



SMP100LC-xxx

TRISIL™ FOR HIGH DEBIT RATE TELECOM LINES PROTECTION

PRELIMINARY DATASHEET

FEATURES

- Bidirectional crowbar protection
- Low capacitance : $C = 30 \text{ PF TYP @ } 50\text{V}$
- Low leakage current : $I_R = 2 \mu\text{A MAX}$
- Repetitive peak pulse current :
 $I_{PP} = 100 \text{ A (10/1000}\mu\text{S)}$
- Holding current: $I_H = 150 \text{ mA}$

MAIN APPLICATIONS

Any sensitive equipment requiring protection against lightning strikes and power crossing:

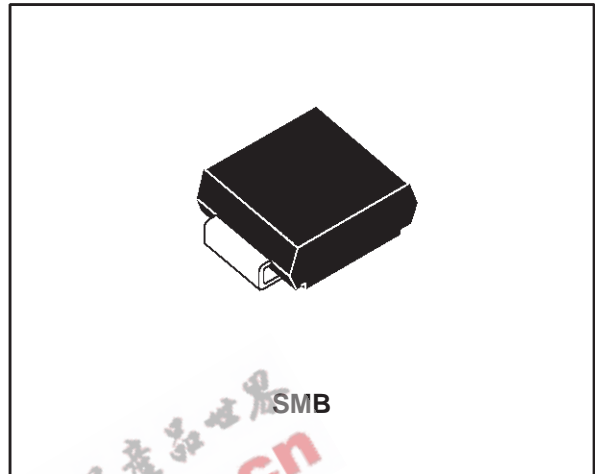
- Analog and digital line cards
(xDSL, T1/ E1, ISDN...)
- Gas tube replacement
- Terminals and transmission equipment

DESCRIPTION

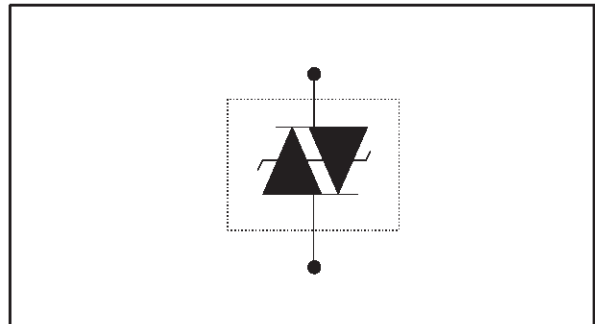
The SMP100LC-xxx series is a very low capacitance transient surge arrestor designed for the protection of high debit rate communication equipment. Its low capacitance avoid any distorsion of the signal. It can also

BENEFITS

- No ageing and no noise
- Short circuit in failure mode, thus still ensuring protection
- Board space saving



SCHEMATIC DIAGRAM



SMP100LC-xxx

COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (μ s)	Current Waveform (μ s)	Admissible I_{pp} (A)	Necessary Resistor (note 1) (Ω)
ITU-T- K20	4000	10/700	5/310	100	-
VDE0433	4000	10/700	5/310	100	-
VDE0878	4000	1.2/50	1/20	100	-
IEC-1000-4-5	level 4	10/700	5/310	100	-
	level 4	1.2/50	8/20	100	-
FCC Part 68, lightning surge type A	1500	10/160	10/160	200	-
	800	10/560	10/560	100	-
FCC Part 68, lightning surge type B	1000	5/320	5/320	25	-
BELLCORE TR-NWT-001089 First level	2500	2/10	2/10	500	-
	1000	10/1000	10/1000	100	-
BELLCORE TR-NWT-001089 Second level	5000	2/10	2/10	500	-
CNET I31-24	4000	0.5/700	0.8/310	100	-

Note 1: minimum series resistance to insert on the module line to withstand the standard.

