

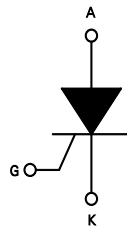
**SxX8BBS Series**



**Main Features**

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

**Schematic Symbol**



**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.

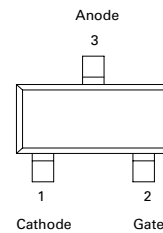
**Features**

- 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  $\mu sec$
- 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.

**Pin out**



**Absolute Maximum Ratings**

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

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

Symbol	Description	Test Conditions	Limit	Value	Unit
$I_{GT}$	DC Gate Trigger Current	$V_D = 6\text{V}, R_L = 100\ \Omega$	MIN.	50	$\mu\text{A}$
			MAX.	200	$\mu\text{A}$
$V_{GT}$	DC Gate Trigger Voltage	$V_D = 6\text{V}, R_L = 100\ \Omega$	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/ $\mu\text{s}$
$V_{GD}$	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	$\mu\text{s}$
$t_{gt}$	Turn-On Time	$I_G = 10\text{mA}, P_w = 15\ \mu\text{sec},$ $I_T = 1.6\text{A(pk)}$	TYP.	2.0	$\mu\text{s}$

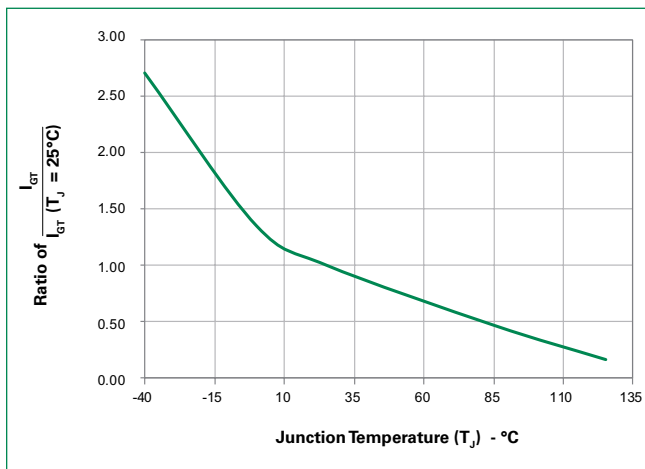
**Static Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)**

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	$\mu\text{A}$
		$T_J = 125^\circ\text{C}$	MAX.	100	$\mu\text{A}$

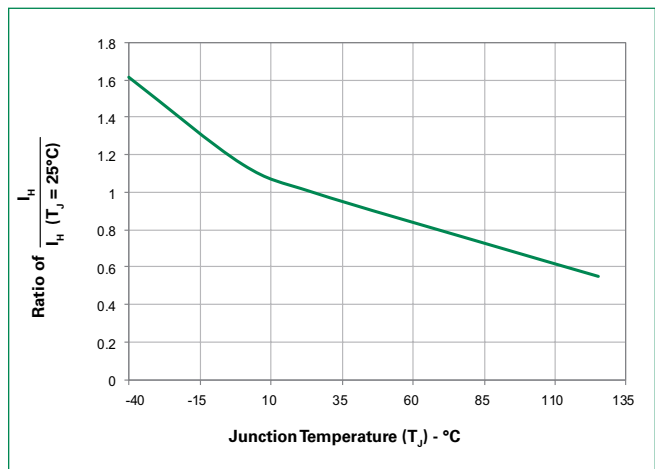
**Thermal Resistances**

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

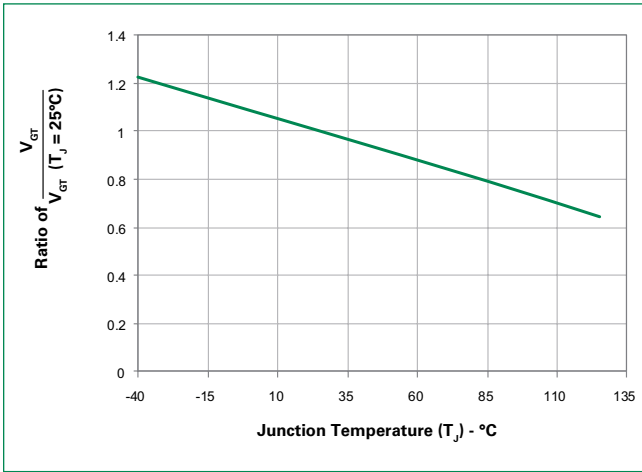
**Figure 1: Normalized DC Gate Trigger Current vs. Junction Temperature**



