S8X5ECSx

H F RoHS



Main Features

Symbol	Value	Unit
I _{T(RMS)}	0.5	А
$V_{\rm drm}/V_{\rm rrm}$	800	V
V_{DSM} (t _p = 50 µs)	1150	V
$V_{RSM}(t_p = 50 \ \mu s)$	900	V
I _{gt}	20 to 100	μA

Schematic Symbol



Features

Description

The S8X5ECSx offers a high static dv/dt with a low turn off (tq) time. It is specifically designed for GFCI (Ground Fault Circuit Interrupter) and AFCI (Arc Fault Circuit Interrupter), RCD (Residual Current Device) and RCBO (Residual Current Circuit Breaker with Overload Protection) applications. All SCR junctions are glass-passivated to ensure long term

- Thru-hole packages
- Surge current capability < 20Amps

reliability and parametric stability.

- Blocking voltage (V_{DRM} / V_{RRM}) capability - up to 800V
- Non-repetitive direct surge peak off-state voltage (V_{DSM}) up to 1150V
- Non-repetitive reverse surge peak off-state voltage (V_{RSM}) up to 900V
- High dv/dt noise immunity
- Improved turn-off time (t_a)
- Sensitive gate for direct microprocessor interface
- Halogen free and RoHS compliant

Absolute Maximum Ratings					
Symbol	Parameter			Value	Unit
I _{T(RMS)}	RMS on-state current (full sine wave)		$T_c = 85^{\circ}C$	0.5	А
I _{T(AV)}	Average on-state current		$T_c = 85^{\circ}C$	0.3	А
1	Non repetitive surge peak on-state current		F= 50Hz	10	A
ITSM	(Sine half wave, T_J initial = 25°C)		F= 60Hz	12	А
l²t	I ² t Value for fusing	t _p = 10 ms	F = 50 Hz	0.5	A ² s
di/dt	Critical rate of rise of on-state current $I_{g} = 10 \text{mA}$		T _J = 125°C	80	A/µs
I _{GM}	Peak Gate Current	t _p = 20 μs	T _J = 125°C	0.5	А
P _{G(AV)}	Average gate power dissipation	_	T _J = 125°C	0.2	W
T _{stg}	Storage junction temperature range			-40 to 150	°C
Tj	Operating junction temperature range	_	_	-40 to 125	°C

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Electrical Characteristics (T_J = 25°C, unless otherwise specified)

				Va	lue	
Symbol	Description Test Conditions Limit		Limit	value		Unit
				S8X5ECS	S8X5ECS2	
1	DC Gate Trigger Current	$V_{\rm D} = 6V$	Min.	20	20	μA
'GT		R _L = 100 Ω	Max.	100	50	μA
V _{gt}	DC Gate Trigger Voltage	$V_{D} = 6V$ $R_{L} = 100 \Omega$	Max.	0	.8	V
V _{grm}	Peak Reverse Gate Voltage	$I_{RG} = 10 \mu A$	Min.	8	3	V
I _H	Holding Current	$R_{_{GK}} = 1 \text{ K}\Omega$ Initial Current = 20mA	Max.	:	3	mA
dv/dt	Critical Rate-of-Rise of Off-State Voltage	$\begin{array}{l} T_{\rm J}=125^{\circ}{\rm C}\\ V_{\rm D}=67\% {\rm of} V_{\rm DRM}\\ {\rm Exp.} {\rm Waveform}\\ {\rm R}_{\rm GK}=1 {\rm k}\Omega \end{array}$	Min.	40		V/µs
V _{GD}	Gate Non-Trigger Voltage	$\begin{array}{l} V_{\mathrm{D}} = 1/2 \; V_{\mathrm{DRM}} \\ R_{\mathrm{GK}} = 1 \; k\Omega \\ T_{\mathrm{J}} = 125^{\circ} \mathrm{C} \end{array}$	Min.	0.2		V
t _q	Turn-Off Time	$I_{T} = 0.5A$	Max.	3	5	μs
t _{gt}	Turn-On Time	I _g =10mA P _w = 15μsec I _τ = 1.6A(pk)	Тур.	2	.3	μs

