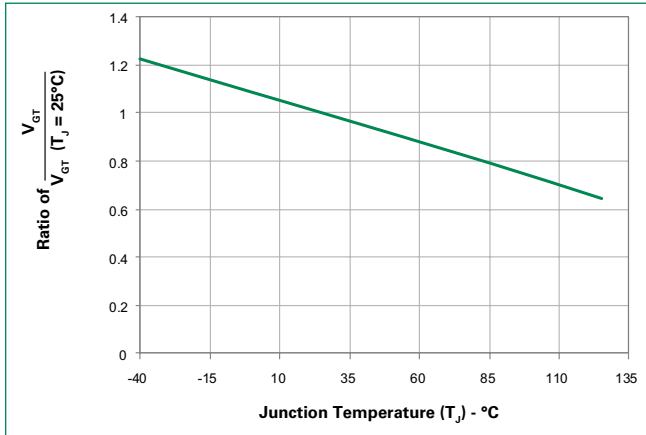


Figure 4:

On-State Current vs. On-State Voltage (Typical)

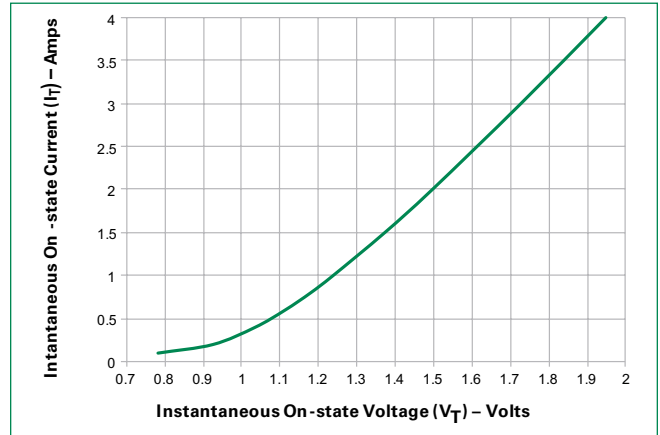


Figure 5:

Power Dissipation (Typical) vs. RMS On-State Current

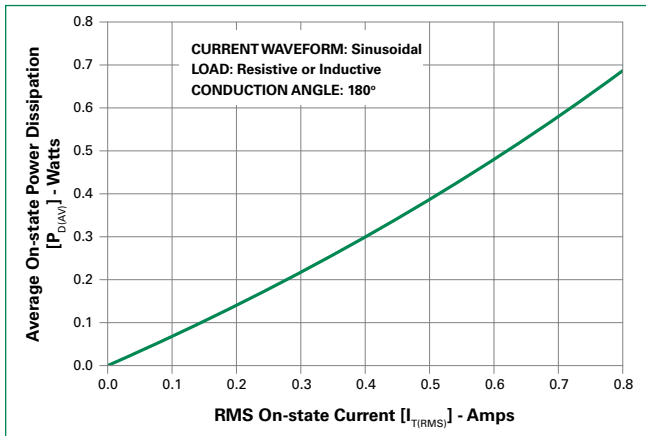


Figure 6:

