

1A, 200V-1000V High Efficient Surface Mount Rectifiers

FEATURES

- Glass passivated junction chip
- Ideal for automated placement
- Low power loss, high efficiency
- Fast switching for high efficiency
- Low profile package
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

- Freewheeling application
- Switching mode converters and inverters, computer and telecommunication.

MECHANICAL DATA

- Case: Thin SMA
- Molding compound meets UL 94V-0 flammability rating
- Moisture sensitivity level: level 1, per J-STD-020
- Terminal: Pure tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.029 g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$I_{F(AV)}$	1	A
V_{RRM}	200-1000	V
I_{FSM}	35	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	HS1DAL	HS1GAL	HS1JAL	HS1KAL	HS1MAL	UNIT
Marking code on the device		HS1DAL	HS1GAL	HS1JAL	HS1KAL	HS1MAL	
Repetitive peak reverse voltage	V_{RRM}	200	400	600	800	1000	V
Reverse voltage, total rms value	$V_{R(RMS)}$	140	280	420	560	700	V
Forward current	$I_{F(AV)}$	1					A
Surge peak forward current, single half sine-wave superimposed on rated load per diode	8.3ms at $T_A = 25^\circ\text{C}$	I_{FSM}	35				A
	1.0ms at $T_A = 25^\circ\text{C}$		90				A
Junction temperature	T_J	-55 to +150					°C
Storage temperature	T_{STG}	-55 to +150					°C

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	TYP	UNIT
Junction-to-lead thermal resistance	$R_{\theta JL}$	29	°C/W
Junction-to-ambient thermal resistance	$R_{\theta JA}$	51	°C/W
Junction-to-case thermal resistance	$R_{\theta JC}$	22	°C/W

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

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)									
PARAMETER		CONDITIONS	SYMBOL	TYP	MAX	UNIT			
Forward voltage per diode ⁽¹⁾	HS1DAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$	V_F	0.80	-	V			
		$I_F = 1\text{A}, T_J = 25^\circ\text{C}$		0.85	1.00	V			
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.65	-	V			
		$I_F = 1\text{A}, T_J = 125^\circ\text{C}$		0.71	0.80	V			
	HS1GAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$		0.84	-	V			
		$I_F = 1\text{A}, T_J = 25^\circ\text{C}$		0.91	1.30	V			
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.68	-	V			
		$I_F = 1\text{A}, T_J = 125^\circ\text{C}$		0.76	0.86	V			
	HS1JAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$		0.92	-	V			
		$I_F = 1\text{A}, T_J = 25^\circ\text{C}$		1.02	1.70	V			
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.73	-	V			
		$I_F = 1\text{A}, T_J = 125^\circ\text{C}$		0.83	1.02	V			
	HS1KAL HS1MAL	$I_F = 0.5\text{A}, T_J = 25^\circ\text{C}$		1.32	-	V			
		$I_F = 1\text{A}, T_J = 25^\circ\text{C}$		1.49	1.70	V			
		$I_F = 0.5\text{A}, T_J = 125^\circ\text{C}$		0.98	-	V			
		$I_F = 1\text{A}, T_J = 125^\circ\text{C}$		1.16	1.39	V			
Reverse current @ rated V_R per diode ⁽²⁾		$T_J = 25^\circ\text{C}$	I_R	-	1	μA			
		$T_J = 125^\circ\text{C}$		-	35	μA			
Reverse recovery time	HS1DAL HS1GAL	$I_F = 0.5\text{A}, I_R = 1.0\text{A}, I_{rr} = 0.25\text{A}$	t_{rr}	-	50	ns			
	HS1JAL HS1KAL HS1MAL			-	75	ns			
	Junction capacitance per diode			HS1DAL	1 MHz, $V_R = 4.0\text{V}$	C_J	20	-	pF
				HS1GAL			17	-	pF
HS1JAL		13	-	pF					
HS1KAL HS1MAL		8	-	pF					

Notes:

(1) Pulse test with PW=0.3 ms

(2) Pulse test with PW=30 ms

ORDERING INFORMATION		
ORDERING CODE⁽¹⁾	PACKAGE	PACKING
HS1xAL M3G	Thin SMA	3,500 / 7" reel
HS1xAL M2G	Thin SMA	14,000 / 13" reel

Notes:

(1) "x" defines voltage from 200V(HS1DAL) to 1000V(HS1MAL)

