



# Frontier Electronics Corp.

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## 400W SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR

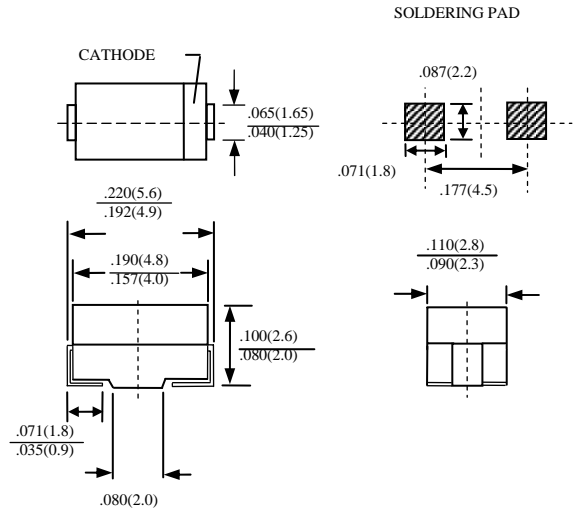
### P4SMAJ5.0-LFR THRU P4SMAJ188A-LFR

#### FEATURES

- OPTIMIZED FOR LAN PROTECTION APPLICATION
- IDEAL FOR ESD PROTECTION OF DATA LINES IN ACCORDANCE WITH IEC 1000-4-2(IEC801-2)
- IDEAL FOR EFT PROTECTION OF DATA LINE IN ACCORDANCE WITH IEC 1000-4-4(IEC801-4)
- EXCELLENT CLAMPING CAPABILITY
- LOW INCREMENTAL SURGE RESISTANCE
- FAST RESPONSE TIME: TYPICALLY LESS THAN 1.0 ps FROM 0 VOLTS TO V(BR) MIN
- 400 W PEAK PULSE POWER CAPABILITY WITH A 10/1000  $\mu$ S WAVEFORM , REPETITION RATE (DUTY CYCLE): 0.01%
- TYPICAL  $I_D$  LESS THAN 1 $\mu$ A ABOVE 10V
- HIGH TEMPERATURE SOLDERING GUARANTEED: 250°C /10 SECONDS AT TERMINAL
- ROHS

#### MECHANICAL DATA

- CASE: MOLDED PLASTIC, DO-214AC (SMA), DIMENSIONS IN INCHES AND (MILLIMETERS)
- TERMINALS: SOLDER PLATED
- POLARITY: INDICATED BY CATHODE BAND
- WEIGHT: 0.064 GRAMS



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS RATINGS AT 25°C AMBIENT TEMPERATURE UNLESS OTHERWISE SPECIFIED

RATINGS	SYMBOL	VALUE	UNITS
PEAK PULSE POWER DISSIPATION ON 10/1000 $\mu$ S WAVEFORM (NOTE 1, FIG. 1)	$P_{PPM}$	MINIMUM 400	WATTS
PEAK PULSE CURRENT OF 0N 10/1000 $\mu$ S WAVEFORM (NOTE 1,FIG. 3)	$I_{PPM}$	SEE TABLE 1	A
STEADY STATE POWER DISSIPATION AT $T_L=75^\circ\text{C}$ (NOTE 2)	$P_{M(AV)}$	1.0	WATTS
PEAK FORWARD SURGE CURRENT, 8.3ms SINGLE HALF SINE-WAVE SUPERIMPOSED ON RATED LOAD, UNIDIRECTIONAL ONLY(NOTE 3)	$I_{FSM}$	40	A
MAXIMUM INSTANTANEOUS FORWARD VOLTAGE AT 25.0A FOR UNIDIRECTIONAL ONLY (NOTE 3 & 4)	VF	3.5	V
OPERATING JUNCTION AND STORAGE TEMPERATURE RANGE	$T_J, T_{STG}$	- 55 TO + 150	$^\circ\text{C}$

- NOTE: 1. NON-REPETITIVE CURRENT PULSE, PER FIG.3 AND DERATED ABOVE  $T_A=25^\circ\text{C}$  PER FIG 2.  
 2. MOUNTED ON 5.0 mm<sup>2</sup> COPPER PADS TO EACH TERMINAL  
 3. LEAD TEMPERATURE AT  $75^\circ\text{C} = T_L$  PER FIG. 5  
 4. MEASURED ON 8.3ms SINGLE HALF SINE-WAVE. FOR UNIDIRECTIONAL DEVICES ONLY  
 5. PEAK PULSE POWER WAVEFORM IS 10/1000  $\mu$ S

