

## 1A, 100V - 600V Super Fast Surface Mount Rectifier

### FEATURES

- Glass passivated chip junction
- Ideal for automated placement
- Low power loss, high efficiency
- Low profile package
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- DC to DC converter
- Switching mode converters and inverters
- Freewheeling application

### MECHANICAL DATA

- Case: Thin SMA
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Indicated by cathode band
- Weight: 0.029g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$I_F$	1	A
$V_{RRM}$	100 - 600	V
$I_{FSM}$	30	A
$T_{J\ MAX}$	150	°C
Package	Thin SMA	
Configuration	Single die	



Thin SMA



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	SYMBOL	ES1BAL	ES1DAL	ES1GAL	ES1JAL	UNIT
Marking code on the device		ES1BAL	ES1DAL	ES1GAL	ES1JAL	
Repetitive peak reverse voltage	$V_{RRM}$	100	200	400	600	V
Reverse voltage, total rms value	$V_{R(RMS)}$	70	140	280	420	V
Forward current	$I_F$	1				A
Surge peak forward current single half sine wave superimposed on rated load	$t = 8.3\text{ms}$	30				A
	$t = 1.0\text{ms}$	60				A
Junction temperature	$T_J$	-55 to +150				°C
Storage temperature	$T_{STG}$	-55 to +150				°C

<b>THERMAL PERFORMANCE</b>			
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>UNIT</b>
Junction-to-lead thermal resistance	$R_{\theta JL}$	28	°C/W
Junction-to-ambient thermal resistance	$R_{\theta JA}$	67	°C/W
Junction-to-case thermal resistance	$R_{\theta JC}$	20	°C/W

**Thermal Performance Note:** Units mounted on PCB (5mm x 5mm Cu pad test board)

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
<b>PARAMETER</b>		<b>CONDITIONS</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>MAX</b>	<b>UNIT</b>
Forward voltage <sup>(1)</sup>	ES1BAL ES1DAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$	$V_F$	0.80	-	V
		$I_F = 1.0\text{A}, T_J = 25^\circ\text{C}$		0.85	0.95	V
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.58	-	V
		$I_F = 1.0\text{A}, T_J = 125^\circ\text{C}$		0.71	0.81	V
	ES1GAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$		0.86	-	V
		$I_F = 1.0\text{A}, T_J = 25^\circ\text{C}$		0.93	1.30	V
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.69	-	V
		$I_F = 1.0\text{A}, T_J = 125^\circ\text{C}$		0.77	0.89	V
	ES1JAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$		1.04	-	V
		$I_F = 1.0\text{A}, T_J = 25^\circ\text{C}$		1.15	1.70	V
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.80	-	V
		$I_F = 1.0\text{A}, T_J = 125^\circ\text{C}$		0.93	1.06	V
Reverse current @ rated $V_R$ <sup>(2)</sup>		$T_J = 25^\circ\text{C}$	$I_R$	-	1	$\mu\text{A}$
		$T_J = 125^\circ\text{C}$		-	20	$\mu\text{A}$
Reverse recovery time		$I_F = 0.5\text{A}, I_R = 1.0\text{A}, I_{rr} = 0.25\text{A}$	$t_{rr}$	-	35	ns
Junction capacitance	ES1BAL ES1DAL	1MHz, $V_R = 4.0\text{V}$	$C_J$	18	-	pF
	ES1GAL			16	-	pF
	ES1JAL			15	-	pF

**Notes:**

1. Pulse test with  $PW = 0.3\text{ms}$
2. Pulse test with  $PW = 30\text{ms}$

<b>ORDERING INFORMATION</b>		
<b>ORDERING CODE<sup>(1)</sup></b>	<b>PACKAGE</b>	<b>PACKING</b>
ES1xAL	Thin SMA	14,000 / Tape & Reel