CHARACTERISTICS CURVES

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

Fig.1 Forward Current Derating Curve

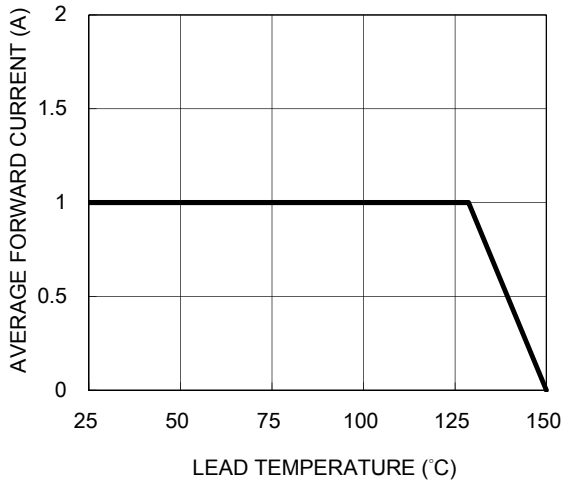


Fig.2 Typical Junction Capacitance

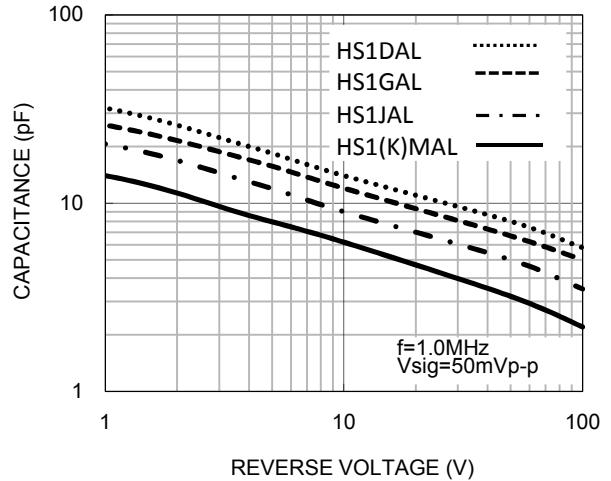


Fig.3 Typical Reverse Characteristics

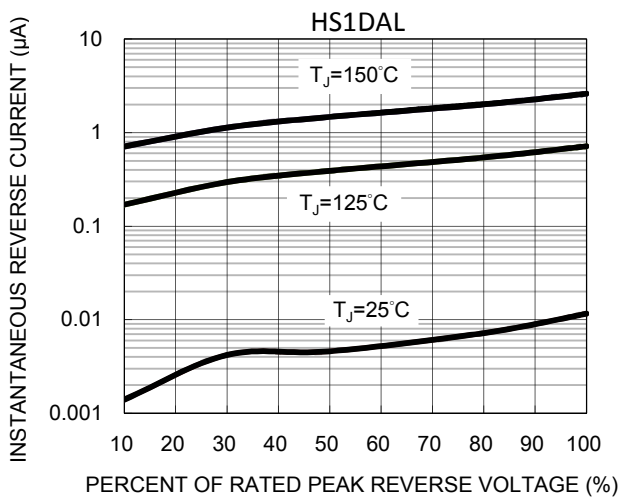


Fig.4 Typical Forward Characteristics

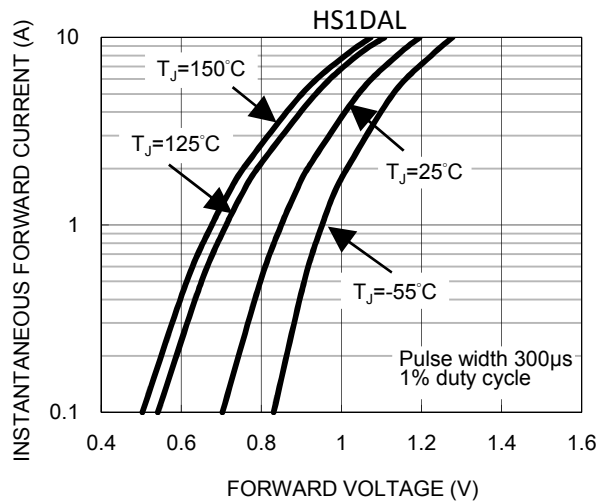