Static Characteristics (T_j = 25°C, unless otherwise specified)

Symbol	Description	Test Conditions	Limit	Value	Unit
V _{TM}	Peak On-State Voltage	0.5A device $I_{TM} = 4A t_p = 380 \ \mu s$	MAX.	1.8	V
V _{T0}	Threshold Voltage	-	MAX	1.03	V
R _D	Dynamic Resistance	-	MAX	106	mΩ
I _{drm} /I _{rrm}	Off-State Current, Peak Repetitive	$T_{J} = 25^{\circ}C$	MAX.	3	μA
		T_ = 125°C	MAX.	500	μA

Thermal Resistances

Symbol	Description	Test Conditions	Value	Unit
R _{th(JC)}	Junction to case (AC)	$I_{T} = 0.8A_{(RMS)}^{1}$	35	°C/W
R _{th(j-a)}	Junction to ambient	$I_{T} = 0.8A_{(RMS)}^{1}$	150	°C/W

1. 60Hz AC resistive load condition, 100% conduction.









Figure 2: Normalized DC Holding Current vs. Junction Temperature



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



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



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



Soldering Parameters

Reflow Cond	Pb – Free assembly		
	- Temperature Min (T _{s(min)})	150°C	
Pre Heat	- Temperature Max (T _{s(max)})	200°C	
	- Time (min to max) (t _s)	60 – 180 secs	
Average ramp up rate (Liquidus Temp) (T _L) to peak		5°C/second max	
T _{S(max)} to T _L - Ramp-up Rate		5°C/second max	
5.4	- Temperature (T _L) (Liquidus)	217°C	
Reflow	- Time (min to max) (t _s)	60 – 150 seconds	
Peak Temper	ature (T _P)	260 ^{+0/-5} °C	
Time within	5°C of actual peak Temperature (t_p)	20 – 40 seconds	
Ramp-down Rate		5°C/second max	
Time 25°C to peak Temperature (T _P)		8 minutes Max.	
Do not exceed		280°C	



Physical Specifications

100% Matte Tin-plated.
UL Recognized compound meeting flammability rating V-0.
Copper Alloy
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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

Specifications and Conditions
MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125°C for 1008 hours
MIL-STD-750, M-1051, 1000 cycles; -55°C to +150°C; 15-min dwell-time
EIA / JEDEC, JESD22-A101 1008 hours; 320V - DC: 85°C; 85% rel humidity
JESD22-A118, 96 hours, 130°C, 85%RH
MIL-STD-750, M-1031,1008 hours; 150°C
1008 hours; -40°C
MIL-STD-750 Method 2031
ANSI/J-STD-002, category 3, Test A
MIL-STD-750, M-2036 Cond E

Dimensions – TO-92



	Inches		Millimeters	
Dimension	Min	Мах	Min	Max
Α	0.175	0.205	4.450	5.200
В	0.170	0.210	4.320	5.330
С	0.500		12.70	
D	0.135		3.430	
E	0.125	0.165	3.180	4.190
F	0.080	0.105	2.040	2.660
G	0.016	0.021	0.407	0.533
Н	0.045	0.055	1.150	1.390
I	0.095	0.105	2.420	2.660
J	0.015	0.020	0.380	0.500

Packing Option

r acking option				
Part Number	Marking	Weight	Packing Mode	Base Quantity
S8X5ECS	S8X5ECS	0.217G	Bulk	2500
S8X5ECSRP	S8X5ECS	0.217G	Tape & Reel	2000
S8X5ECSAP	S8X5ECS	0.217G	Ammo Pack	2000
S8X5ECS2	S8X5ECS2	0.217G	Bulk	2500
S8X5ECS2RP	S8X5ECS2	0.217G	Tape & Reel	2000
S8X5ECS2AP	S8X5ECS2	0.217G	Ammo Pack	2000

TO-92 (3-lead) Reel Pack (RP) Radial Leaded Specifications



TO-92 (3-lead) Ammo Pack (AP) Radial Leaded Specifications



Part Numbering System



Part Marking System



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