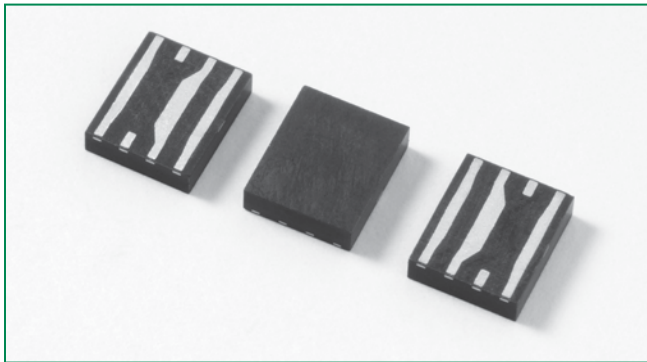


SEP Biased Series - 5x6 QFN



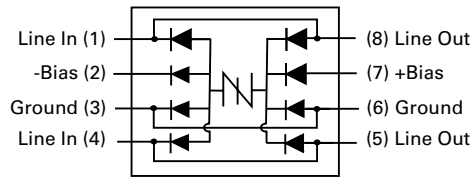
**Agency Approvals**

Agency	Agency File Number
	E133083

**Pinout Designation**

Line in	1	8	Line out
- Bias	2	7	+ Bias
Ground	3	6	Ground
Line in	4	5	Line out

**Schematic Symbol**



**Additional Information**



Datashheet



Resources



Samples

**Electrical Characteristics**

Part Number	Marking	$V_{DRM}@I_{DRM}=5\mu A$	$V_S@100V/\mu s$	$I_H$	$I_S$	$I_T@V_T$	$V_T@I_T=2.2Amps$	Capacitance
		V min	V max	mA min	mA max	A max	V max	
SEP0080Q38CB	SEP-8C	6	25	50	800	2.2	8	See Capacitance vs. Bias Voltage Graph
SEP0640Q38CB	SEP06C	58	77	150	800	2.2	8	
SEP0720Q38CB	SEP07C	65	88	150	800	2.2	8	
SEP0900Q38CB	SEP09C	75	98	150	800	2.2	8	
SEP0080Q38BB	SEP-8B	6	25	50	800	2.2	8	
SEP0640Q38BB	SEP06B	58	77	150	800	2.2	8	
SEP0720Q38BB	SEP07B	65	88	150	800	2.2	8	
SEP0900Q38BB	SEP09B	75	98	150	800	2.2	8	

Notes:  
- Absolute maximum ratings measured at  $T_A=25^\circ C$  (unless otherwise noted).  
- Components are bidirectional (unless otherwise noted).

**Description**

The new SEP (SIDACtor Thyristor Ethernet/PoE Protector) series has a surge rating compatible with GR1089 inter-building and ITU K.20/21 Enhanced protection requirements. Targeted for high-speed applications such as 10BaseT, 100BaseT, and 1000BaseT, the SEP series maintains signal quality while providing robust protection for Ethernet and PoE applications. This latest silicon design innovation results in a capacitive loading characteristic that is constant with respect to the voltage across the component. This reduces distortion caused by typical solid-state protection solutions. Offered in a surface-mount, QFN package, the SEP provides small package size without sacrificing power and surge handling capabilities.

**Features & Benefits**

- Compatible with 1000Base-T
- Balanced overvoltage protection
- Low distortion
- Low insertion loss
- Low profile
- SO-8 footprint compatible
- Fails short circuit when surged in excess of ratings
- RoHS Compliant and Halogen-Free
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

**Applicable Global Standards**

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- IEC 61000-4-5 2<sup>nd</sup> edition
- GR 1089 Inter-building
- GR 1089 Intra-building
- YD/T 1082
- YD/T 993
- YD/T 950
- Class 4/5 compliance of IEC 61000-4-5

**50/60 Hz Ratings**

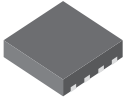
Parameter Name	Test Conditions	Value	Units
I <sub>TSM</sub> Maximum non-repetitive on-state current, 50/60 Hz	0.5s	6.5	A
	1s	4.6	
	2s	3.4	
	5s	2.3	
	30s	1.3	
	900s	0.73	