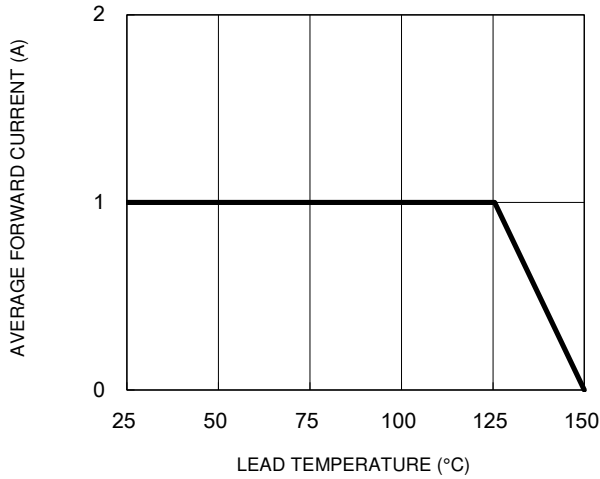
**Notes:**

1. "x" defines voltage from 100V(ES1BAL) to 600V(ES1JAL)

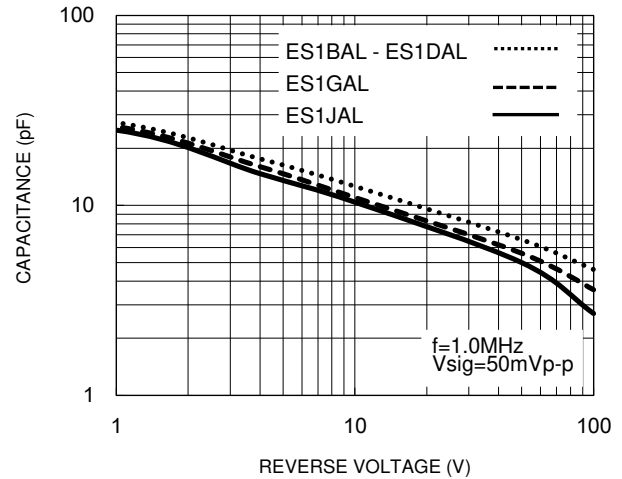
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

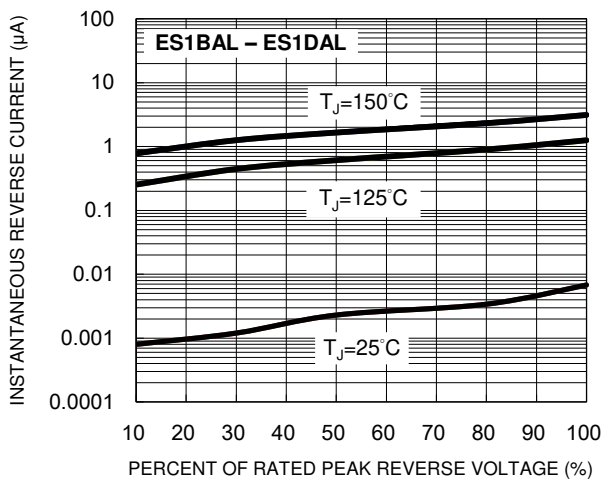
**Fig.1 Forward Current Derating Curve**