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to leads	20	$^{\circ}\text{C/W}$
$R_{th(j-a)}$	Junction to ambient on printed circuit (with standard footprint dimensions)	100	$^{\circ}\text{C/W}$

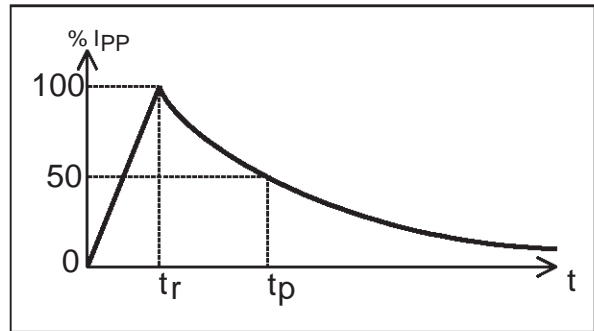
ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameter	Value	Unit
I_{pp}	Repetitive peak pulse current:		
	10/1000 μ s (open circuit voltage wave shape 1 kV 10/1000 μ s)	100	A
	8/20 μ s (open circuit voltage wave shape 4 kV 1.2/50 μ s)	250	A
	5/310 μ s (open circuit voltage wave shape 5 kV 10/700 μ s)	150	A
	2/10 μ s (open circuit voltage wave shape 2.5 kV 2/10 μ s)	500	A
I_{FS}	Fail-safe mode : maximum current (note 2)	8/20 μ s	5 kA
I_{TSM}	Non repetitive surge peak on-state current One cycle	50Hz	50 A
		60Hz	53 A
	Non repetitive surge peak on-state current F = 50Hz	0.2s	23 A
		2s	10 A
T_L	Maximum lead temperature for soldering during 10s	260	$^{\circ}\text{C}$
T_{stg} T_j	Storage temperature range	- 55 to + 150	$^{\circ}\text{C}$
	Maximum junction temperature	150	$^{\circ}\text{C}$

Note 2: in fail safe mode, the device acts as a short circuit.

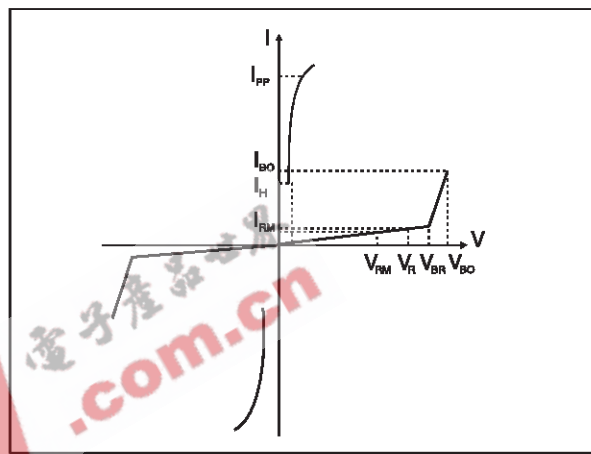
Pulse waveform:

10 / 1000 μ s	$t_r = 10 \mu$ s	$t_p = 1000 \mu$ s
8 / 20 μ s	$t_r = 8 \mu$ s	$t_p = 20 \mu$ s
5 / 310 μ s	$t_r = 5 \mu$ s	$t_p = 310 \mu$ s
1 / 20 μ s	$t_r = 1 \mu$ s	$t_p = 20 \mu$ s
2 / 10 μ s	$t_r = 2 \mu$ s	$t_p = 10 \mu$ s



ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$)

Symbol	Parameter
V_{RM}	Stand-off voltage
I_{RM}	Leakage current at V_{RM}
V_R	Continuous reverse voltage
I_R	Leakage current
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
C	Capacitance



DYNAMIC PARAMETERS

Type	$I_{RM} @ V_{RM}$ max.		$I_R @ V_R$ max. Note 1		$V_{BO} @ I_{BO}$ max. Note 2		I_H min. Note 3	C typ. Note 4
	μ A	V	μ A	V	V	mA	mA	pF
SMP100LC-140	2	120	50	140	185	800	150	30
SMP100LC-200	2	170	50	200	265	800	150	30
SMP100LC-270	2	230	50	262	350	800	150	30

- Note 1:** I_R measured at V_R guarantee $V_{BR} > V_R$
- Note 2:** $V_{RISE} = 100V/\mu$ s, $di/dt < 10 A/\mu$ s, $I_{PP} = 100A$
 $V_{RISE} = 1kV/\mu$ s, $di/dt < 10 A/\mu$ s, $I_{PP} = 10A$
 V_{BO} parameters are given by a KeyTek "System 2" generator with PN2461 module.
 See test circuits 3 for V_{BO} dynamic parameters
- Note 3:** See functional holding current test circuit 1
- Note 4:** $V_R=50V$ bias, $V_{RMS}=1V$, $F=1MHz$.