**Surge Ratings**

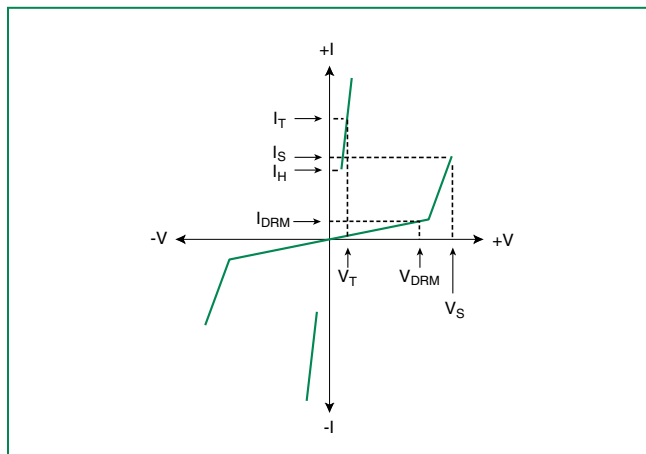
Series	I <sub>PP</sub>				I <sub>TSM</sub>
	2x10μs	1.2/50μs-8/20μs	10/700-5/310μs	10x1000μs	600V <sub>RMS</sub> 1 cycle
	A min	A min	A min	A min	A <sub>RMS</sub>
B	250	250	100	80	30
C	500	430	200	100	30

Notes:  
 - Peak pulse current rating (I<sub>PP</sub>) is repetitive and guaranteed for the life of the product as long as it returns to 25°C between surges  
 - I<sub>PP</sub> ratings applicable over temperature range of -40°C to +85°C  
 - The components must initially be in thermal equilibrium with -40°C ≤ T<sub>J</sub> ≤ +150°C

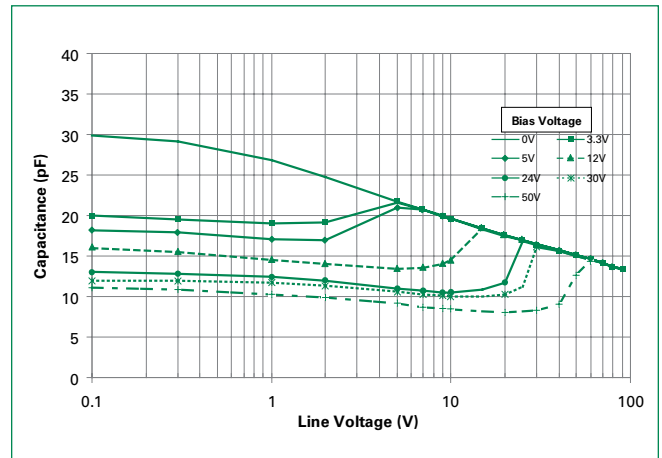
**Thermal Considerations**

Package	Symbol	Parameter	Value	Unit
 5x6 QFN	T <sub>J</sub>	Junction Temperature	-40 to +150	°C
	T <sub>STG</sub>	Storage Temperature Range	-40 to +150	°C
	R <sub>θJA</sub>	Thermal Resistance: Junction to Ambient	100	°C/W