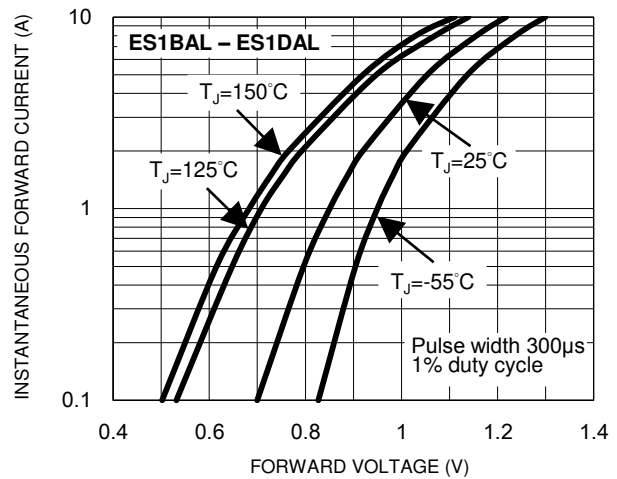
**Fig.2 Typical Junction Capacitance**



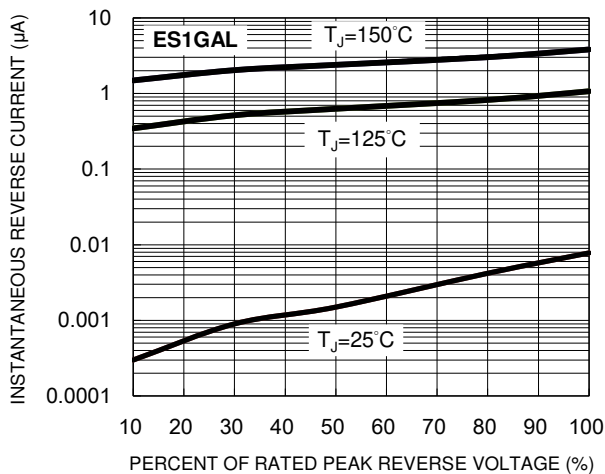
**Fig.3 Typical Reverse Characteristics**



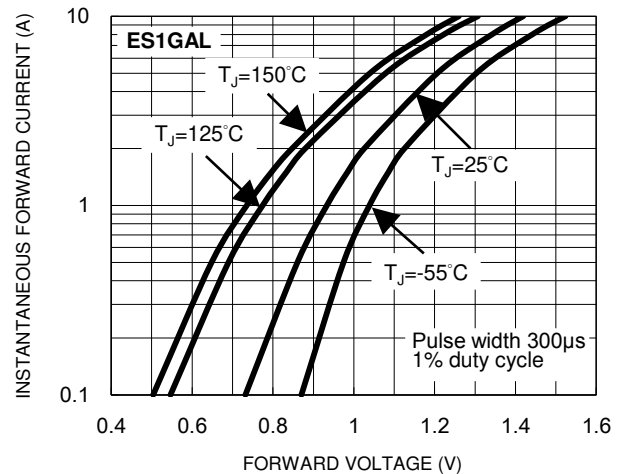
**Fig.4 Typical Forward Characteristics**



**Fig.5 Typical Reverse Characteristics**



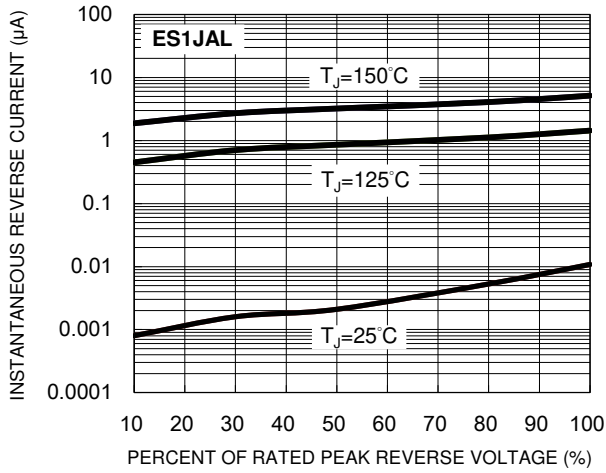
**Fig.6 Typical Forward Characteristics**



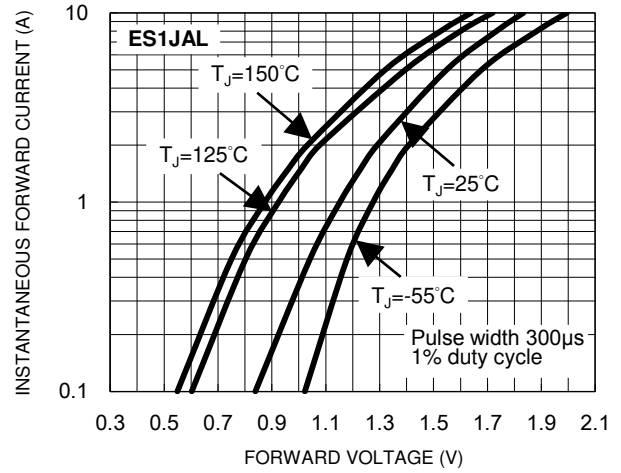
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

