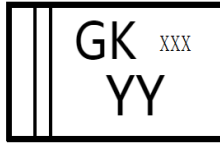


## FEATURES

- For surface mounted applications in order to optimize board space.
- Low profile package
- Glass passivated junction
- Low inductance
- Plastic package has Underwriters Laboratory Flammability

## MECHANICAL DATA

- Case: SMAF
- Terminals: Solderable per MIL-STD-750, Method 2026



- "GK" represents the brand name
- "XXX" represents the periodic code
- "YY" represents the product type marking

## VOLTAGE RANGE

5.0 to 440 Volts  
400 Watts Peak Power

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

RATINGS	SYMBOL	VALUE	UNITS
Peak Power Dissipation at $T_A=25^\circ\text{C}$ , $T_P=1\text{ms}$ (NOTE 1)	$P_{PK}$	Minimum 400	Watts
Peak Forward Surge Current at 8.3ms Single Half Sine-Wave superimposed on rated load (JEDEC method) (NOTE 3)	$I_{FSM}$	40	Amps
Maximum Instantaneous Forward Voltage at 25.0A for Unidirectional only	$V_F$	3.5	Volts
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

### NOTES:

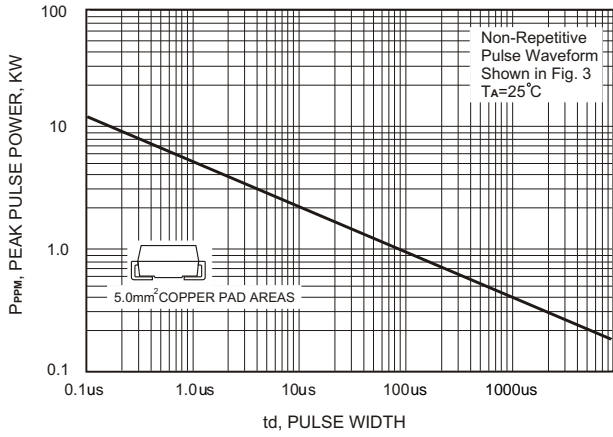
1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2.
2. Mounted on Copper Pad area of  $5.0\text{mm}^2$  (.013mm Thick) to each terminal.
3. 8.3ms single half sine-wave, duty cycle = 4 pulses per minute maximum.

## DEVICES FOR BIDIRECTIONAL APPLICATIONS

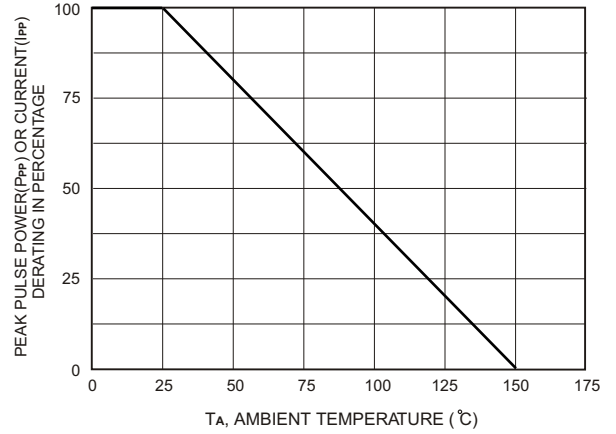
- 1. For bi-directional use C suffix for Types .
- 2. Electrical characteristics apply in both directions.

**RATING AND CHARACTERISTIC CURVES**

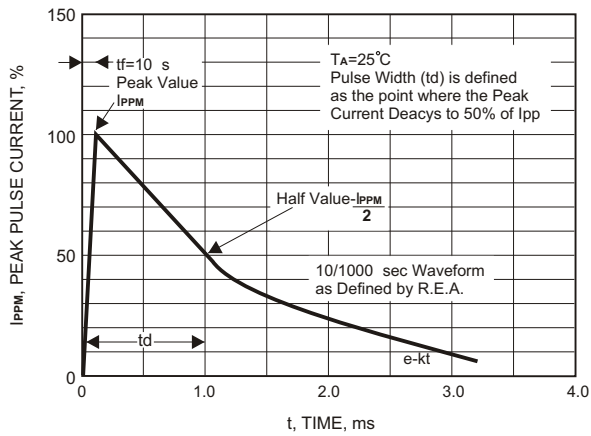
**FIG.1-PEAK PULSE POWER DERATING CURVE**



