# ES1AF THRU ES1JF

## 1.0AMP SURFACE MOUNT SUPER FAST RECTIFIERS

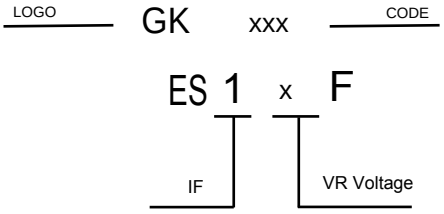
**VOLTAGE RANGE**
50 to 600 Volts
**CURRENT**
1.0 Ampere

## FEATURES

* Ideal for surface mount applications
* Easy pick and place
* Built-in strain relief
* Super fast recovery time for high speed switching

## MECHANICAL DATA

* Case: Molded plastic
* Epoxy: UL 94V-0 rate flame retardant
* Metallurgically bonded construction
* Polarity: Color band denotes cathode end
* Mounting position: Any


## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

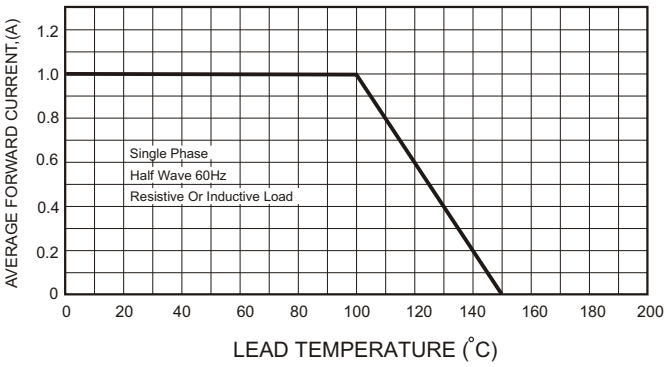
Rating 25°C ambient temperature uniess otherwies specified.
Single phase half wave, 60Hz, resistive or inductive load.
For capacitive load, derate current by 20%.

| TYPE NUMBER | ES1AF | ES1BF | ES1CF | ES1DF | ES1EF | ES1GF | ES1JF | UNITS |
|---|---|---|---|---|---|---|---|---|
| Maximum Recurrent Peak Reverse Voltage | 50 | 100 | 150 | 200 | 300 | 400 | 600 | V |
| Maximum RMS Voltage | 35 | 70 | 105 | 140 | 210 | 280 | 420 | V |
| Maximum DC Blocking Voltage | 50 | 100 | 150 | 200 | 300 | 400 | 600 | V |
| Maximum Average Forward Rectified Current | 1.0 | | | | | | | A |
| Peak Forward Surge Current, 8.3 ms single half sine-wave superimposed on rated load (JEDEC method) | 30 | | | | | | | A |
| Maximum Instantaneous Forward Voltage at 1.0A | 0.95 | | | | 1.25 | | 1.7 | V |
| Maximum DC Reverse Current Ta=25°C | 5.0 | | | | | | | μA |
| at Rated DC Blocking Voltage Ta=100°C | 500 | | | | | | | μA |
| Maximum Reverse Recovery Time (Note 1) | 35 | | | | | | | nS |
| Typical Junction Capacitance (Note 2) | 15 | | | | | | | pF |
| Typical Thermal Resistance R JA (Note 3) | 80 | | | | | | | °C/W |
| Operating and Storage Temperature Range $T_J$, $T_{STG}$ | -65 — +150 | | | | | | | °C |

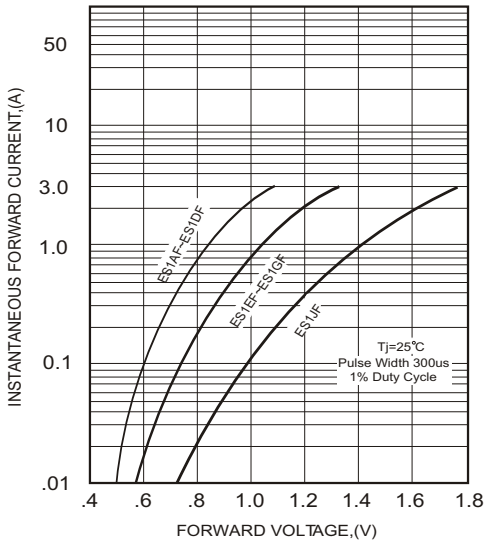
**NOTES:**
1. Reverse Recovery Time test condition: IF=0.5A, IR=1.0A, IRR=0.25A
2. Measured at 1MHz and applied reverse voltage of 4.0V D.C.
3. Thermal Resistance from Junction to Ambient.