Fig.5 Typical Reverse Characteristics

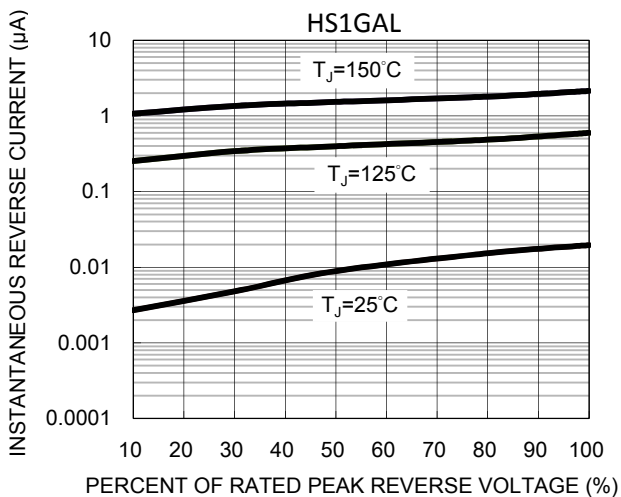


Fig.6 Typical Forward Characteristics

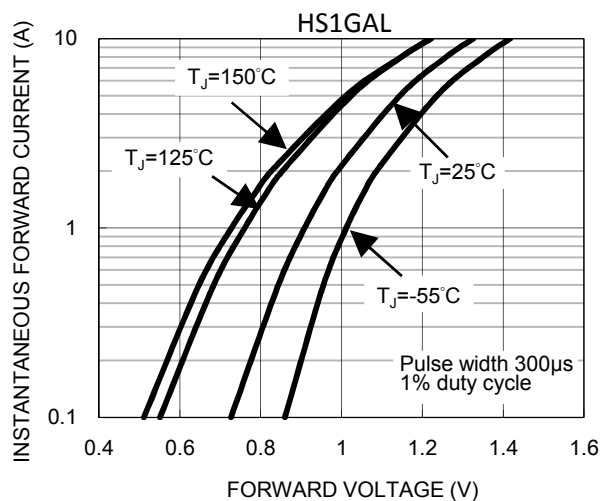


Fig.7 Typical Reverse Characteristics

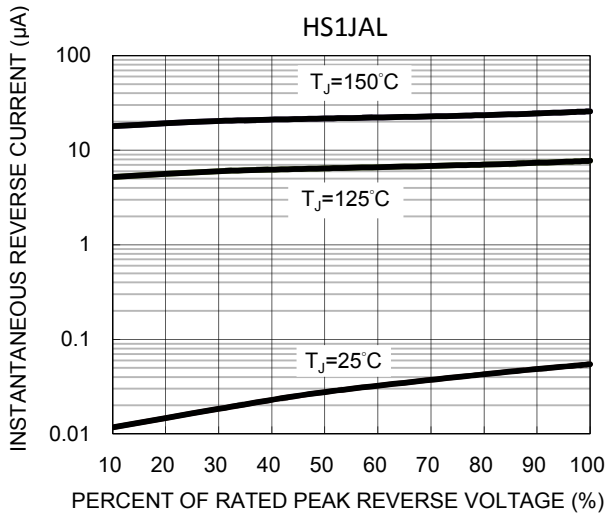


Fig.8 Typical Forward Characteristics

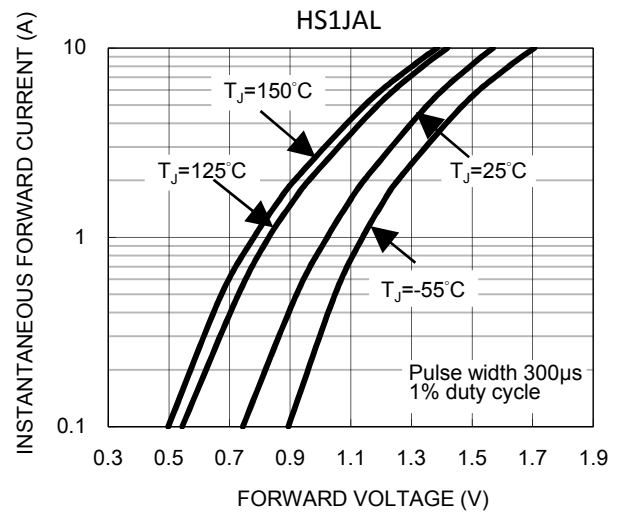


Fig.9 Typical Reverse Characteristics

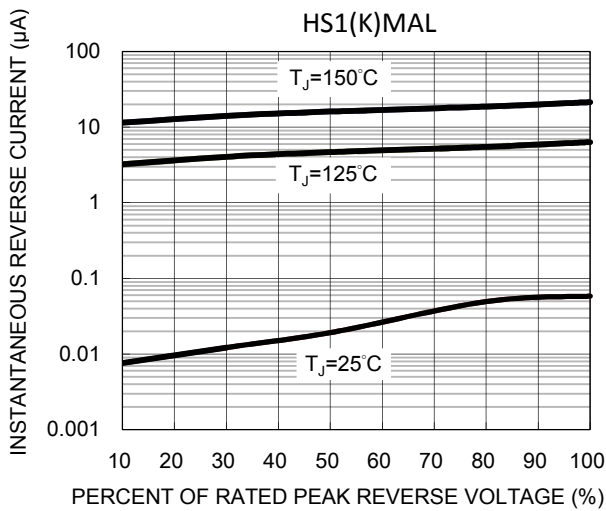