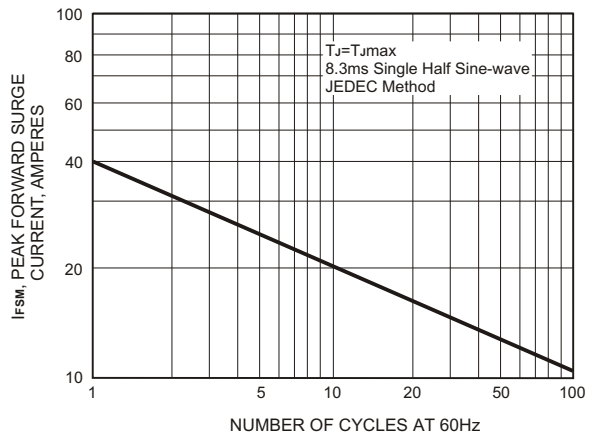
**FIG.2-PULSE DERATING CURVE**



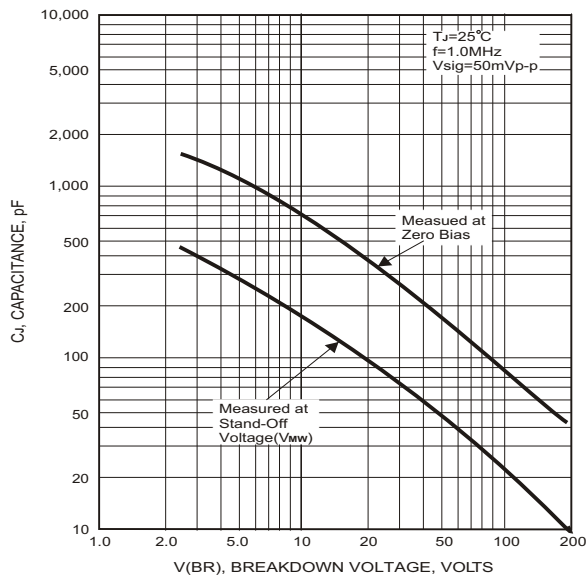
**FIG.3-PULSE WAVE FORM**



**FIG.4 MAXIMUM NON REPETITIVE PEAK FORWARD SURGE CURRENT**

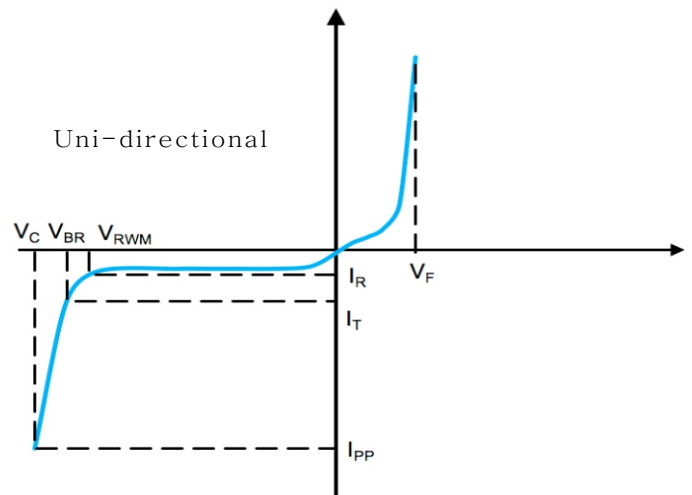
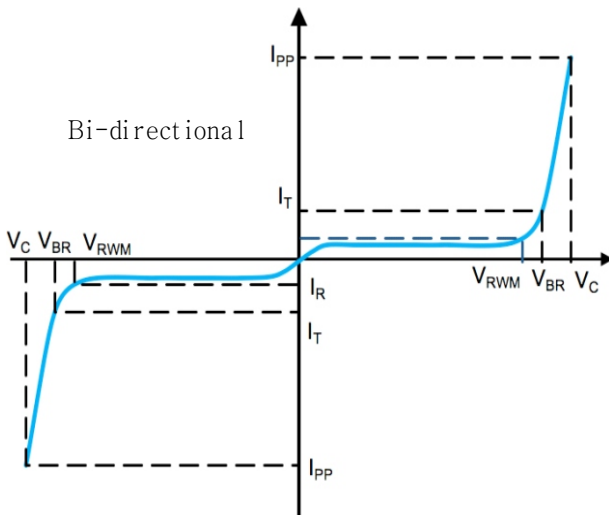