**V-I Characteristics**

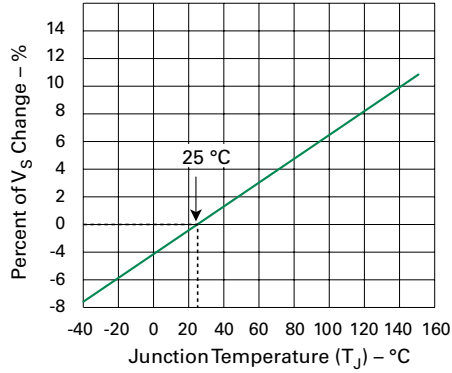


**Capacitance vs. Bias Voltage\***

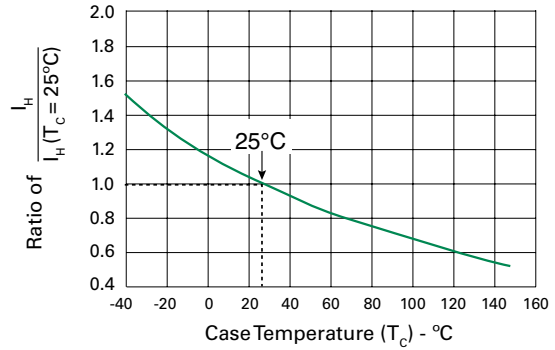


\* Bias voltage must be lower than V<sub>DRM</sub>

**Normalized  $V_s$  Change vs. Junction Temperature**

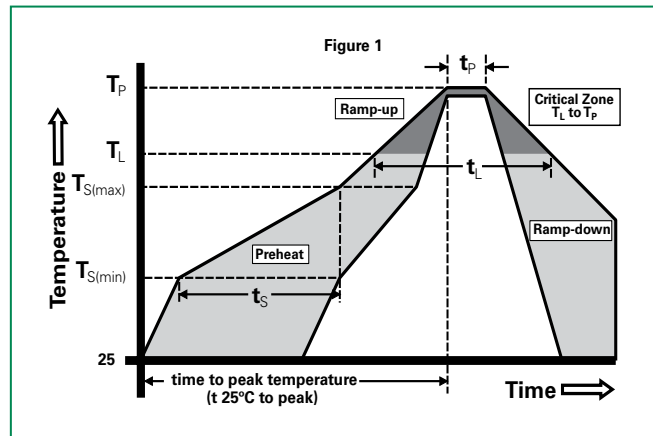


**Normalized DC Holding Current vs. Case Temperature**



**Soldering Parameters**

Reflow Condition		Pb-Free assembly (see Fig. 1)
Pre Heat	- Temperature Min ( $T_{s(\text{min})}$ )	+150°C
	- Temperature Max ( $T_{s(\text{max})}$ )	+200°C
	- Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/sec. Max.
$T_{s(\text{max})}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max.
Reflow	- Temperature ( $T_L$ ) (Liquidus)	+217°C
	- Temperature ( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max.
Ramp-down Rate		6°C/sec. Max.
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max.
Do not exceed		+260°C



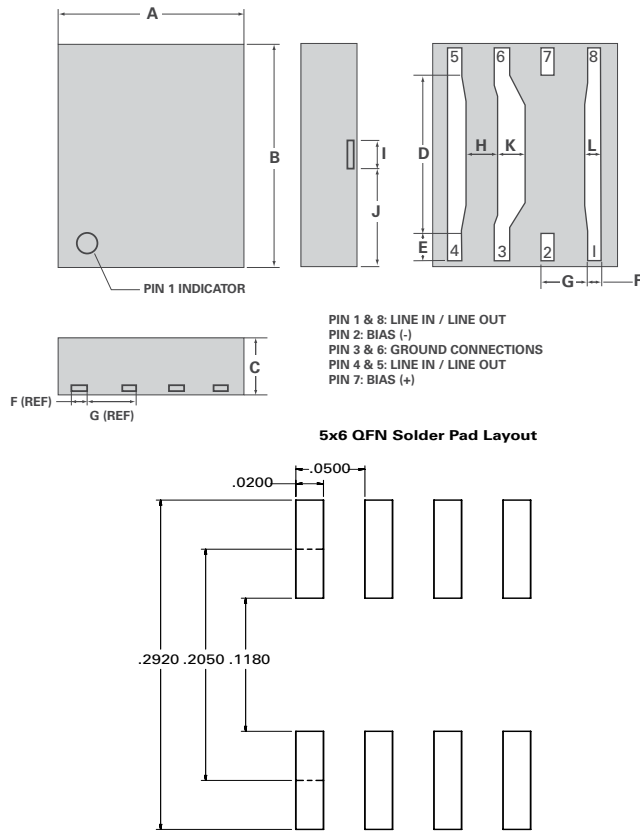
**Physical Specifications**

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

**Environmental Specifications**

<b>High Temp Voltage Blocking</b>	80% Rated $V_{\text{DRM}}$ ( $V_{\text{AC Peak}}$ ) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
<b>Temp Cycling</b>	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
<b>Biased Temp &amp; Humidity</b>	52 $V_{\text{DC}}$ (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101
<b>High Temp Storage</b>	+150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101
<b>Low Temp Storage</b>	-65°C, 1008 hrs.
<b>Thermal Shock</b>	0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106
<b>Resistance to Solder Heat</b>	+260°C, 30 secs. MIL-STD-750 (Method 2031)
<b>Moisture Sensitivity Level</b>	85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1

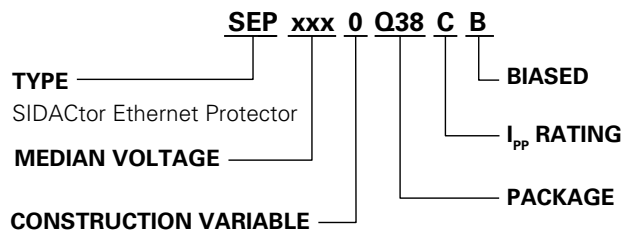
**Dimensions — 5x6 QFN**



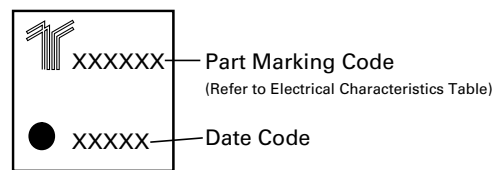
PIN 1 & 8: LINE IN / LINE OUT  
PIN 2: BIAS (-)  
PIN 3 & 6: GROUND CONNECTIONS  
PIN 4 & 5: LINE IN / LINE OUT  
PIN 7: BIAS (+)