DEVICE	DEVICE MARKING CODE		WORKING PEAK REVERSE VOLTAGE $V_{WM}$ (VOLTS)	BREAKDOWN VOLTAGE $V_{(BR)}$ (VOLTS) at $I_T$		TEST CURRENT $I_T$ (mA)	MAXIMUM Clamping VOLTAGE AT $I_{PPM}$ VC(Volts) (Note 5)	MAX PEAK PULSE SURGE CURRENT $I_{PPM}$ (NOTE 5) (Amps)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu$ A)
	UNI	BI		MIN	MAX				

P4SMAJ5.0-LFR	AD	WD	5.0	6.40	7.82	10	9.6	41.7	800
P4SMAJ5.0A-LFR	AE	WE	5.0	6.40	7.07	10	9.2	43.5	800
R	AF	WF	6.0	6.67	8.15	10	11.4	35.1	800
P4SMAJ6.0-LFR	AG	WG	6.0	6.67	7.37	10	10.3	38.8	800
P4SMAJ6.0A-LFR	AH	WH	6.5	7.22	8.82	10	12.3	32.5	500
R	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500
P4SMAJ6.5-LFR	AL	WL	7.0	7.78	9.51	10	13.3	30.1	200
P4SMAJ6.5A-LFR	AM	WM	7.0	7.78	8.60	10	12.0	33.3	200
R	AN	WN	7.5	8.33	10.3	1.0	14.3	28.0	100
P4SMAJ7.0-LFR	AP	WP	7.5	8.33	9.21	1.0	12.9	31.0	100
P4SMAJ7.0A-LFR	AQ	WQ	8.0	8.89	10.9	1.0	15.0	26.7	50.0
R	AR	WR	8.0	8.89	9.83	1.0	13.6	29.4	50.0
P4SMAJ7.5-LFR	AS	WS	8.5	9.44	11.5	1.0	15.9	25.2	10.0
P4SMAJ7.5A-LFR	AT	WT	8.5	9.44	10.4	1.0	14.4	27.8	10.0
R	AU	WU	9.0	10.0	12.2	1.0	16.9	23.7	5.0
P4SMAJ8.0-LFR	AV	WV	9.0	10.0	11.1	1.0	15.4	26.0	5.0
P4SMAJ8.0A-LFR	AW	WW	10.0	11.1	13.6	1.0	18.8	21.3	5.0
R	AX	WX	10.0	11.1	12.3	1.0	17.0	23.5	5.0
P4SMAJ8.5-LFR	AY	WY	11.0	12.2	14.9	1.0	20.1	19.9	5.0
P4SMAJ8.5A-LFR	AZ	WZ	11.0	12.2	13.5	1.0	18.2	22.0	5.0
R	BD	XD	12.0	13.3	16.3	1.0	22.0	18.2	5.0
P4SMAJ9.0-LFR	BE	XE	12.0	13.3	14.7	1.0	19.9	20.1	5.0
P4SMAJ9.0A-LFR	BF	XF	13.0	14.4	17.6	1.0	23.8	16.8	5.0
R	BG	XG	13.0	14.4	15.9	1.0	21.5	18.6	5.0
P4SMAJ10-LFR	BH	XH	14.0	15.6	19.1	1.0	25.8	15.5	5.0
P4SMAJ10A-LFR	BK	XK	14.0	15.6	17.2	1.0	23.2	17.2	5.0
P4SMAJ11-LFR	BL	XL	15.0	16.7	20.4	1.0	26.9	14.9	5.0
P4SMAJ11A-LFR	BM	XM	15.0	16.7	18.5	1.0	24.4	16.4	5.0