**FIG.5-TYPICAL JUNCTION CAPACITANCE**



PART NUMBER ADD C FOR BI- DIRECTIONAL	Reverse Stand-off Voltage	Breakdown Voltage		Test Current	Reverse Leakage	Max. Clamp Voltage	Peak Pulse Current	Package	
		$V_{BR} @ I_T$						SMAF	
	$V_{RRM}$	Min	Max	$I_T$	$I_R @ V_{RRM}$	$V_C @ I_{PP}$	$I_{PP}$	Device Marking Ccode	
See Note 1	V	V	V	mA	$\mu A$	V	A	UNI	BI
SMAFJ5.0(C)A	5	6.4	7	10	800	9.2	43.5	AE	WE
SMAFJ6.0(C)A	6	6.67	7.37	10	800	10.3	38.8	AG	WG
SMAFJ6.5(C)A	6.5	7.22	7.98	10	500	11.2	35.7	AK	WK
SMAFJ7.0(C)A	7	7.78	8.6	10	200	12	33.3	AM	WM
SMAFJ7.5(C)A	7.5	8.33	9.21	1	100	12.9	31	AP	WP
SMAFJ8.0(C)A	8	8.89	9.83	1	50	13.6	29.4	AR	WR
SMAFJ8.5(C)A	8.5	9.44	10.4	1	20	14.4	27.8	AT	WT
SMAFJ9.0(C)A	9	10	11.1	1	10	15.4	26	AV	WV
SMAFJ10(C)A	10	11.1	12.3	1	5	17	23.5	AX	WX
SMAFJ11(C)A	11	12.2	13.5	1	1	18.2	22	AZ	WZ
SMAFJ12(C)A	12	13.3	14.7	1	1	19.9	20.1	BE	XE
SMAFJ13(C)A	13	14.4	15.9	1	1	21.5	18.6	BG	XG
SMAFJ14(C)A	14	15.6	17.2	1	1	23.2	17.2	BK	XK
SMAFJ15(C)A	15	16.7	18.5	1	1	24.4	16.4	BM	XM
SMAFJ16(C)A	16	17.8	19.7	1	1	26	15.4	BP	XP
SMAFJ17(C)A	17	18.9	20.9	1	1	27.6	14.5	BR	XR
SMAFJ18(C)A	18	20	22.1	1	1	29.2	13.7	BT	XT
SMAFJ20(C)A	20	22.2	24.5	1	1	32.4	12.3	BV	XV
SMAFJ22(C)A	22	24.4	26.9	1	1	35.5	11.3	BX	XX
SMAFJ24(C)A	24	26.7	29.5	1	1	38.9	10.3	BZ	XZ
SMAFJ26(C)A	26	28.9	31.9	1	1	42.1	9.5	CE	YE
SMAFJ28(C)A	28	31.1	34.4	1	1	45.4	8.8	CG	YG
SMAFJ30(C)A	30	33.3	36.8	1	1	48.4	8.3	CK	YK
SMAFJ33(C)A	33	36.7	40.6	1	1	53.3	7.5	CM	YM
SMAFJ36(C)A	36	40	44.2	1	1	58.1	6.9	CP	YP
SMAFJ40(C)A	40	44.4	49.1	1	1	64.5	6.2	CR	YR
SMAFJ43(C)A	43	47.8	52.8	1	1	69.4	5.8	CT	YT
SMAFJ45(C)A	45	50	55.3	1	1	72.7	5.5	CV	YV
SMAFJ48(C)A	48	53.3	58.9	1	1	77.4	5.2	CX	YX
SMAFJ51(C)A	51	56.7	62.7	1	1	82.4	4.9	CZ	YZ
SMAFJ54(C)A	54	60	66.3	1	1	87.1	4.6	RE	ZE
SMAFJ58(C)A	58	64.4	71.2	1	1	93.6	4.3	RG	ZG
SMAFJ60(C)A	60	66.7	73.7	1	1	96.8	4.1	RK	ZK
SMAFJ64(C)A	64	71.1	78.6	1	1	103	3.9	RM	ZM
SMAFJ70(C)A	70	77.8	86	1	1	113	3.5	RP	ZP
SMAFJ75(C)A	75	83.3	92.1	1	1	121	3.3	RR	ZR
SMAFJ78(C)A	78	86.7	95.8	1	1	126	3.2	RT	ZT
SMAFJ85(C)A	85	94.4	104	1	1	137	2.9	RV	ZV
SMAFJ90(C)A	90	100	111	1	1	146	2.7	RX	ZX
SMAFJ100(C)A	100	111	123	1	1	162	2.5	RZ	ZZ
SMAFJ110(C)A	110	122	135	1	1	177	2.3	SE	VE
SMAFJ120(C)A	120	133	147	1	1	193	2.1	SG	VG
SMAFJ130(C)A	130	144	159	1	1	209	1.9	SK	VK
SMAFJ150(C)A	150	167	185	1	1	243	1.6	SM	VM
SMAFJ160(C)A	160	178	197	1	1	259	1.5	SP	VP
SMAFJ170(C)A	170	189	209	1	1	275	1.5	SR	VR
SMAFJ180(C)A	180	201	222	1	1	292	1.4	ST	VT
SMAFJ200(C)A	200	224	247	1	1	324	1.2	SV	VV
SMAFJ220(C)A	220	246	272	1	1	356	1.1	SX	VX
SMAFJ250(C)A	250	279	309	1	1	405	1	SZ	VZ
SMAFJ300(C)A	300	335	371	1	1	486	0.8	TE	UE
SMAFJ350(C)A	350	391	432	1	1	567	0.7	TG	UG
SMAFJ400(C)A	400	447	494	1	1	648	0.6	TK	UK
SMAFJ440(C)A	440	492	543	1	1	713	0.6	TM	UM