Maximum Allowable Case Temperature vs. On-State Current

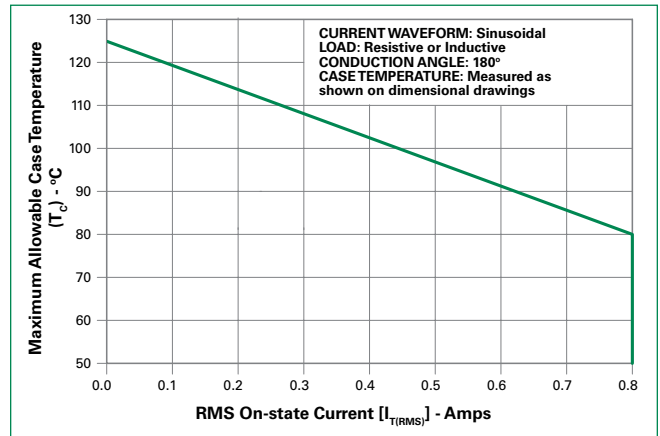
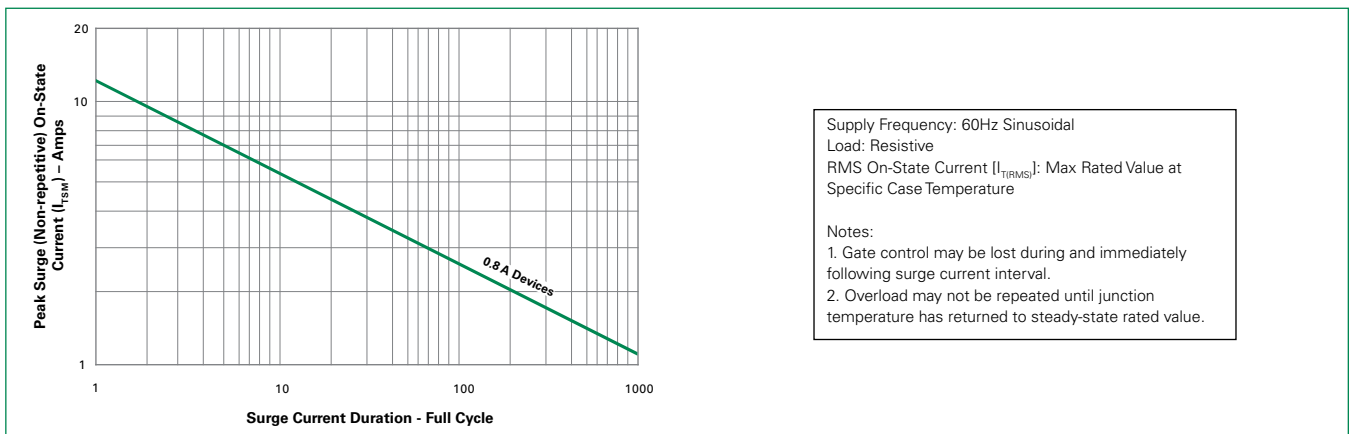


Figure 7: Surge Peak On-State Current vs. Number of Cycles



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Figure 8:

Static dv/dt vs. RGK vs. Junction Temperature

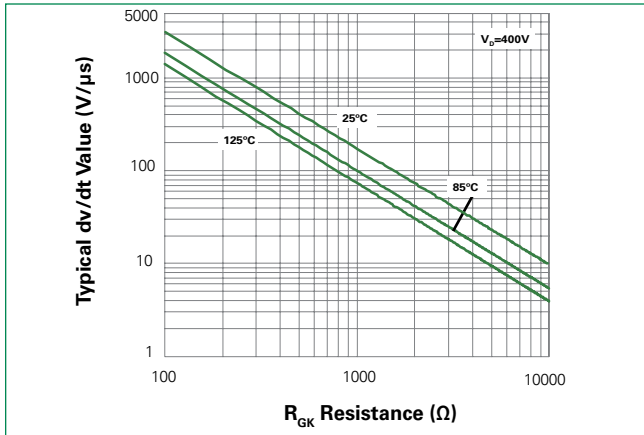
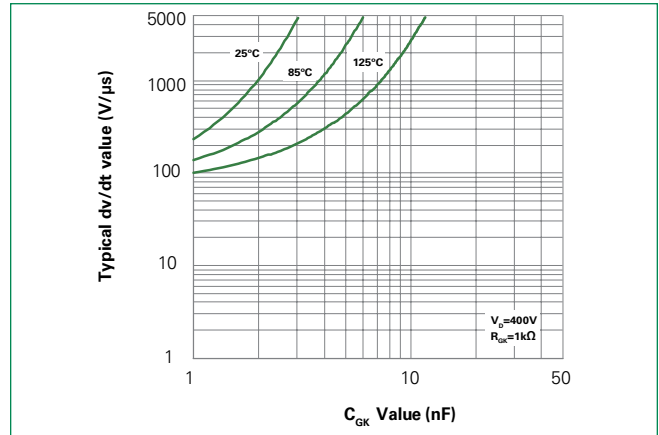