Dimension	Inches		Millimeters	
	Min	Max	Min	Max
<b>A</b>	0.187	0.207	4.745	5.253
<b>B</b>	0.226	0.246	5.745	6.253
<b>C</b>	0.054	0.064	1.374	1.628
<b>D</b>	0.165	0.171	4.199	4.351
<b>E</b>	0.027	0.033	0.686	0.838
<b>F</b>	0.011	0.017	0.279	0.432
<b>G</b>	0.047	0.053	1.194	1.346
<b>H</b>	0.032	0.038	0.800	0.953
<b>I</b>	0.027	0.033	0.686	0.838
<b>J</b>	0.100	0.106	2.540	2.692
<b>K</b>	0.027	0.033	0.686	0.838
<b>L</b>	0.015	0.021	0.381	0.533

**Part Numbering**



**Part Marking**

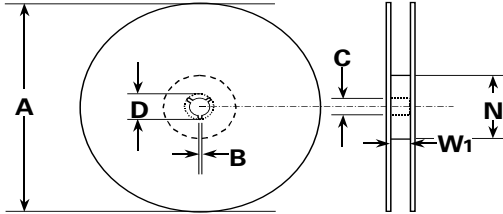


**Packing Options**

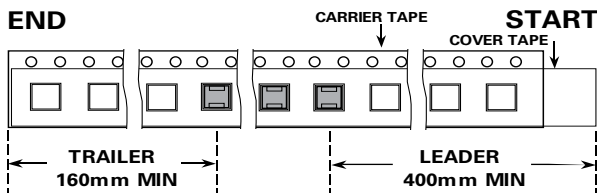
Package Type	Description	Quantity	Added Suffix	Industry Standard
Q38	5x6x1.5 QFN Tape and Reel	4,000	N / A	EIA-481-D

**Tape and Reel Specifications — 5x6 QFN**

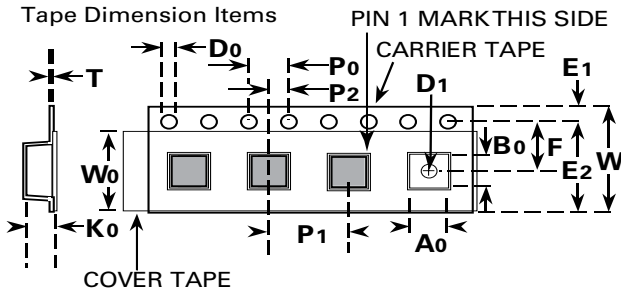
Reel Dimension



Tape Leader and Trailer Dimensions



Tape Dimension Items



Symbols	Description	Inches		Millimeters	
		Min	Max	Min	Max
A	Reel Diameter	N/A	12.992	N/A	330.0
B	Drive Spoke Width	0.059	N/A	1.50	N/A
C	Arbor Hole Diameter	0.504	0.531	12.80	13.50
D	Drive Spoke Diameter	0.795	N/A	20.20	N/A
N	Hub Diameter	1.969	N/A	50.00	N/A
W <sub>1</sub>	Reel Inner Width at Hub	0.488	0.567	12.40	14.40
A <sub>0</sub>	Pocket Width at Bottom	0.204	0.212	5.20	5.40
B <sub>0</sub>	Pocket Length at Bottom	0.244	0.252	6.20	6.40
D <sub>0</sub>	Feed Hole Diameter	0.059	0.063	1.50	1.60
D <sub>1</sub>	Pocket Hole Diameter	0.059	N/A	1.50	N/A
E <sub>1</sub>	Feed Hole Position 1	0.065	0.073	1.65	1.85
E <sub>2</sub>	Feed Hole Position 2	0.400	0.408	10.15	10.35
F	Feed Hole Center - Pocket Hole Center 2	0.212	0.220	5.40	5.60
K <sub>0</sub>	Pocket Depth	0.067	0.075	1.70	1.90
P <sub>0</sub>	Feed Hole Pitch	0.153	0.161	3.90	4.10
P <sub>1</sub>	Component Spacing	0.311	0.319	7.90	8.10
P <sub>2</sub>	Feed Hole Center - Pocket Hole Center 1	0.077	0.081	1.90	2.10
T	Carrier Tape Thickness	0.010	0.014	0.25	0.35
W	Embossed Carrier Tape Width	0.460	0.484	11.70	12.30
W <sub>0</sub>	Cover Tape Width	0.358	0.366	9.10	9.30

**Disclaimer Notice** - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.