## I-V Curve Characteristics



$P_{PPM}$  Peak Pulse Power Dissipation - Max power dissipation

$V_{RWM}$  Reverse Stand-off Voltage - Maximum voltage that can be applied to TVS without operation

$V_{BR}$  Breakdown Voltage – Maximum voltage that flows though the TVS at a specified current ( $I_T$ )

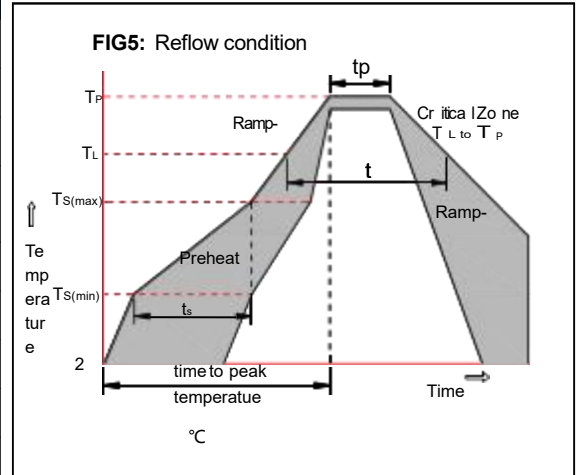
$V_C$  Clamping Voltage – Peak voltage measured across the TVS at a specified  $I_{PPM}$  (peak impulse current)

$I_R$  Reverse Leakage Current – Current measured at  $V_R$

$V_F$  Forward Voltage Drop for Uni-directional

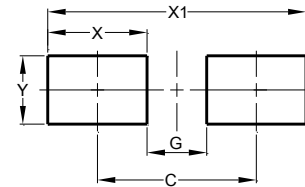
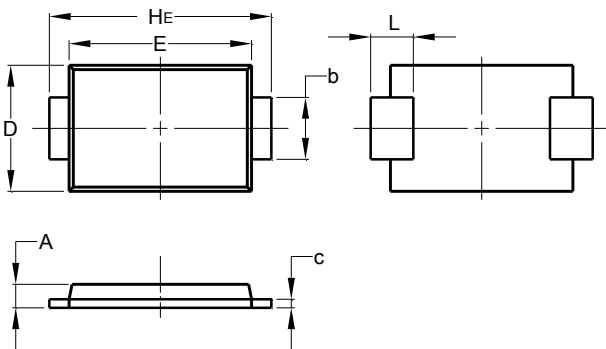
**Soldering parameters**

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



**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 <sub>E</sub>	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 & reel 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
	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	