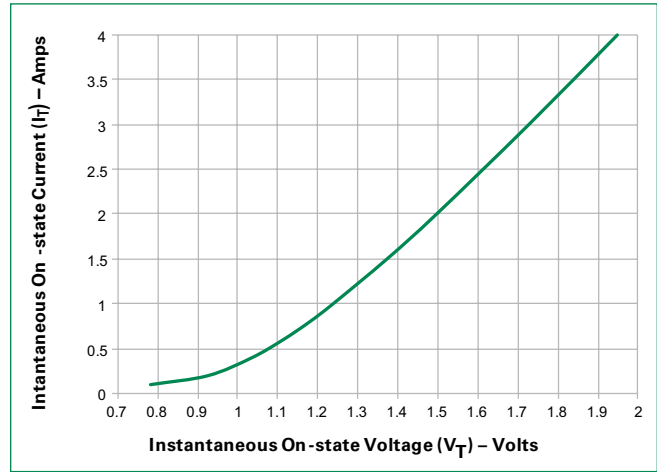
**Figure 2: Normalized DC Holding Current vs. Junction Temperature**



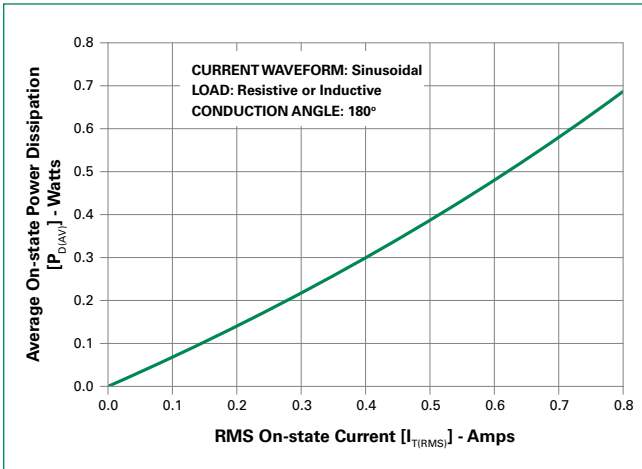
**Figure 3: Normalized DC Gate Trigger Voltage vs. Junction Temperature**



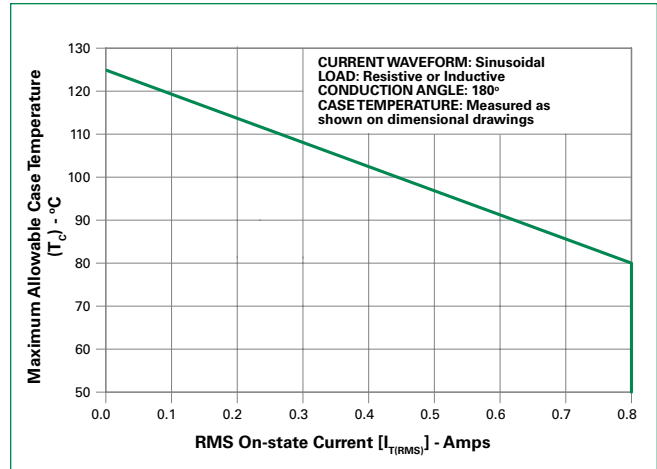
**Figure 4: On-State Current vs. On-State Voltage (Typical)**



