

**Super Fast Surface Mount Rectifiers**  
 Reverse Voltage 50V to 1000V Forward Current 1.0A

# ES1A thru ES1M

**Features**

- For surface mounted application
- Low profile package
- Built-in strain relief, ideal for automatic placement
- Easy pick and place
- Super fast recovery time for high efficiency
- Glass passivated junction chip
- High temperature soldering: 250° C/10 seconds at terminals
- Plastic material used carries UL flammability classification 94V-0

**Mechanical Data**

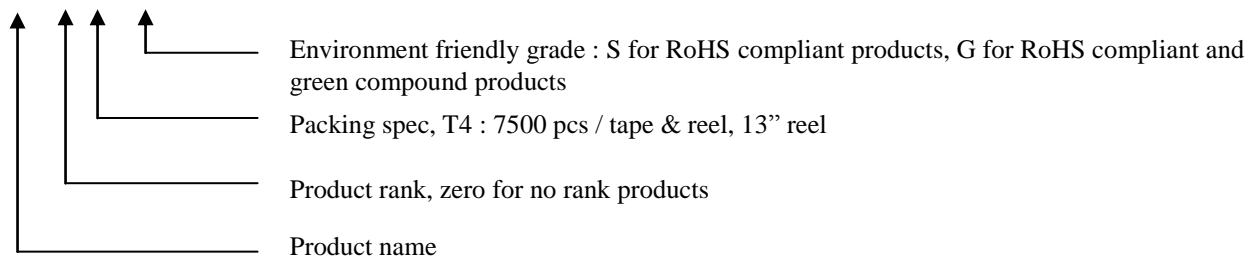
- Case: SMA/DO-214AC molded plastic
- Terminals: Pure tin plated, solderable per MIL-STD-750 method 2026
- Polarity: Indicated by cathode band
- Weight: 0.064 gram, 0.002 ounce

**Outline**



**Ordering Information**

Device	Package	Shipping	Marking
ES1A-0-T4-G	SMA (Pb-free lead plating and halogen-free package)	7500 pcs / Tape & Reel	ES1A
ES1B-0-T4-G			ES1B
ES1C-0-T4-G			ES1C
ES1D-0-T4-G			ES1D
ES1F-0-T4-G			ES1F
ES1G-0-T4-G			ES1G
ES1J-0-T4-G			ES1J
ES1K-0-T4-G			ES1K
ES1M-0-T4-G			ES1M



## Maximum Ratings and Electrical Characteristics

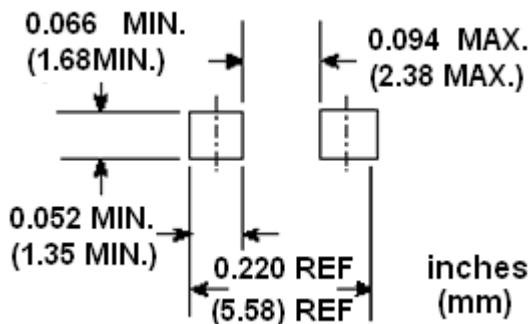
(Rating at 25°C ambient temperature unless otherwise specified. Single phase, half wave, 60Hz, resistive or inductive load. For capacitive load, derate current by 20%.)

Parameter	Symbol	Type									Units
		ES1A	ES1B	ES1C	ES1D	ES1F	ES1G	ES1J	ES1K	ES1M	
Maximum repetitive peak reverse voltage	$V_{RRM}$	50	100	150	200	300	400	600	800	1000	V
Maximum RMS voltage	$V_{RMS}$	35	70	105	140	210	280	420	560	700	V
Maximum DC blocking voltage	$V_R$	50	100	150	200	300	400	600	800	1000	V
Maximum instantaneous forward voltage, $I_F=1A$	$V_F$	0.95			1.3		1.7		2.5		V
Maximum average forward rectified current, see Fig. 1	$I_{F(AV)}$	1									A
Peak forward surge current @8.3ms single half sine wave superimposed on rated load (JEDEC method)	$I_{FSM}$	30									A
Maximum DC reverse current $V_R=V_{RRM}, T_A=25^\circ C$ $V_R=V_{RRM}, T_A=100^\circ C$	$I_R$	5 100									$\mu A$
Maximum reverse recovery time (Note 1)	$t_{rr}$	35									ns
Typical junction capacitance @ f=1MHz and applied 4V reverse voltage	$C_J$	10				8					pF
Typical thermal resistance (Note 2)	$R_{\theta JA}$	85									$^\circ C/W$
	$R_{\theta JC}$	40									
Power dissipation	$T_A=25^\circ C$ (Note 2)	1.5									W
	$T_C=25^\circ C$	3.1									
Storage temperature range	$T_{STG}$	-55 ~ +150									$^\circ C$
Operating junction temperature range	$T_J$	-55 ~ +150									$^\circ C$

Note: 1.Reverse recovery test conditions :  $I_F=0.5A$ ,  $I_R=1A$ ,  $I_{RR}=0.25A$

2.P.C.B. mounted on 0.2"×0.2"(5.0mm×5.0mm) copper pad area.