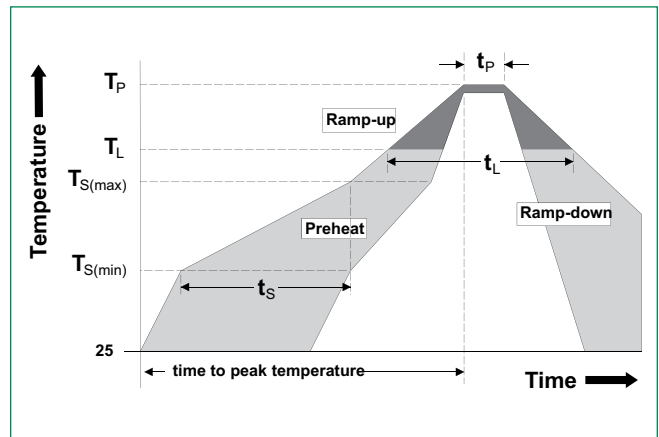
Figure 9:

Static dv/dt vs. CGK vs. Junction Temperature



Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| Reflow Condition | | Pb – Free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 120 secs |
| Average ramp up rate (Liquidus Temp) (T_L) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 5°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Time (min to max) (t_s) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 30 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



SxX8BBS Series

EV Series 0.8 Amp Sensitive SCRs

Physical Specifications

| | |
|------------------------|---|
| Terminal Finish | 100% Matte Tin-plated. |
| Body Material | UL Recognized compound meeting flammability rating V-0. |
| Lead Material | Copper Alloy |

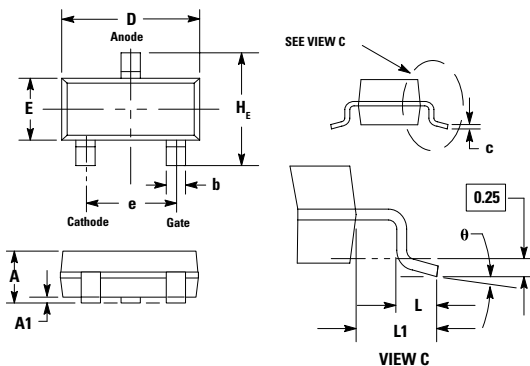
Design Considerations

Careful selection of the correct component for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the component rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

Reliability/Environmental Tests

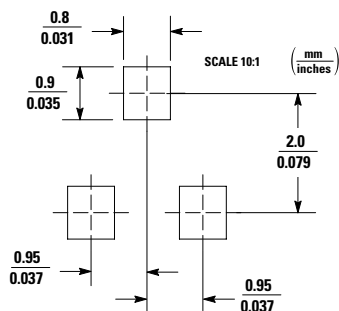
| Test | Specifications and Conditions |
|-----------------------------------|--|
| HTRB (AC Blocking) | MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ V_{DRM} @ 125°C for 1008 hours |
| Temperature Cycling | MIL-STD-750, M-1051, 100 cycles; -55°C to +150°C; 15-min dwell-time |
| H3TRB | EIA / JEDEC, JESD22-A101 1008 hours; 160V - DC; 85°C; 85% rel humidity |
| UHASt | ESD22-A118, 96hours, 130°C, 85%RH |
| Resistance to Solder Heat | MIL-STD-750 Method 2031, 260°C, 10s |
| Solderability | ANSI/J-STD-002, category 3, Test A |
| Moisture Sensitivity Level | Level 1, JEDEC-J-STD-020D |