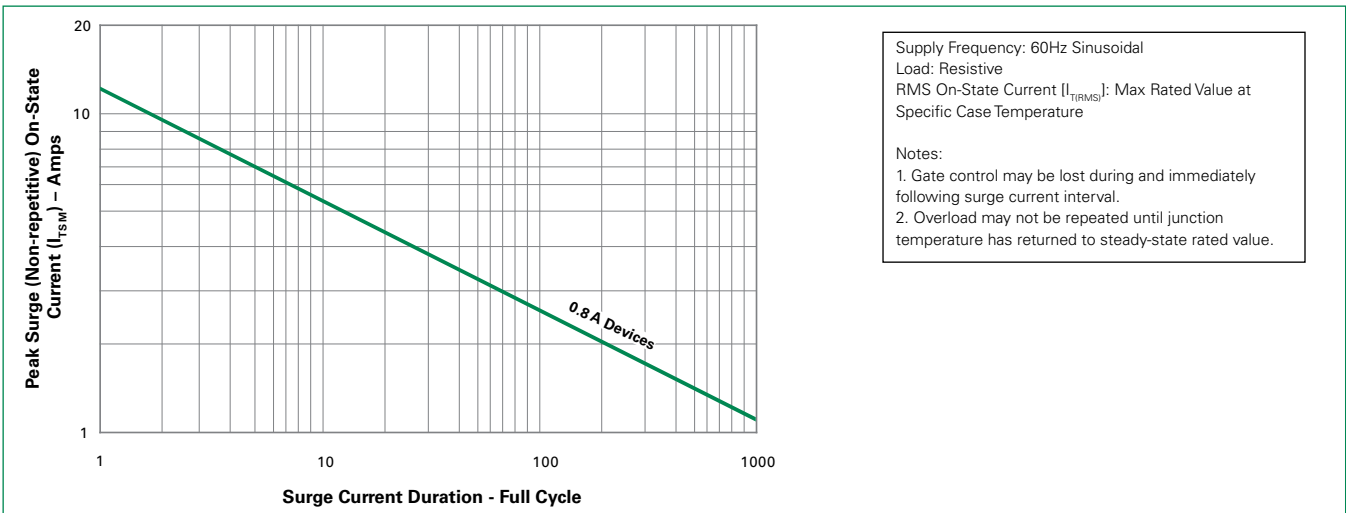
**Figure 5: Power Dissipation (Typical) vs. RMS On-State Current**



**Figure 6: Maximum Allowable Case Temperature vs. On-State Current**



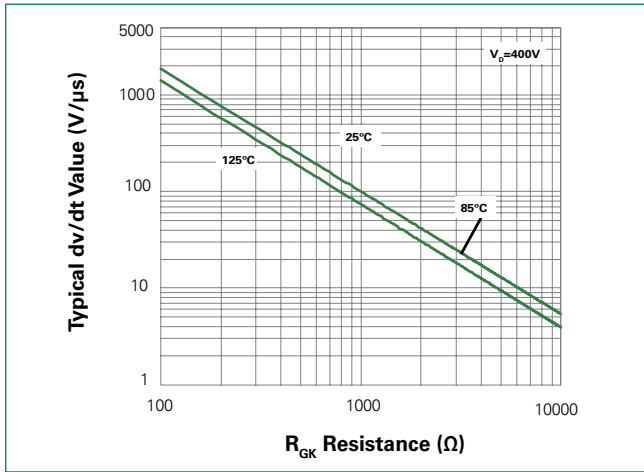
**Figure 7: Surge Peak On-State Current vs. Number of Cycles**