## RATING AND CHARACTERISTIC CURVES

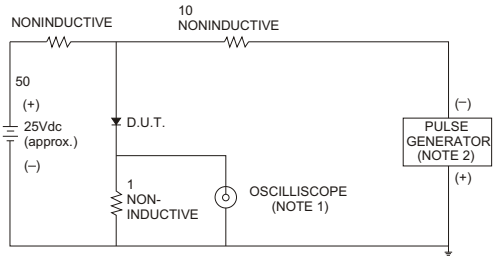
### FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE




### FIG.2-TYPICAL FORWARD CHARACTERISTICS

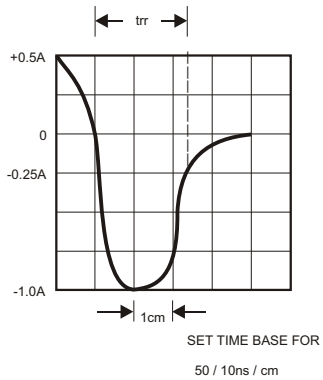



### FIG.3- TEST CIRCUIT DIAGRAM AND REVERSE RECOVERY TIME CHARACTERISTICS

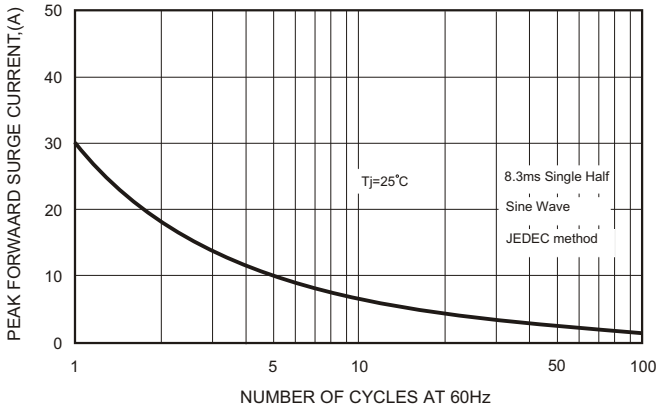



NOTES: 1. Rise Time= 7ns max., Input Impedance= 1 megohm.22pF.

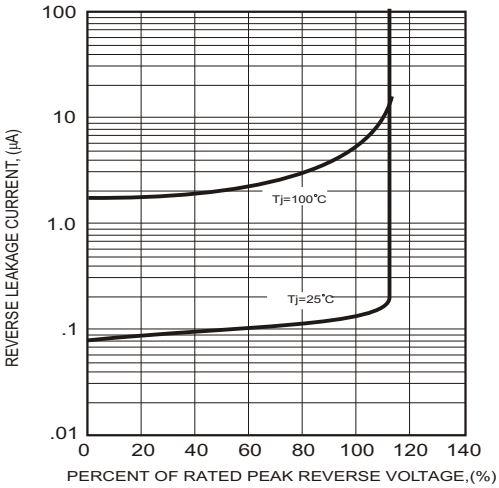
2. Rise Time= 10ns max., Source Impedance= 50 ohms.