## Recommended soldering footprint



## Characteristic Curves

FIG.1- MAXIMUM FORWARD CURRENT DERATING CURVE

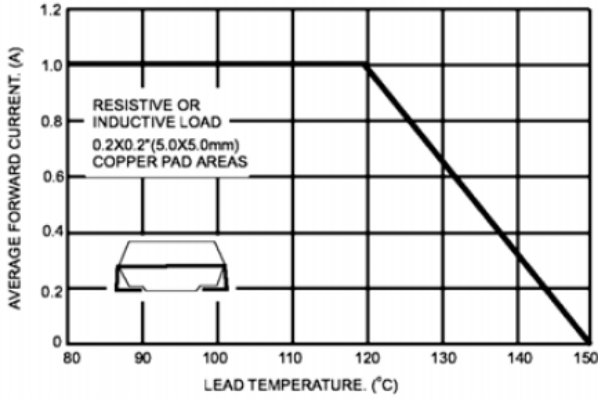


FIG.2- MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT

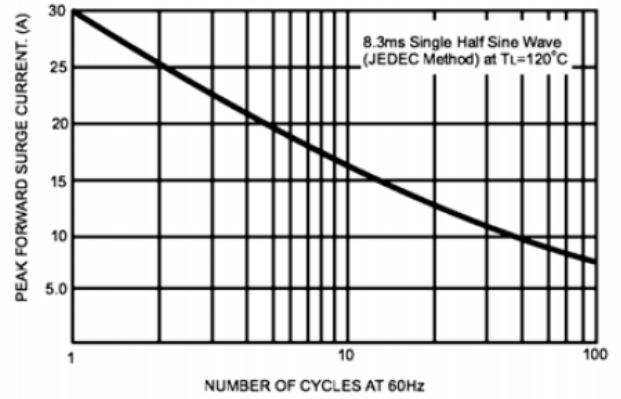