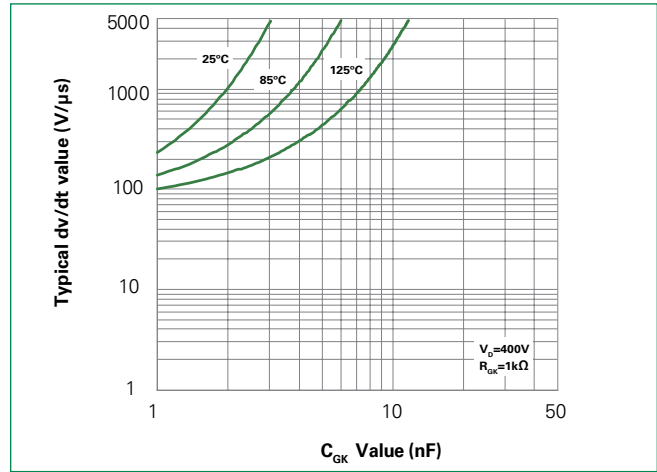
Supply Frequency: 60Hz Sinusoidal  
 Load: Resistive  
 RMS On-State Current [ $I_{T(RMS)}$ ]: Max Rated Value at Specific Case Temperature

Notes:  
 1. Gate control may be lost during and immediately following surge current interval.  
 2. Overload may not be repeated until junction temperature has returned to steady-state rated value.

**Figure 8: Static dv/dt vs. RGK vs. Junction Temperature**

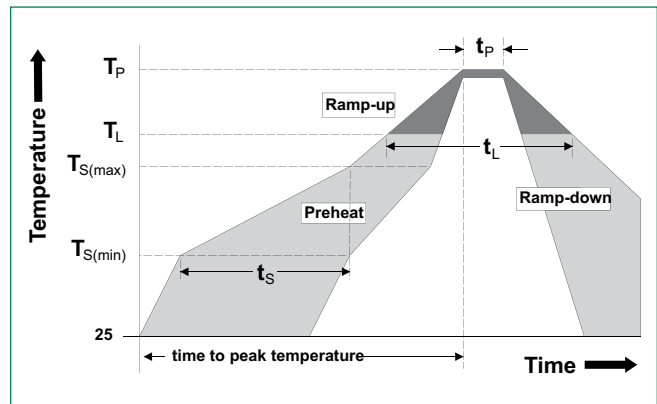


**Figure 9: Static dv/dt vs. CGK vs. Junction Temperature**



**Soldering Parameters**

<b>Reflow Condition</b>		Pb – Free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
<b>Average ramp up rate (Liquidus Temp) (<math>T_L</math>) to peak</b>		5°C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		5°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_s$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		20 – 40 seconds
<b>Ramp-down Rate</b>		5°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		280°C



### Physical Specifications

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

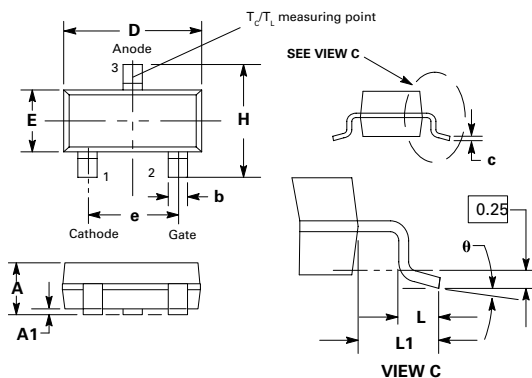
### Design Considerations

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.

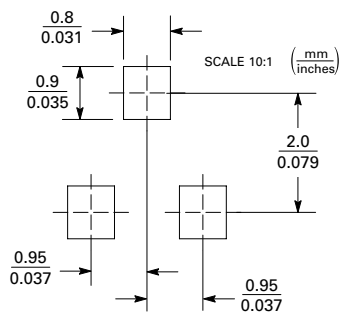
### Reliability/Environmental Tests

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

### Dimensions – SOT-23



#### SOLDERING FOOTPRINT



Dimensions	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
A	0.035	0.040	0.044	0.89	1.02	1.12
A1	0.001	0.002	0.004	0.03	0.05	0.10
b	0.015	0.018	0.020	0.38	0.46	0.51
c	0.003	0.005	0.007	0.08	0.13	0.18
D	0.110	0.114	0.120	2.79	2.90	3.05
E	0.047	0.051	0.055	1.19	1.30	1.40
e	0.070	0.075	0.081	1.78	1.91	2.06
L	0.004	0.008	0.012	0.10	0.20	0.30
L1	0.014	0.021	0.029	0.36	0.53	0.74
H	0.083	0.094	0.104	2.11	2.39	2.64
Θ	0°	-	10°	0°	-	10°

