

## Surface Mount Super Fast Recovery Rectifier

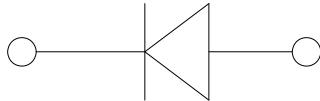


### Features

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- High forward surge capability
- Super Fast reverse recovery time
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C

### Typical Applications

For use in high frequency rectification of power, supplies, inverters, converters, and freewheeling diodes for consumer, and telecommunication.



### Mechanical Data

- **Package:** SMAF  
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** Cathode line denotes the cathode end

### ■ Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	U1AF	U1BF	U1CF	U1DF	U1FF	U1GF	U1HF	U1JF
Device marking code			U1AF	U1BF	U1CF	U1DF	U1FF	U1GF	U1HF	U1JF
Maximum Repetitive Peak Reverse Voltage	VRRM	V	50	100	150	200	300	400	500	600
Maximum RMS Voltage	VRMS	V	35	70	105	140	210	280	350	420
Maximum DC blocking Voltage	VDC	V	50	100	150	200	300	400	500	600
Average rectified output current @60Hz sine wave, resistance load, TL (Fig.1)	IO	A	1.0							
Forward Surge Current (Non-repetitive) @60Hz Half-sine wave, 1 cycle, Tj=25°C	IFSM	A	30							
Forward Surge Current (Non-repetitive) @1ms, square wave, 1 cycle, Tj=25°C			60							
Current squared time @1ms≤t≤8.3ms Tj=25°C	I <sup>2</sup> t	A <sup>2</sup> s	3.735							
Storage temperature	Tstg	°C	-55 ~ +150							
Junction temperature	Tj	°C	-55 ~ +150							

### ■ Electrical Characteristics (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	TEST CONDITIONS	U1AF	U1BF	U1CF	U1DF	U1FF	U1GF	U1HF	U1JF
Maximum instantaneous forward voltage	VF	V	IFM=1.0A	0.92				1.25	1.7		
Maximum reverse recovery time	trr	ns	IF=0.5A, IR=1.0A, Irr=0.25A	25						35	
Maximum DC reverse current at rated DC blocking voltage	IR	µA	Tj = 25°C	5.0							
			Tj = 125°C	50							
Typical junction capacitance	Cj	pF	Measured at 1MHz and Applied Reverse Voltage of 4.0 V.D.C	17				15	16		



# U1AF THRU U1JF

## Dynamic Characteristics

### ◆ U1AF THRU U1DF

PARAMETER	SYMBOL	UNIT	TEST CONDITIONS		Min	Typ	Max
Reverse Recovery Time	$T_{RR}$	ns	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ , $di/dt=-50\text{A}/\mu\text{s}$ $V_{RM}=30\text{V}$	-	27	-
			$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=100\text{V}$	-	18	-
			$T_j=125^\circ\text{C}$		-	24	-
Peak recovery current	$I_{RRM}$	A	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=100\text{V}$	-	2.4	-
			$T_j=125^\circ\text{C}$		-	3.9	-
Reverse recovery charge	$Q_{rr}$	nC	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=100\text{V}$	-	21.6	-
			$T_j=125^\circ\text{C}$		-	46.6	-
Non-repetitive avalanche energy	$E_{AS}$	mJ	$T_j=25^\circ\text{C}$	$I_R=1.5\text{A}$ , $L=15\text{mH}$	16.9	-	-

### ◆ U1FF THRU U1GF

PARAMETER	SYMBOL	UNIT	TEST CONDITIONS		Min	Typ	Max
Reverse Recovery Time	$T_{RR}$	ns	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ , $di/dt=-50\text{A}/\mu\text{s}$ $V_{RM}=30\text{V}$	-	26	-
			$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=200\text{V}$	-	22	-
			$T_j=125^\circ\text{C}$		-	31	-
Peak recovery current	$I_{RRM}$	A	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=200\text{V}$	-	1.9	-
			$T_j=125^\circ\text{C}$		-	3.5	-
Reverse recovery charge	$Q_{rr}$	nC	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=200\text{V}$	-	21.1	-
			$T_j=125^\circ\text{C}$		-	54.9	-
Non-repetitive avalanche energy	$E_{AS}$	mJ	$T_j=25^\circ\text{C}$	$I_R=0.4\text{A}$ , $L=15\text{mH}$	1.2	-	-