P4SMAJ12-LFR	BN	XN	16.0	17.8	21.8	1.0	28.8	13.9	5.0
P4SMAJ12A-LFR	BP	XP	16.0	17.8	19.7	1.0	26.0	15.4	5.0
P4SMAJ13-LFR	BQ	XQ	17.0	18.9	23.1	1.0	30.5	13.1	5.0
P4SMAJ13A-LFR	BR	XR	17.0	18.9	20.9	1.0	27.6	14.5	5.0
P4SMAJ14-LFR	BS	XS	18.0	20.0	24.4	1.0	32.2	12.4	5.0
P4SMAJ14A-LFR	BT	XT	18.0	20.0	22.1	1.0	29.2	13.7	5.0
P4SMAJ15-LFR	BU	XU	20.0	22.2	27.1	1.0	35.8	11.2	5.0
P4SMAJ15A-LFR	BV	XV	20.0	22.2	24.5	1.0	32.4	12.3	5.0
P4SMAJ16-LFR	BW	XW	22.0	24.4	29.8	1.0	39.4	10.2	5.0
P4SMAJ16A-LFR	BX	XX	22.0	24.4	26.9	1.0	35.5	11.3	5.0
P4SMAJ17-LFR	BY	XY	24.0	26.7	32.6	1.0	43.0	9.3	5.0
P4SMAJ17A-LFR	BZ	XZ	24.0	26.7	29.5	1.0	38.9	10.3	5.0
P4SMAJ18-LFR	CD	YD	26.0	28.9	35.3	1.0	46.6	8.6	5.0
P4SMAJ18A-LFR	CE	YE	26.0	28.9	31.9	1.0	42.1	9.5	5.0
P4SMAJ20-LFR	CF	YF	28.0	31.1	38.0	1.0	50.1	8.0	5.0
P4SMAJ20A-LFR	CG	YG	28.0	31.1	34.4	1.0	45.4	8.8	5.0
P4SMAJ22-LFR	CH	YH	30.0	33.3	40.7	1.0	53.5	7.5	5.0
P4SMAJ22A-LFR	CK	YK	30.0	33.3	36.8	1.0	48.4	8.3	5.0
P4SMAJ24-LFR	CL	YL	33.0	36.7	44.9	1.0	59.0	6.8	5.0
P4SMAJ24A-LFR	CM	YM	33.0	36.7	40.6	1.0	53.3	7.5	5.0
P4SMAJ26-LFR	CN	YN	36.0	40.0	48.9	1.0	64.3	6.2	5.0
P4SMAJ26A-LFR	CP	YP	36.0	40.0	44.2	1.0	58.1	6.9	5.0
P4SMAJ28-LFR	CQ	YQ	40.0	44.4	54.3	1.0	71.4	5.6	5.0
P4SMAJ28A-LFR	CR	YR	40.0	44.4	49.1	1.0	64.5	6.2	5.0
P4SMAJ30-LFR	CS	YS	43.0	47.8	58.4	1.0	76.7	5.2	5.0
P4SMAJ30A-LFR	CT	YT	43.0	47.8	52.8	1.0	69.4	5.8	5.0
P4SMAJ33-LFR	CU	YU	45.0	50.0	61.1	1.0	80.3	5.0	5.0
P4SMAJ33A-LFR	CV	YV	45	50.0	55.3	1.0	72.7	5.5	5.0
P4SMAJ36-LFR	CW	YW	48	53.3	65.1	1.0	85.5	4.7	5.0
P4SMAJ36A-LFR	CX	YX	48	53.3	58.9	1.0	77.4	5.2	5.0
P4SMAJ40-LFR									
P4SMAJ40A-LFR									
P4SMAJ43-LFR									
P4SMAJ43A-LFR									
P4SMAJ45-LFR									
P4SMAJ45A-LFR									
P4SMAJ48-LFR									
P4SMAJ48A-LFR									