FIG.3- TYPICAL INSTANTANEOUS FORWARD CHARACTERISTICS

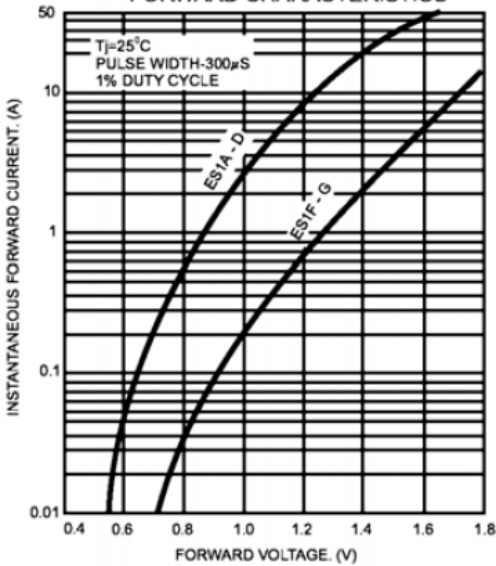


FIG.4- TYPICAL REVERSE CHARACTERISTICS

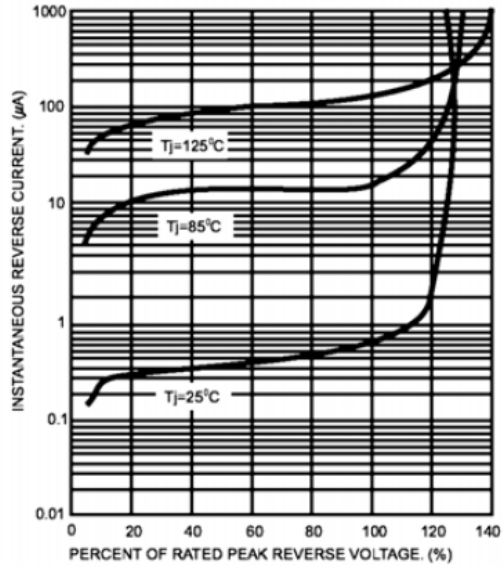
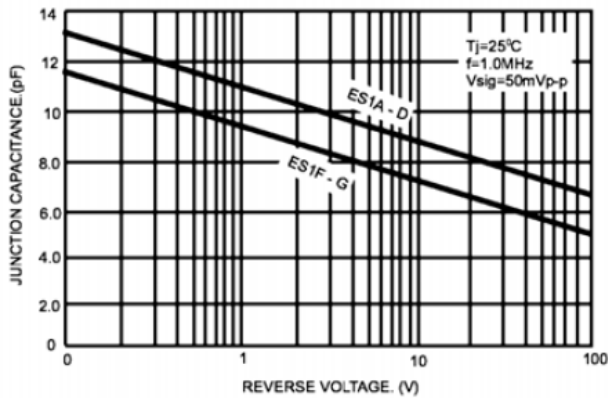
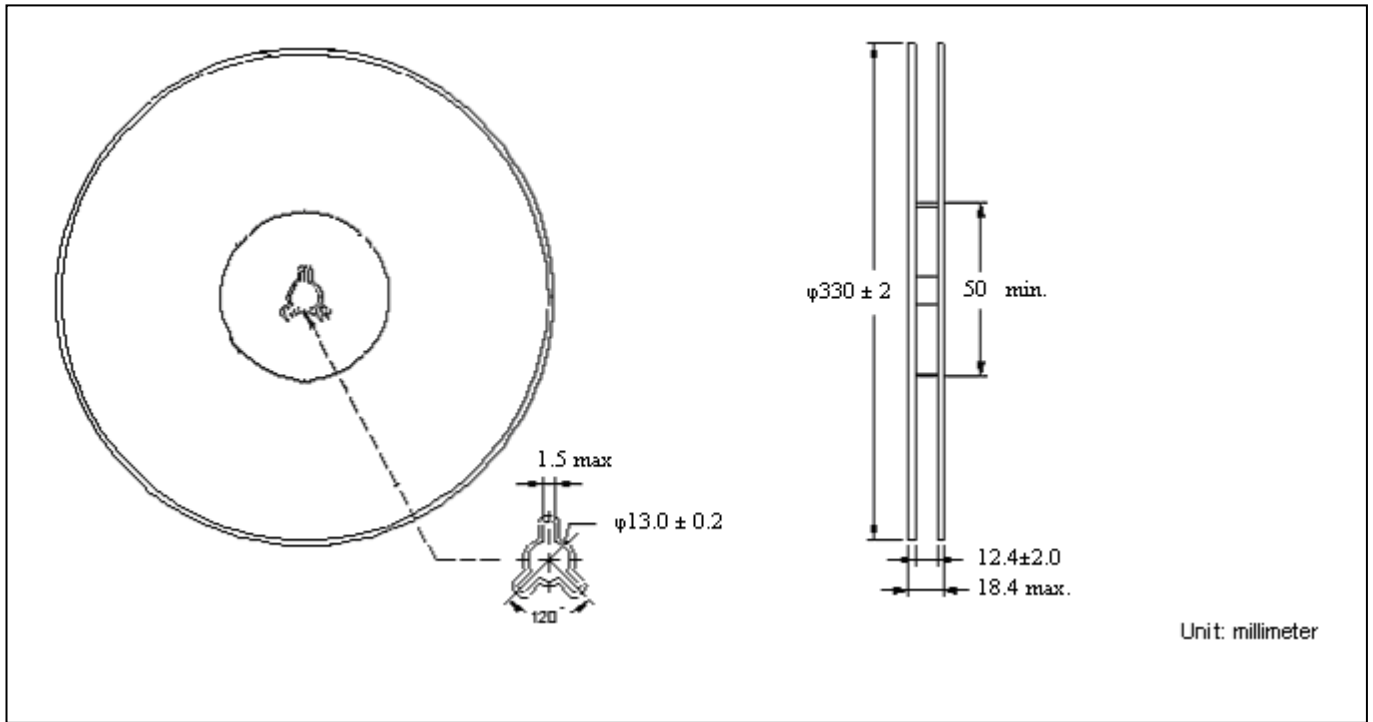