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STATIC PARAMETERS

Symbol	Type	Test conditions	Max.	Unit
V _{BO}	SMP100LC-140	Measured at 50Hz, see test circuit 2. In any case V _{BOmin} ≥ V _{BR}	190	V
	SMP100LC-200		275	
	SMP100LC-270		370	

Fig 1 : Non repetitive surge peak on-state current versus overload duration (T_j initial = 25 °C).

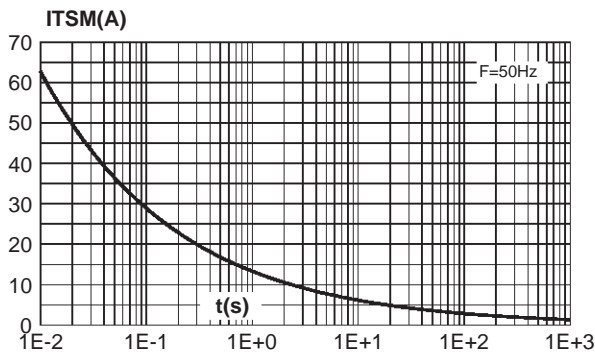


Fig 2 : On-state voltage versus on-state current (typical values).

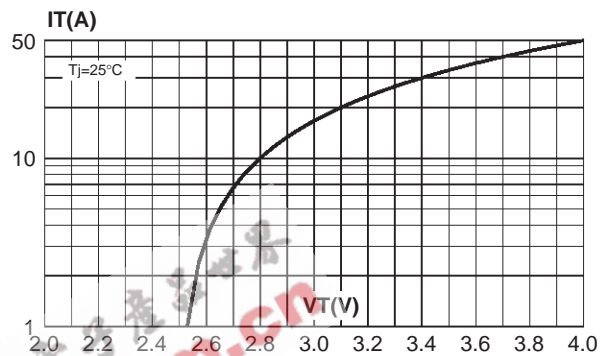


Fig 3 : Relative variation of holding current versus junction temperature.

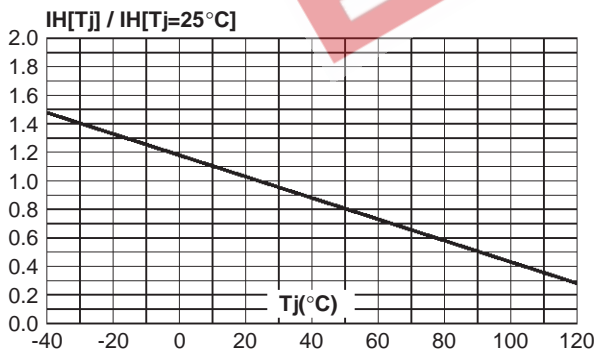


Fig 4 : Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4, SCu=35µm, recommended pad layout).