DEVICE	DEVICE MARKING CODE		WORKING PEAK REVERSE VOLTAGE $V_{WM}$ (VOLTS)	BREAKDOWN VOLTAGE $V_{BR}$ (VOLTS) at $I_T$		TEST CURRENT $I_T$ (mA)	MAXIMUM Clamping VOLTAGE AT $I_{PPM}$ VC(Volts) (Note 5)	MAX PEAK PULSE SURGE CURRENT $I_{PPM}$ (NOTE 5) (Amps)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu$ A)
	UNI	BI		MIN	MAX				
P4SMAJ51-LFR	CY	YY	51	56.7	69.3	1.0	91.1	4.4	5.0
P4SMAJ51A-LFR	CZ	YZ	51	56.7	62.7	1.0	82.4	4.9	5.0
P4SMAJ54-LFR	RD	ZD	54	60.0	73.3	1.0	96.3	4.2	5.0
P4SMAJ54A-LFR	RE	ZE	54	60.0	66.3	1.0	87.1	4.6	5.0
P4SMAJ58-LFR	RF	ZF	58	64.4	78.7	1.0	103.0	3.9	5.0
P4SMAJ58A-LFR	RG	ZG	58	64.4	71.2	1.0	93.6	4.3	5.0
P4SMAJ60-LFR	RH	ZH	60	66.7	81.5	1.0	107.0	3.7	5.0
P4SMAJ60A-LFR	RK	ZK	60	66.7	73.7	1.0	96.8	4.1	5.0
P4SMAJ64-LFR	RL	ZL	64	71.1	86.4	1.0	114.0	3.5	5.0
P4SMAJ64A-LFR	RM	ZM	64	71.1	78.6	1.0	103.0	3.9	5.0
P4SMAJ70-LFR	RN	ZN	70	77.8	95.1	1.0	125.0	3.2	5.0
P4SMAJ70A-LFR	RP	ZP	70	77.8	86.0	1.0	113.0	3.5	5.0
P4SMAJ75-LFR	RQ	ZQ	75	83.3	102.0	1.0	134.0	3.0	5.0
P4SMAJ75A-LFR	RR	ZR	75	83.3	92.1	1.0	121.0	3.3	5.0
P4SMAJ78-LFR	RS	ZS	78	86.7	106.0	1.0	139.0	2.9	5.0
P4SMAJ78A-LFR	RT	ZT	78	86.7	95.8	1.0	126.0	3.2	5.0
P4SMAJ85-LFR	RU	ZU	85	94.4	115.0	1.0	151.0	2.6	5.0
P4SMAJ85A-LFR	RV	ZV	85	94.4	104.0	1.0	137.0	2.9	5.0
P4SMAJ90-LFR	RW	ZW	90	100	122.0	1.0	160.0	2.5	5.0
P4SMAJ90A -LFR	RX	ZX	90	100	111.0	1.0	146.0	2.7	5.0
P4SMAJ100-LFR	RY	ZY	100	111	136.0	1.0	179.0	2.2	5.0
P4SMAJ100A-LFR	RZ	ZZ	100	111	123.0	1.0	162.0	2.5	5.0
P4SMAJ110-LFR	SD	VD	110	122	149.0	1.0	196.0	2.0	5.0
P4SMAJ110A-LFR	SE	VE	110	122	135.0	1.0	177.0	2.3	5.0
P4SMAJ120-LFR	SF	VF	120	133	163.0	1.0	214.0	1.9	5.0
P4SMAJ120A-LFR	SG	VG	120	133	147.0	1.0	193.0	2.1	5.0
P4SMAJ130-LFR	SH	VH	130	144	176.0	1.0	231.0	1.7	5.0
P4SMAJ130A-LFR	SK	VK	130	144	159.0	1.0	209.0	1.9	5.0
P4SMAJ150-LFR	SL	VL	150	167	204.0	1.0	268.0	1.5	5.0
P4SMAJ150A-LFR	SM	VM	150	167	185.0	1.0	243.0	1.6	5.0
P4SMAJ160-LFR	SN	VN	160	178	218.0	1.0	287.0	1.4	5.0
P4SMAJ160A-LFR	SP	VP	160	178	197.0	1.0	259.0	1.5	5.0
P4SMAJ170-LFR	SQ	VQ	170	189	231.0	1.0	304.0	1.3	5.0
P4SMAJ170A-LFR	SR	VR	170	189	209.0	1.0	275.0	1.4	5.0
P4SMAJ188-LFR	ST	VT	188	209	255.0	1.0	344.0	1.1	5.0
P4SMAJ188A-LFR	SS	VS	188	209	231.0	1.0	328.0	1.2	5.0