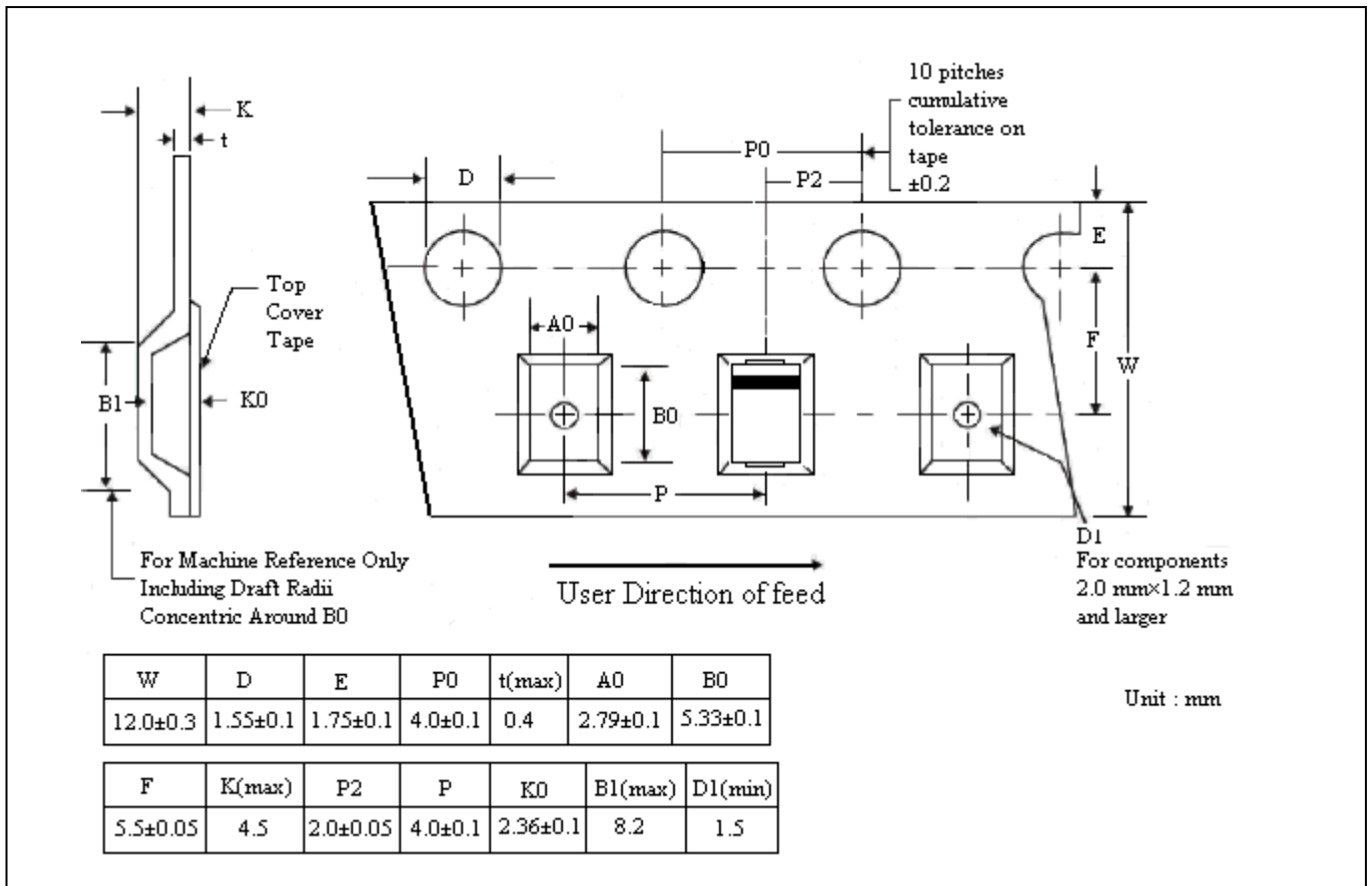
FIG.5- TYPICAL JUNCTION CAPACITANCE



## Reel Dimension

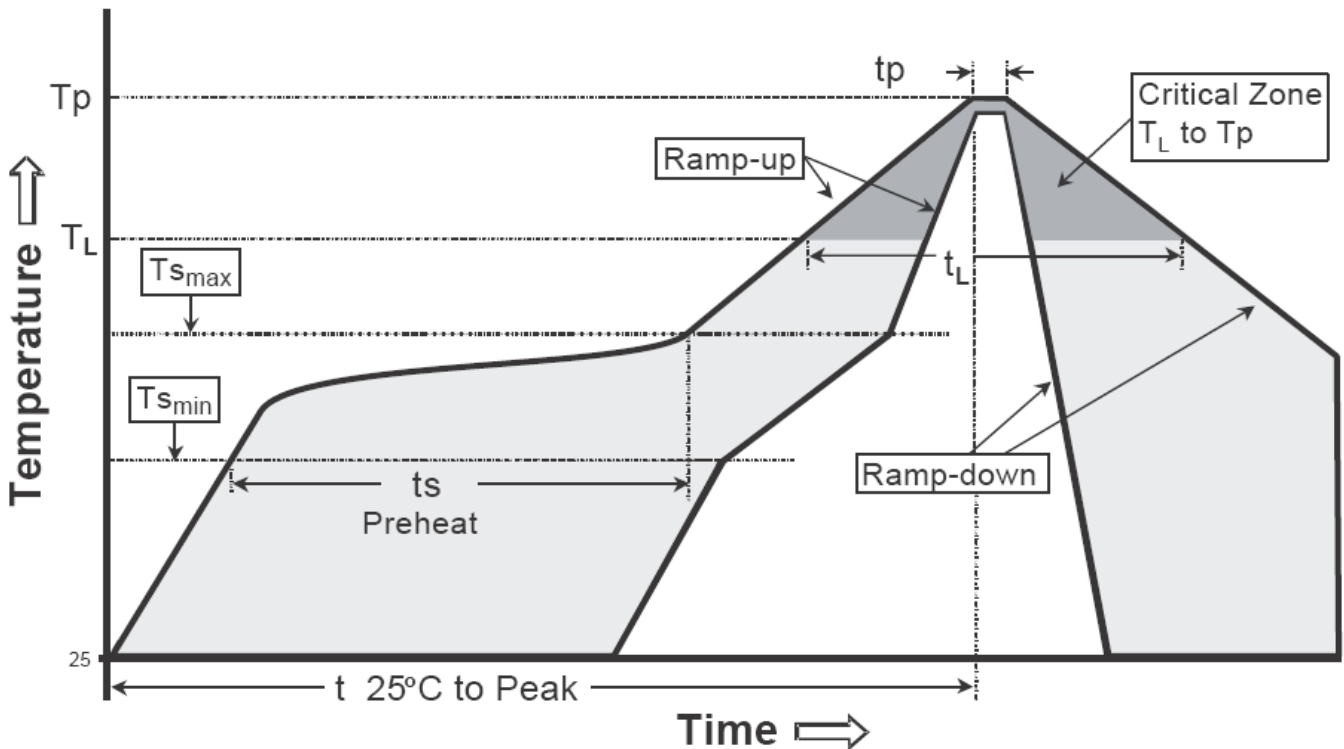


## Carrier Tape Dimension



**Recommended wave soldering condition**

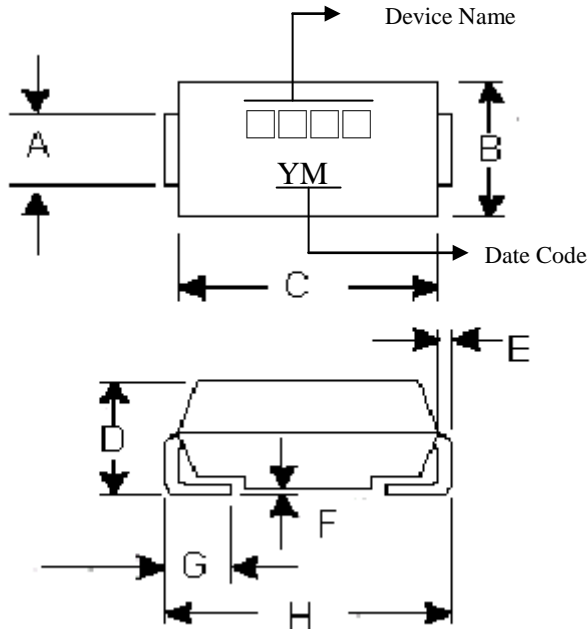
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>p</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

**SMA/DO-214AC Dimension**



Marking :

Device	ES1A	ES1B	ES1C
Code	ES1A	ES1B	ES1C
Device	ES1D	ES1F	ES1G
Code	ES1D	ES1F	ES1G
Device	ES1J	ES1K	ES1M
Code	ES1J	ES1K	ES1M

SMA/DO-214AC Plastic  
 Surface Mounted Package  
 CYStek Package Code : SA

Date Code : Year Code + Month Code

Year Code :

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Code	9	A	B	C	D	E	F	G	H	J	K	0	1

Month Code :

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.052	0.062	1.32	1.60	E	0.006	0.012	0.15	0.31
B	0.098	0.114	2.50	2.90	F	0.002	0.008	0.05	0.20
C	0.154	0.181	3.90	4.60	G	0.030	0.060	0.76	1.52
D	0.067	0.091	1.70	2.30	H	0.188	0.208	4.80	5.28

- Notes :
- Controlling dimension : millimeters.
  - Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
  - If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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