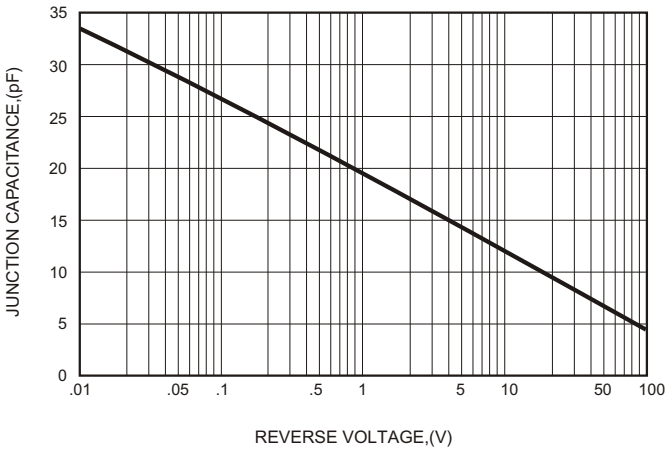

### FIG.4-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT




### FIG.5 - TYPICAL REVERSE CHARACTERISTICS



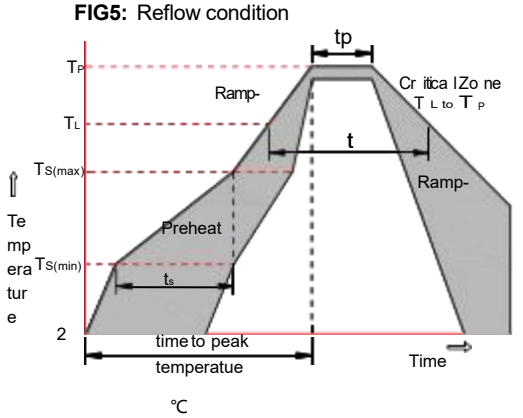

### FIG.6-TYPICAL JUNCTION CAPACITANCE



## Soldering parameters

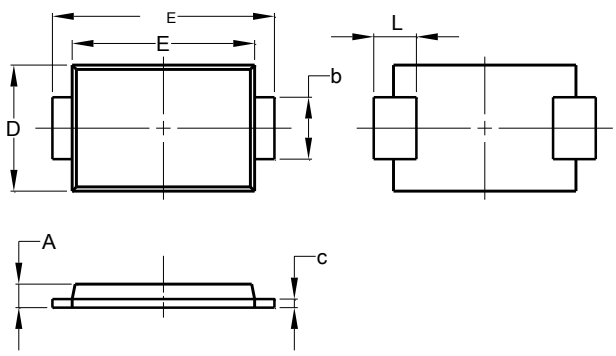
| Reflow Condition | | Pb-Free assembly (see as bellow) |
|---|---|---|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150℃ |
| | -Temperature Max($T_{s(max)}$) | +200℃ |
| | -Time (Min to Max) (ts) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp ($T_L$) to peak) | | 3℃/sec. Max |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate | | 3℃/sec. Max |
| Reflow | -Temperature($T_L$)(Liquid us) | +217℃ |
| | -Temperature($t_L$) | 60-150 secs. |
| Peak Temp ($T_p$) | | +260(+0/-5)℃ |
| Time within 5℃ of actual Peak Temp ($t_p$) | | 30 secs. Max |
| Ramp-down Rate | | 6℃/sec. Max |
| Time 25℃ to Peak Temp ($T_P$) | | 8 min. Max |
| Do not exceed | | +260℃ |

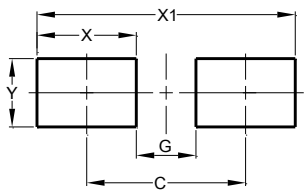
**FIG5:** Reflow condition




## Package Dimensions & Suggested Pad Layout

**SMAF**



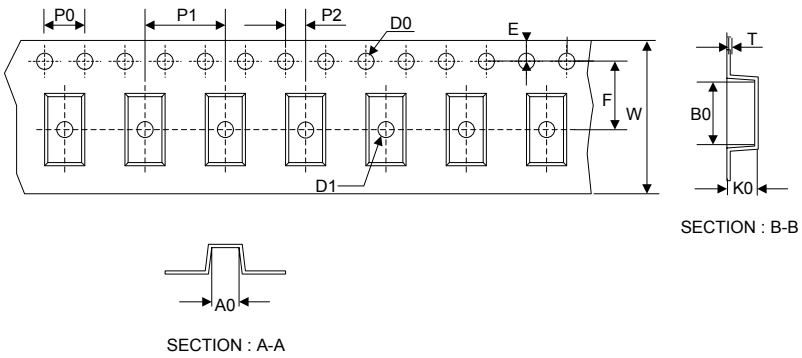




| SMAF | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.90 | 1.20 |
| **b** | 1.30 | 1.60 |
| **c** | 0.10 | 0.20 |
| **D** | 2.40 | 2.70 |
| **E** | 3.30 | 3.70 |
| **$H_E$** | 4.40 | 4.90 |
| **L** | 0.60 | 1.20 |
| **All Dimensions in mm** | | |

| Dimensions | Value (in mm) |
|---|---|
| **C** | 3.80 |
| **G** | 2.20 |
| **X** | 1.60 |
| **X1** | 5.40 |
| **Y** | 1.70 |

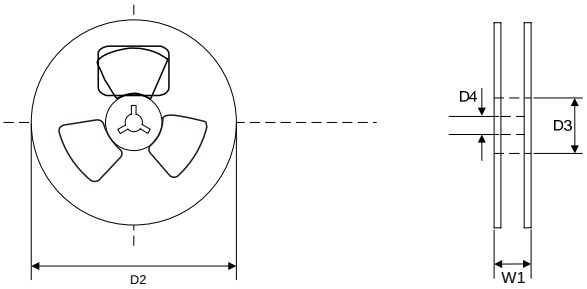
## Tape & rell specification

Tape



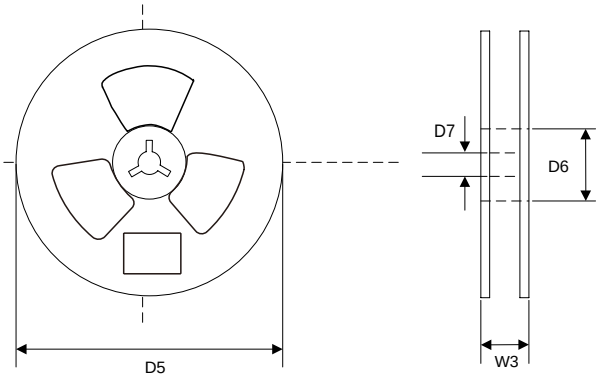

| Symbol | Dimension (mm) |
|---|---|
| P0 | 4.00±0.20 |
| P1 | 4.00±0.20 |
| P2 | 2.00±0.20 |
| D0 | 1.55±0.25 |
| D1 | 1.55±0.25 |
| E | 1.75±0.20 |
| F | 5.50±0.20 |
| W | 12.00±0.20 |
| A0 | 2.85±0.20 |
| B0 | 5.00±0.20 |
| K0 | 1.45±0.20 |
| T | 0.26±0.10 |

7” Reel




| | |
|---|---|
| D2 | 176.0±5.0 |
| D3 | 55.0Min. |
| D4 | 14.0±2.5 |
| W1 | 14.0±2.5 |
| Quantity: 3000PCS | |

13” Reel




| | |
|---|---|
| D5 | 330.0±5.0 |
| D6 | 73.0Min. |
| D7 | 14.0±2.5 |
| W2 | 14.0±2.5 |
| Quantity: 10000PCS | |