### ◆ U1HF THRU U1JF

PARAMETER	SYMBOL	UNIT	TEST CONDITIONS		Min	Typ	Max
Reverse Recovery Time	$T_{RR}$	ns	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ , $di/dt=-50\text{A}/\mu\text{s}$ $V_{RM}=30\text{V}$	-	38	-
			$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=400\text{V}$	-	32	-
			$T_j=125^\circ\text{C}$		-	52	-
Peak recovery current	$I_{RRM}$	A	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=400\text{V}$	-	2.9	-
			$T_j=125^\circ\text{C}$		-	4.7	-
Reverse recovery charge	$Q_{rr}$	nC	$T_j=25^\circ\text{C}$	$I_F=1\text{A}$ $di/dt=-200\text{A}/\mu\text{s}$ $V_{RM}=400\text{V}$	-	45.8	-
			$T_j=125^\circ\text{C}$		-	121.9	-
Non-repetitive avalanche energy	$E_{AS}$	mJ	$T_j=25^\circ\text{C}$	$I_R=0.3\text{A}$ , $L=15\text{mH}$	0.7	-	-

## Thermal Characteristics ( $T_a=25^\circ\text{C}$ Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	U1AF	U1BF	U1CF	U1DF	U1FF	U1GF	U1HF	U1JF
Typical Thermal resistance	$R_{\theta J-A}^{(1)}$	$^\circ\text{C}/\text{W}$	60							
	$R_{\theta J-L}^{(1)}$		20							
	$R_{\theta J-C}^{(1)}$		18							

Note:

(1) Thermal resistance from junction to ambient and from junction to lead mounted on P.C.B. with 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad areas