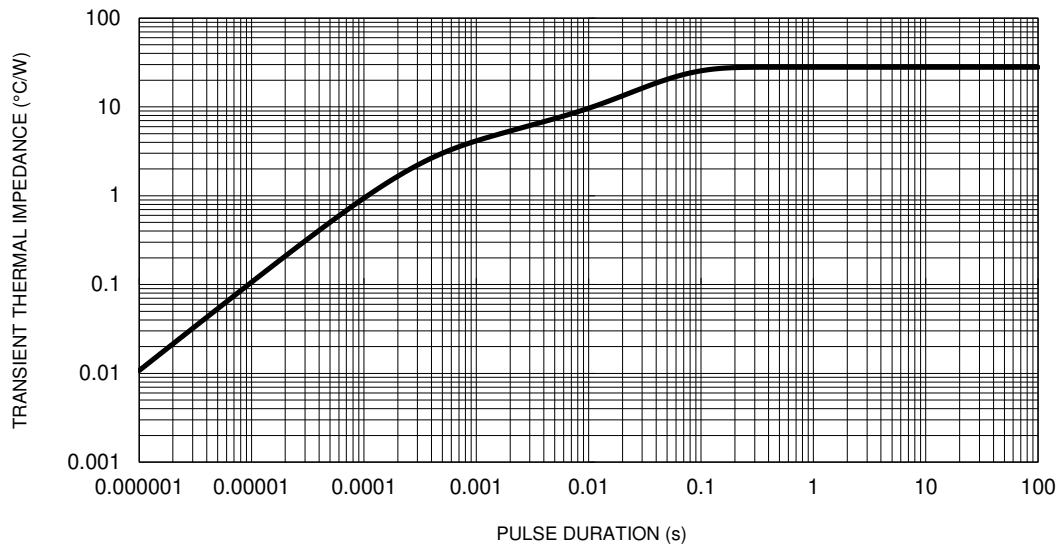
**Fig.7 Typical Reverse Characteristics**



**Fig.8 Typical Forward Characteristics**

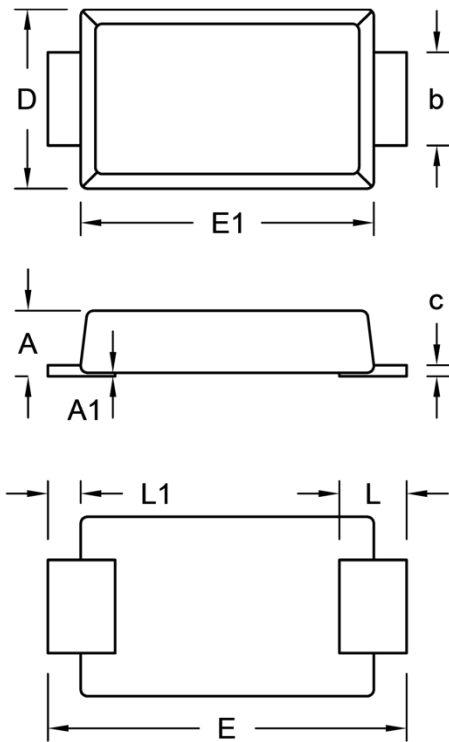


**Fig.9 Typical Transient Thermal Impedance**



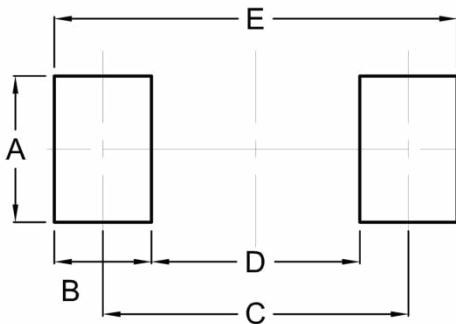
**PACKAGE OUTLINE DIMENSIONS**

Thin SMA



DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	0.90	1.00	0.035	0.039
A1	0.00	0.10	0.000	0.004
b	1.25	1.45	0.049	0.057
c	0.10	0.22	0.004	0.009
D	2.50	2.70	0.098	0.106
E	5.05	5.35	0.199	0.211
E1	4.15	4.35	0.163	0.171
L	0.75	1.20	0.030	0.047
L1	0.30	0.60	0.012	0.024

**SUGGESTED PAD LAYOUT**



Symbol	Unit (mm)	Unit (inch)
A	2.10	0.083
B	1.40	0.055
C	4.40	0.173
D	3.00	0.118
E	5.80	0.228

**MARKING DIAGRAM**



P/N = Marking Code  
 YW = Date Code  
 F = Factory Code

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