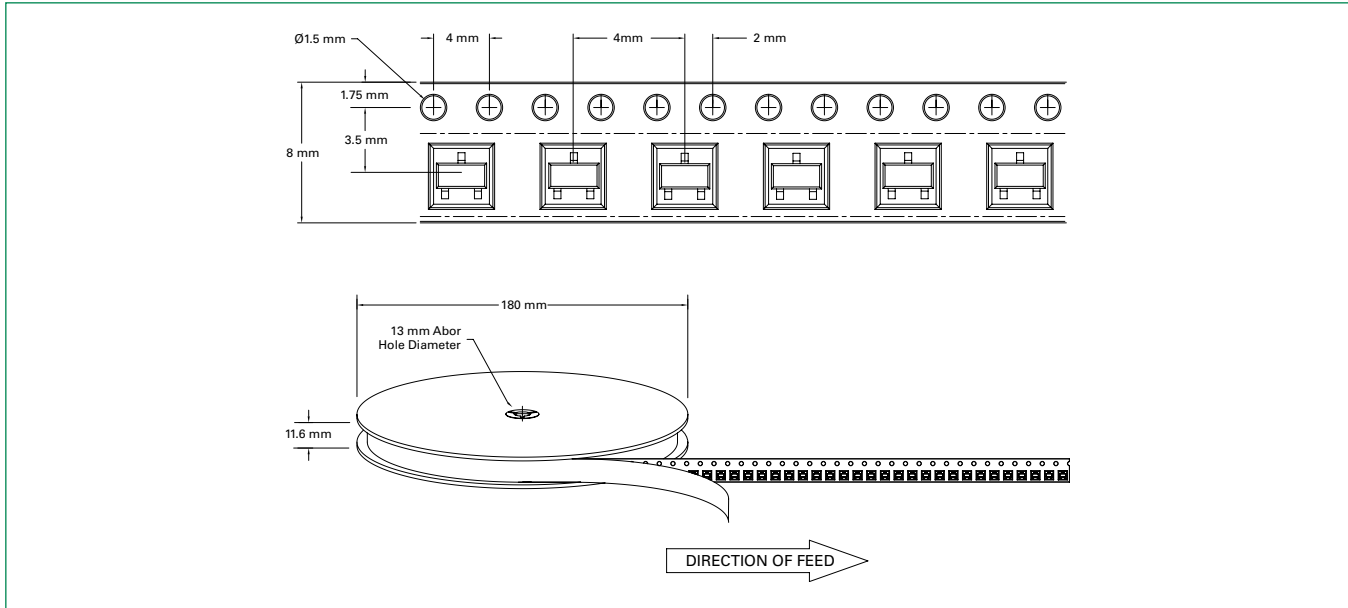
### Product Selector

Part Number	Voltage	Gate Sensitivity	Package
	600V		
S6X8BBS	X	200 $\mu$ A	SOT-23

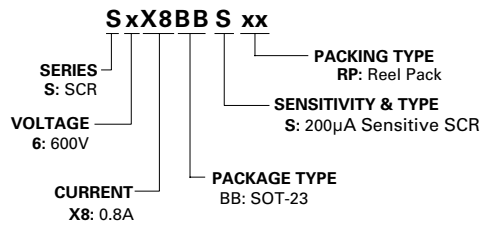
### Packing Options

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

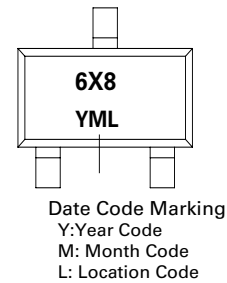
**SOT-23 Reel Pack (RP) Specifications**



**Part Numbering System**



**Part Marking System**



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