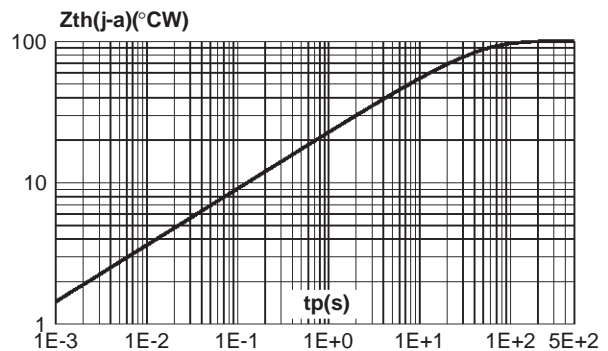
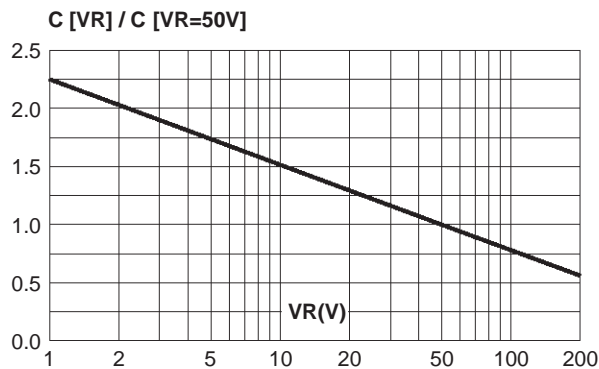
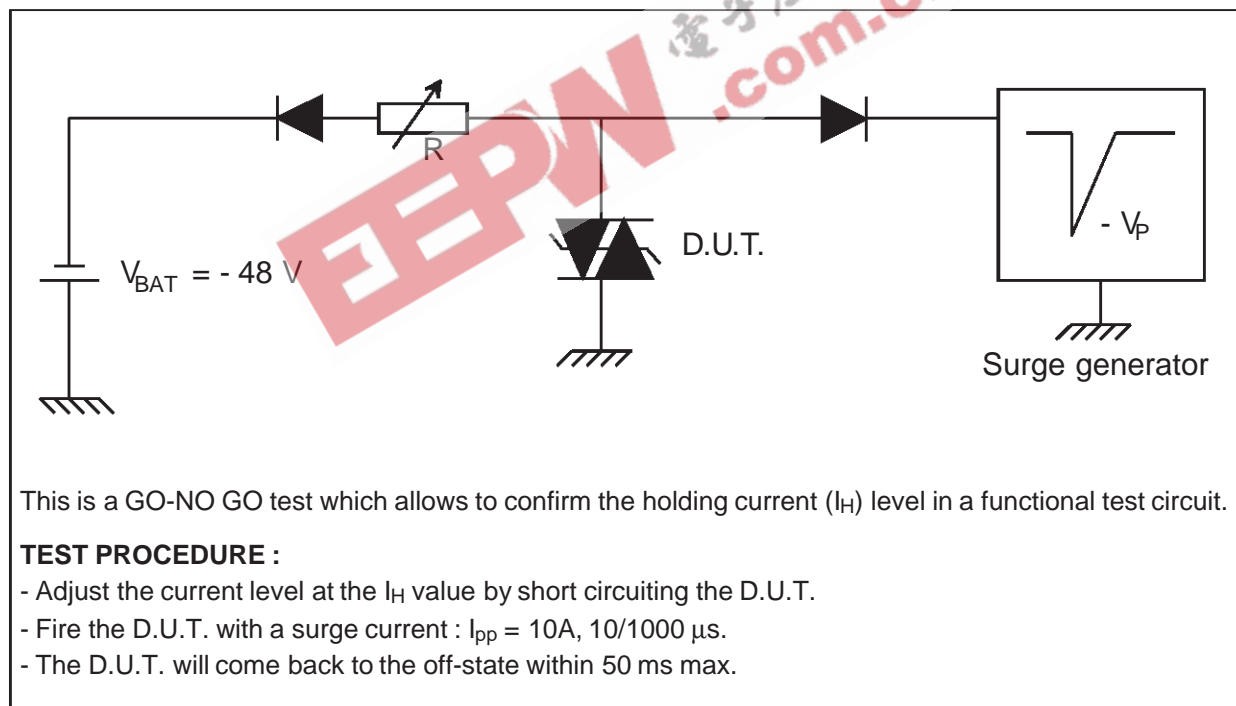