Dimensions – SOT-23



| Dimensions | Inches | | | Millimeters | | |
|------------|--------|------|------|-------------|------|------|
| | Min | Typ | Max | Min | Typ | Max |
| A | 0.04 | 0.04 | 0.04 | 0.89 | 1.02 | 1.12 |
| A1 | 0.00 | 0.00 | 0.01 | 0.01 | 0.10 | 0.15 |
| b | 0.02 | 0.02 | 0.02 | 0.38 | 0.46 | 0.51 |
| c | 0.00 | 0.01 | 0.01 | 0.08 | 0.13 | 0.18 |
| D | 0.11 | 0.11 | 0.12 | 2.80 | 2.90 | 3.04 |
| E | 0.05 | 0.05 | 0.06 | 1.19 | 1.30 | 1.40 |
| e | 0.07 | 0.08 | 0.08 | 1.78 | 1.91 | 2.06 |
| L | 0.02 | 0.02 | 0.02 | 0.40 | 0.49 | 0.60 |
| L1 | 0.01 | 0.02 | 0.03 | 0.36 | 0.53 | 0.74 |
| H | 0.08 | 0.09 | 0.10 | 2.10 | 2.30 | 2.64 |
| θ | 0° | - | 10° | 0° | - | 10° |

SOLDERING FOOTPRINT



Product Selector

| Part Number | Voltage 600V | Gate Sensitivity | Package |
|-------------|-----------------|------------------|---------|
| S6X8BBS | X | 200 μ A | SOT-23 |

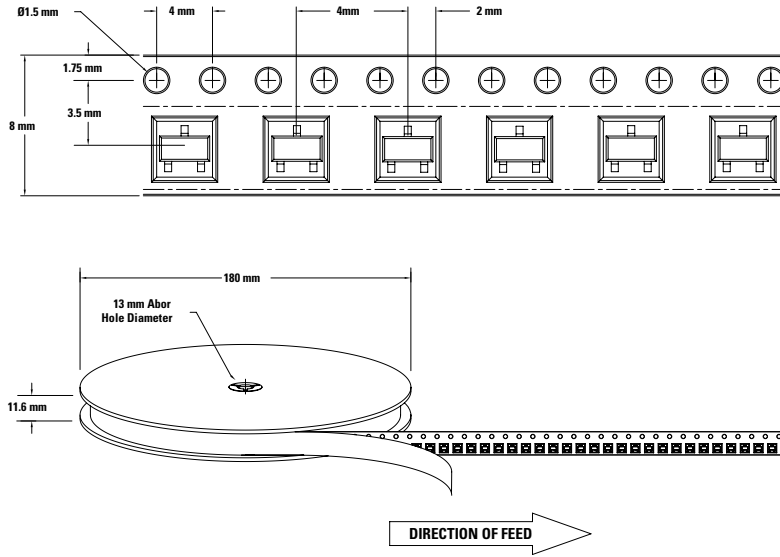
Packing Options

| Part Number | Marking | Weight | Packing Mode | Base Quantity |
|-------------|---------|--------|--------------|---------------|
| S6X8BBSRP | 6X8 | 0.01g | Tape & Reel | 3000 |

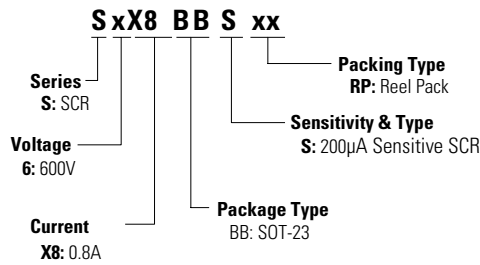
SxX8BBS Series

EV Series 0.8 Amp Sensitive SCRs

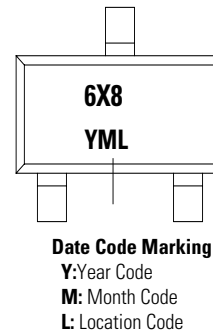
SOT-23 Reel Pack (RP) Specifications



Part Numbering System



Part Marking System



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