- NOTE:
1.  $V_F=3.5V$  at  $I_F=25A$  on  $\frac{1}{2}$  Square or Equivalent Sine Wave.  $PW = 8.3ms$  , Duty Cycle = 4 Pulses per Minute Maximum
  2. For Bipolar types with  $V_R$  of 10 volts and under , the IR limit is doubled
  3. Mounted on  $5.0mm^2$  copper pads to each terminal.
  4. For Bidirectional use C suffix for 10% tolerance , CA suffix for 5% tolerance

# RATINGS AND CHARACTERISTIC CURVES P4SMAJ5.0-LFR THRU P4SMAJ188A-LFR

FIG. 1 - PEAK PULSE POWER RATING CURVE

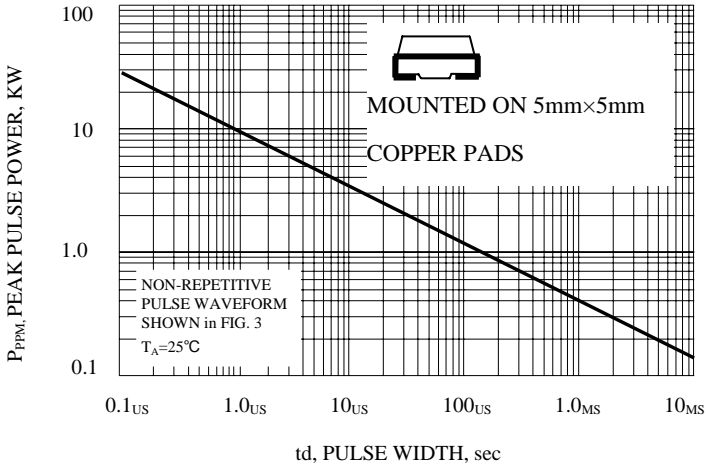


FIG. 2 - PULSE DERATING CURVE

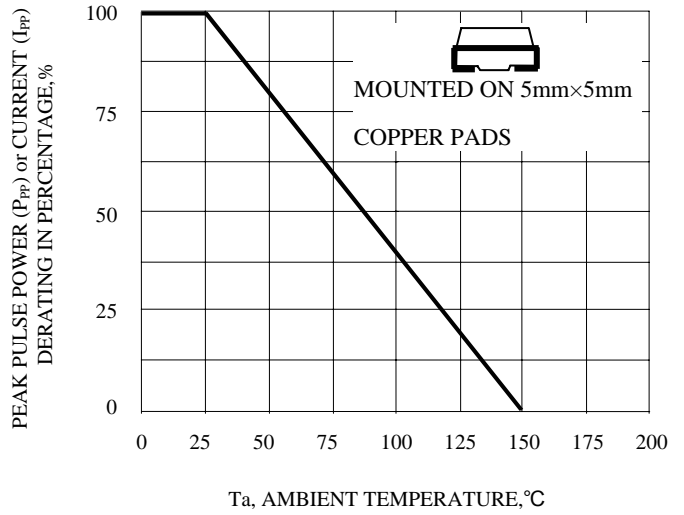


FIG. 3 - PULSE WAVEFORM

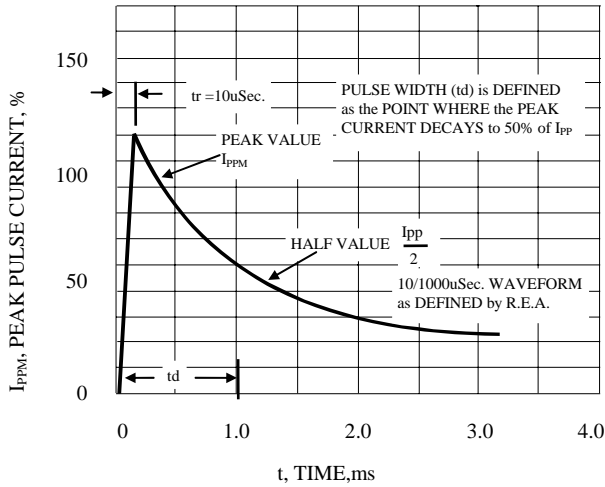


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

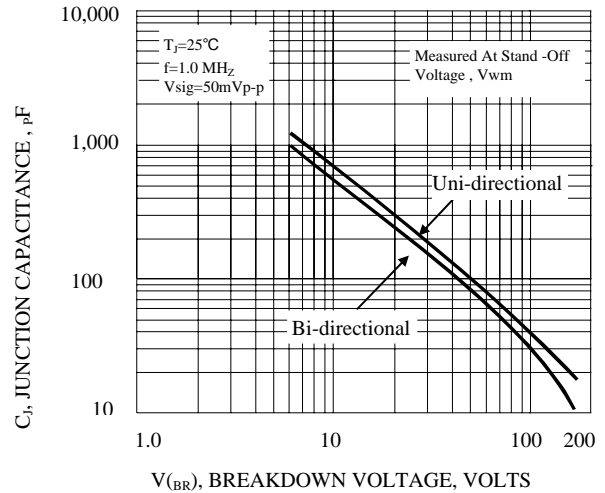


FIG. 5 - STEADY STATE POWER DERATING CURVE

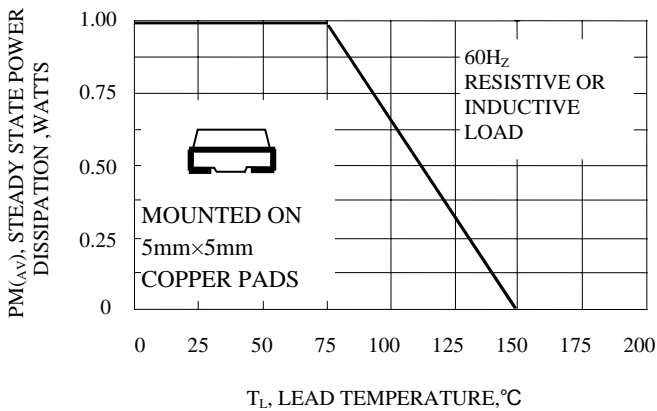


FIG. 6 - MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