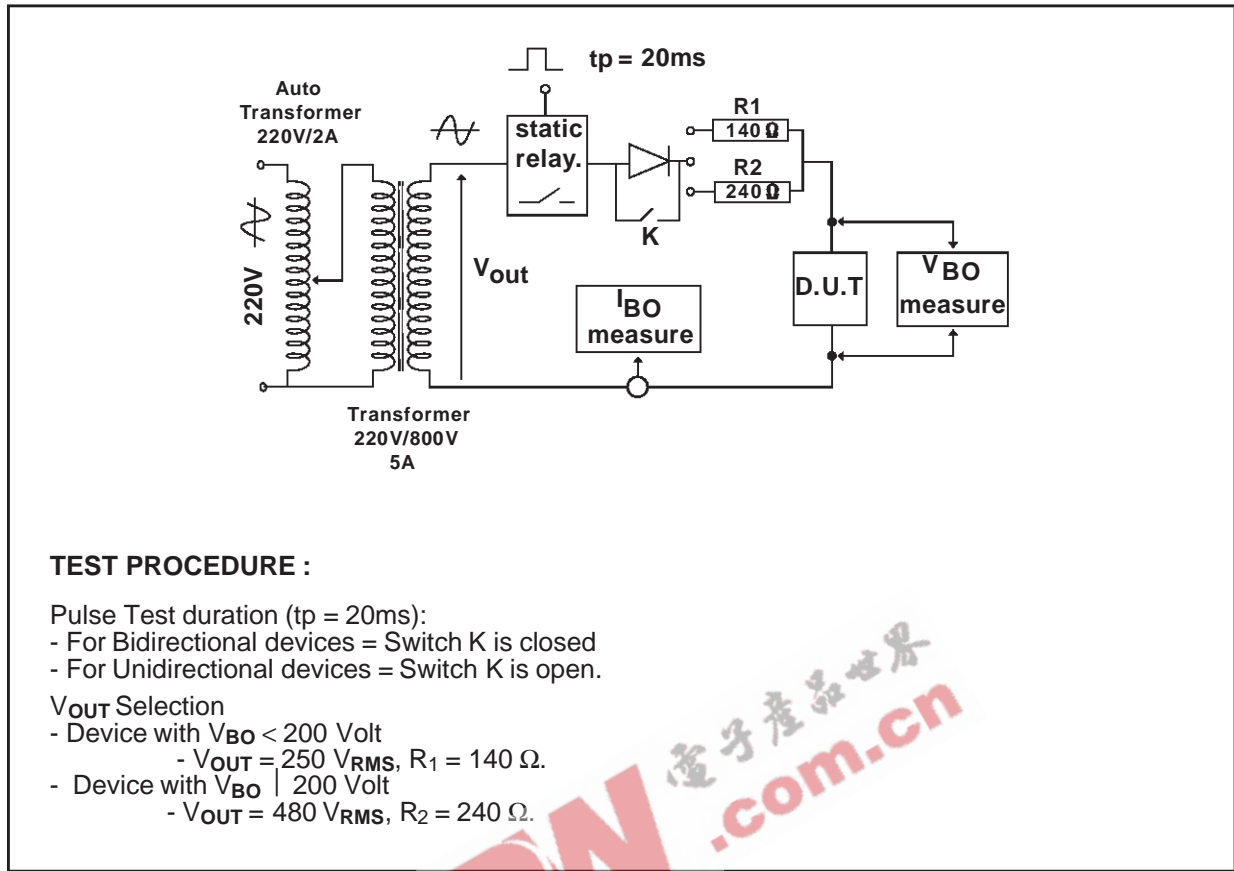
Fig 5 : Variation of junction capacitance versus reverse voltage applied (typical values).



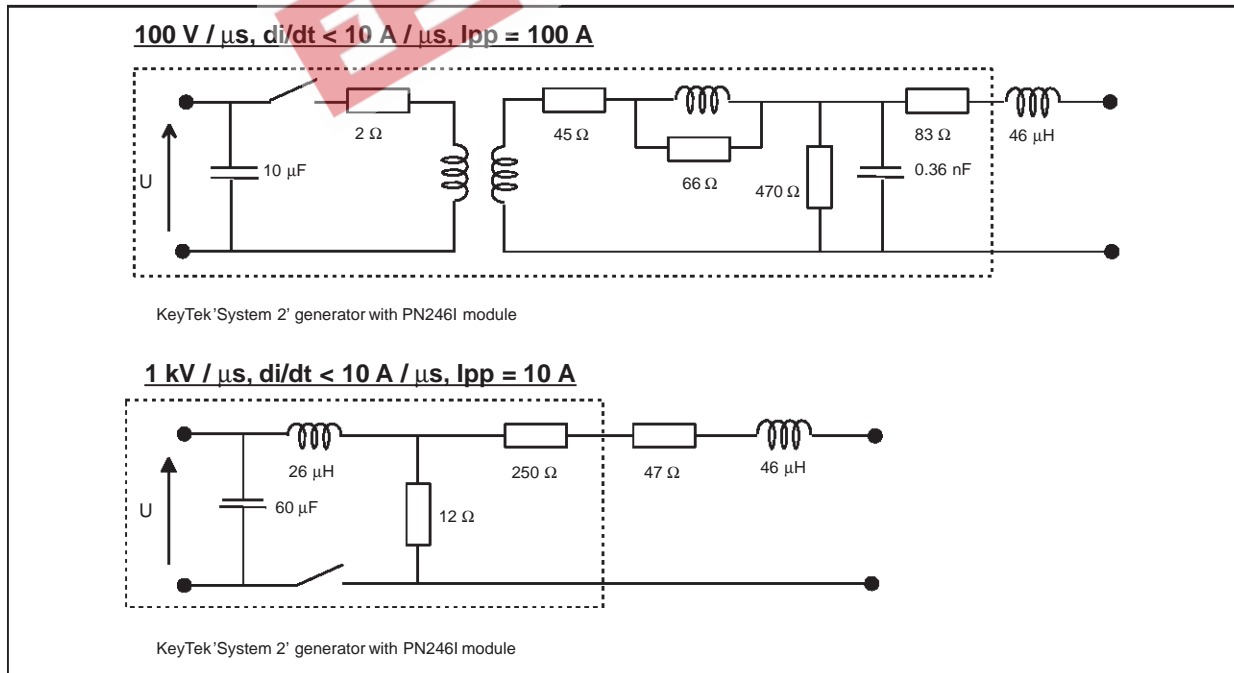
FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT 1 : GO-NO GO TEST