Fig.10 Typical Forward Characteristics

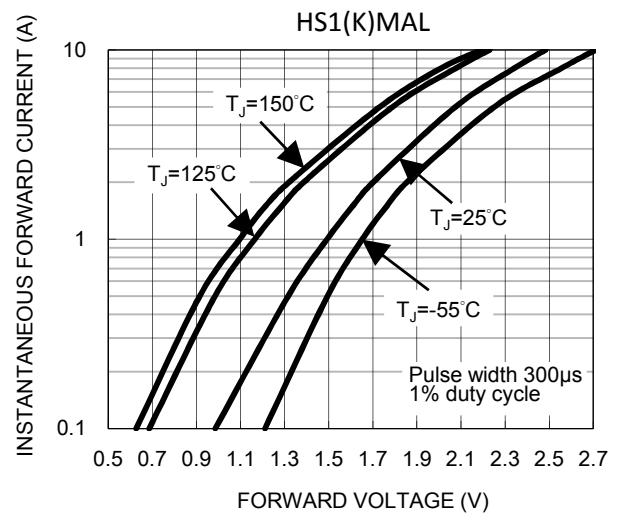
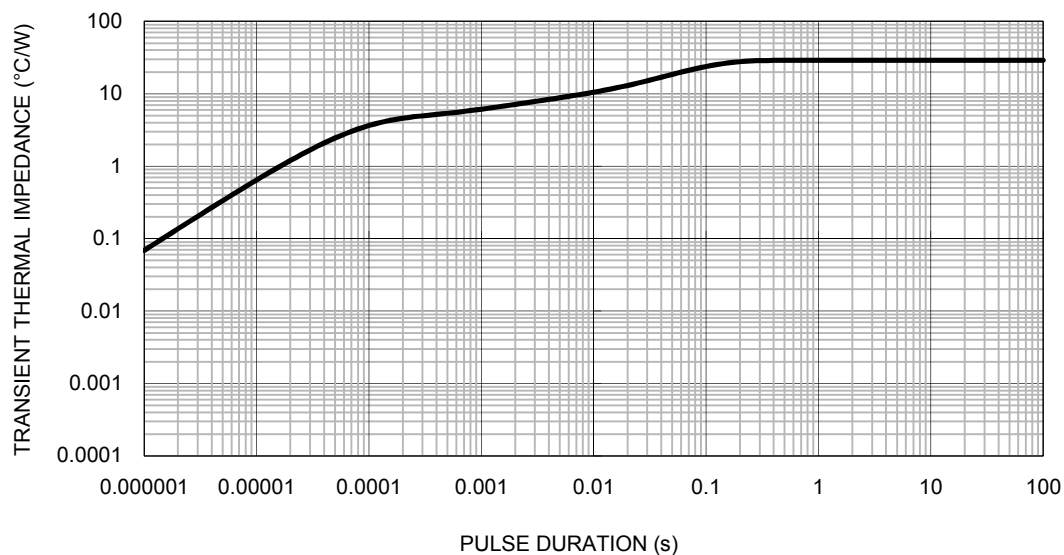
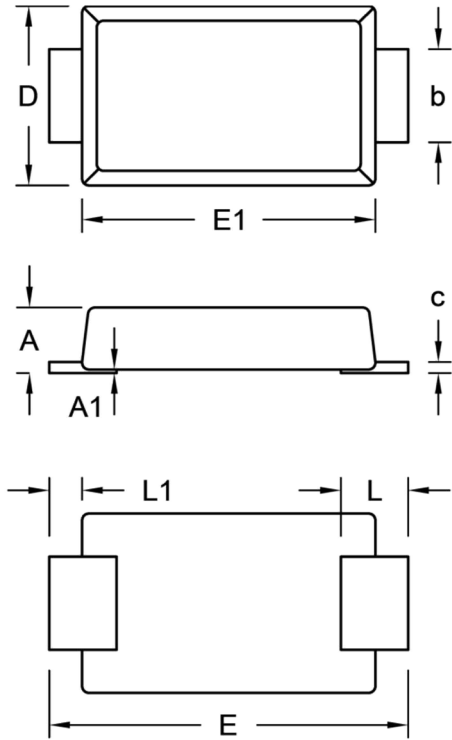


Fig.11 Typical Transient Thermal Impedance



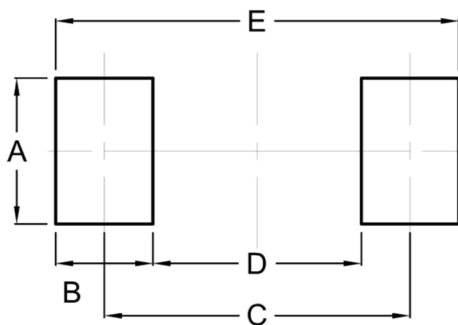
PACKAGE OUTLINE DIMENSIONS

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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