# U1AF THRU U1JF

## ■ Characteristics (Typical)

FIG.1: Io-TL Cure

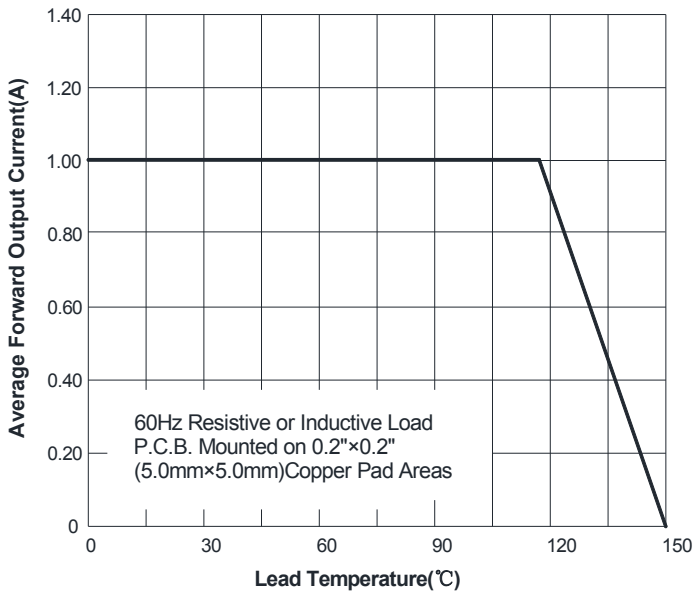


FIG.2: Forward Surge Current Capability

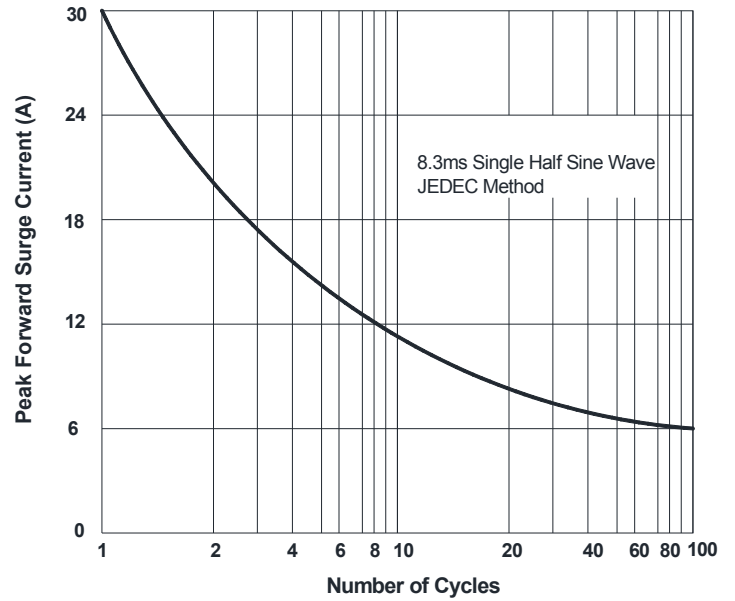


FIG.3: Typical Forward Characteristics

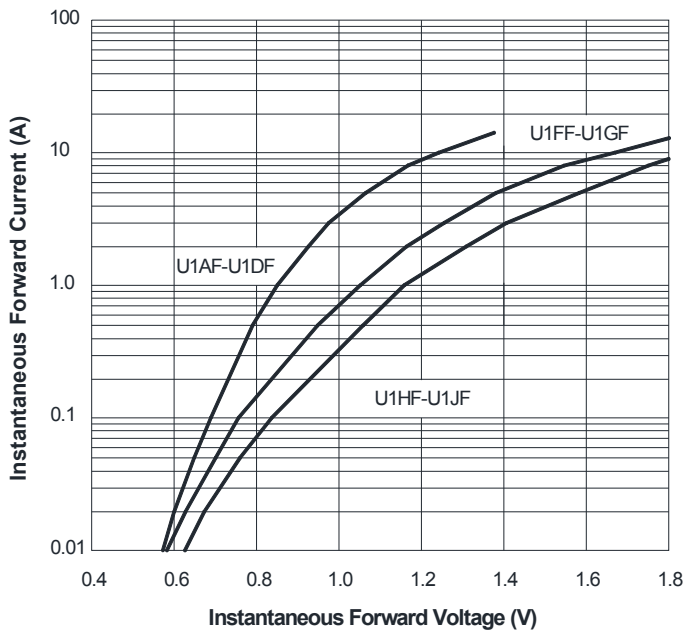


FIG.4: Typical Reverse Characteristics

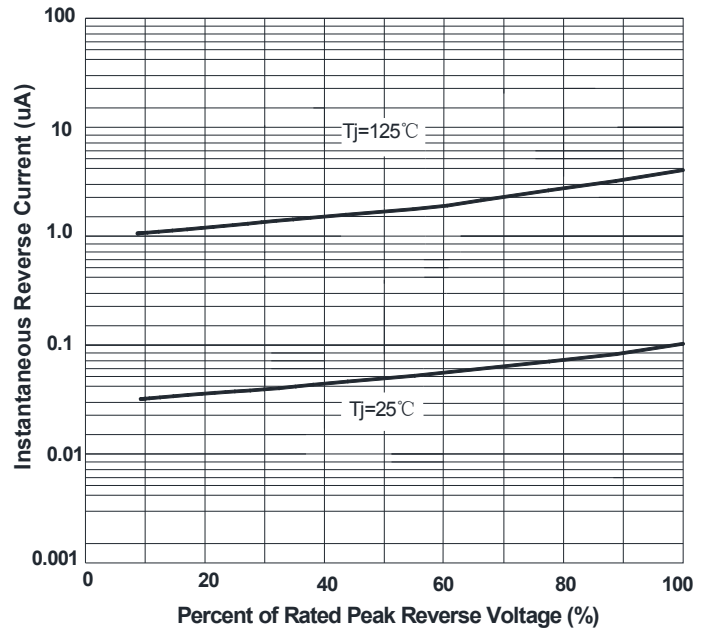
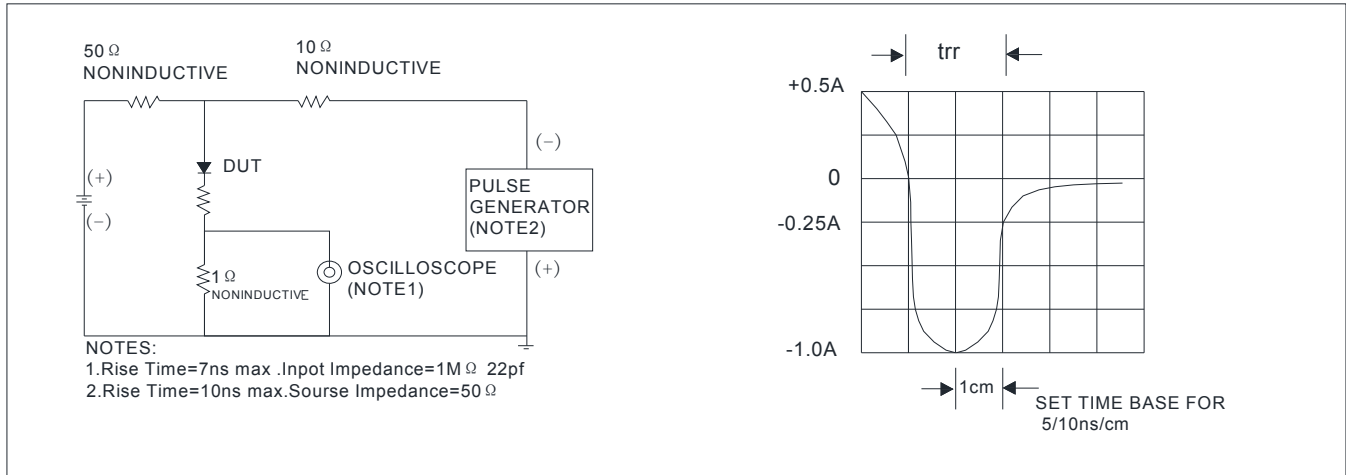