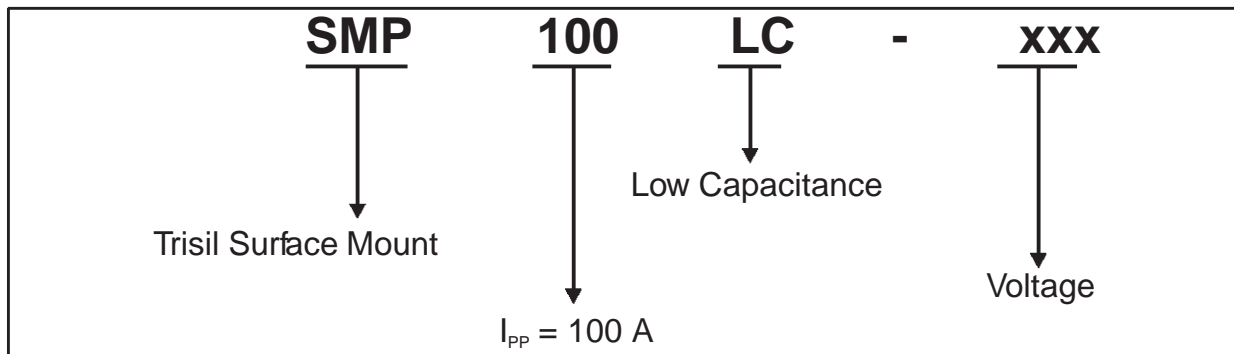
TEST CIRCUIT 2 FOR I_{BO} and V_{BO} parameters :



TEST CIRCUITS 3 FOR V_{BO} DYNAMIC PARAMETERS

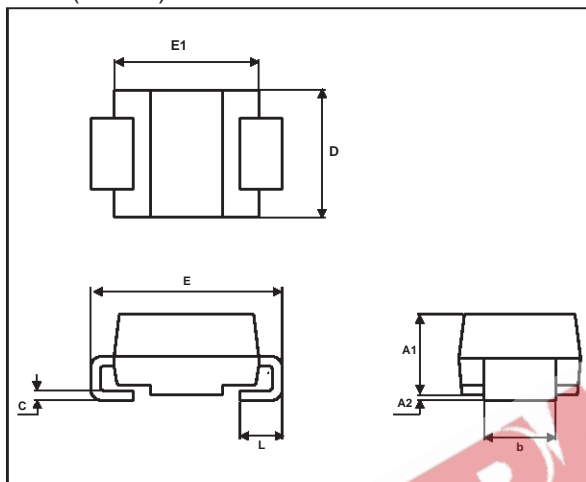


ORDER CODE



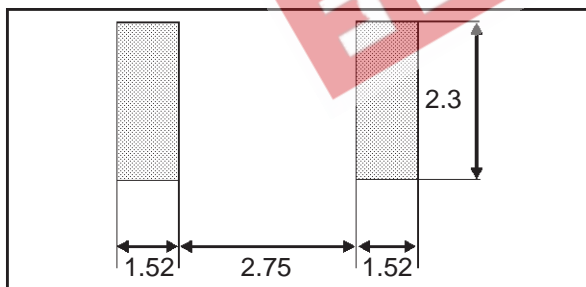
PACKAGE MECHANICAL DATA

SMB (Plastic)



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

FOOT PRINT (in millimeters)



Ordering type	Marking	Package	Weight	Base qty	Delivery mode
SMP100LC-140	L14	SMB	0.107g.	2500	Tape & Reel
SMP100LC-200	L20	SMB	0.107g	2500	Tape & Reel
SMP100LC-270	L27	SMB	0.107g	2500	Tape & Reel



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