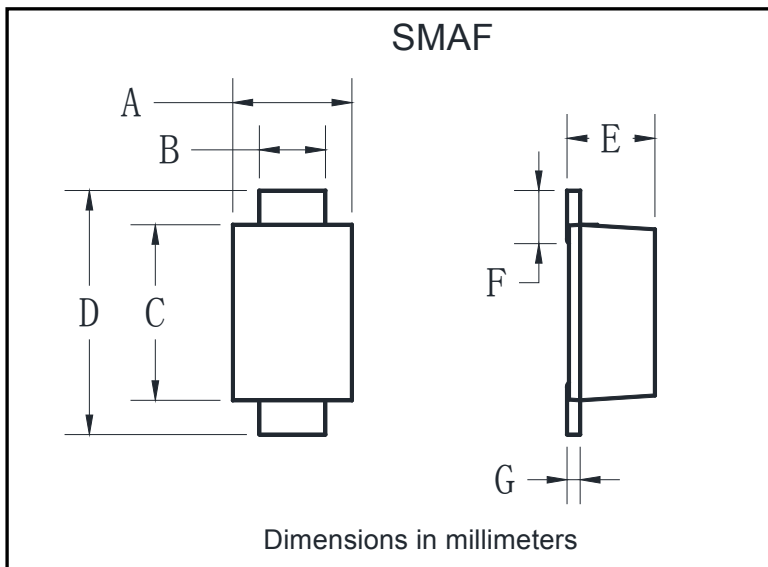
FIG.5: Diagram of circuit and Testing wave form of reverse recovery time



### Ordering Information (Example)

PREFERED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
U1AF-U1JF	F1	Approximate 0.034	3000	24000	96000	7" reel
U1AF-U1JF	F2	Approximate 0.034	10000	/	160000	13" reel
U1AF-U1JF	F3	Approximate 0.034	10000	/	120000	13" reel
U1AF-U1JF	F4	Approximate 0.034	7500	/	120000	13" reel

### Outline Dimensions

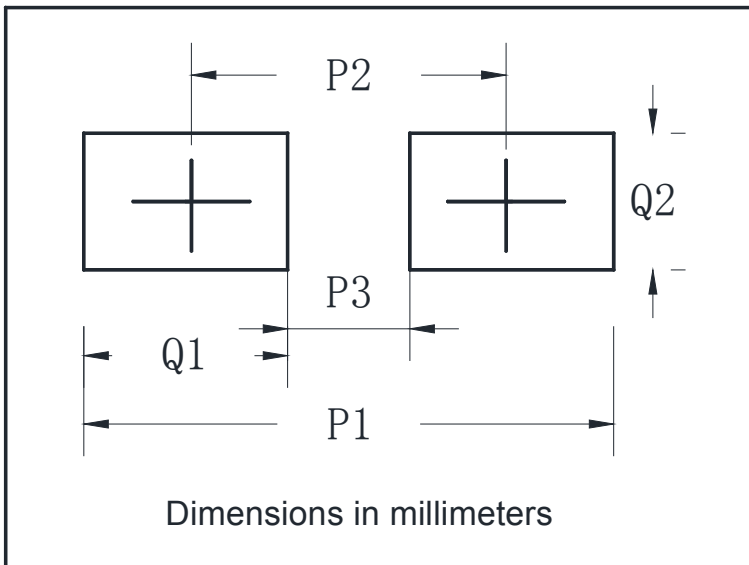


SMAF		
Dim	Min	Max
A	2.40	2.80
B	1.35	1.45
C	3.40	3.60
D	4.40	4.80
E	1.05	1.25
F	0.50	1.00
G	0.15	0.22



## U1AF THRU U1JF

### ■ Suggested pad layout



SMAF	
Dim	Millimeters
P1	6.50
P2	4.00
P3	1.50
Q1	2.50
Q2	1.70



## U1AF THRU U1JF

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