



# Frontier Electronics Corp.

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## 400W SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR

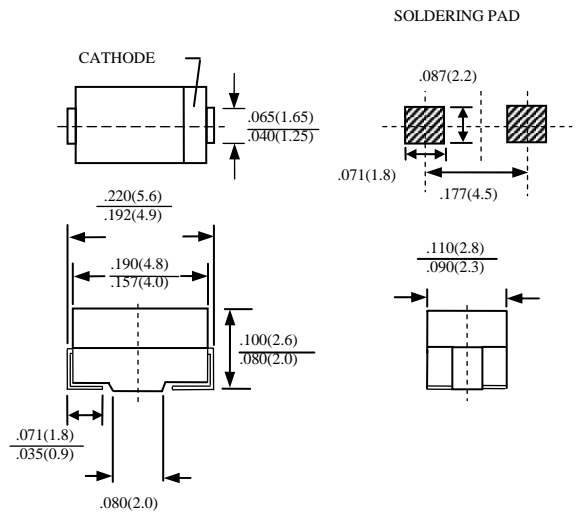
### P4SMAJ5.0 THRU P4SMAJ188A

#### 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

#### 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 5.0mm<sup>2</sup> COPPER PADS TO EACH TERMINAL
  3. LEAD TEMPERATURE AT 75°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 <sub>WM</sub> (VOLTS)	BREAKDOWN VOLTAGE V <sub>(BR)</sub> (VOLTS) at I <sub>T</sub>		TEST CURRENT I <sub>T</sub> (mA)	MAXIMUM Clamping VOLTAGE AT I <sub>PPM</sub> VC(Volts) (Note 5)	MAX PEAK PULSE SURGE CURRENT I <sub>PPM</sub> (NOTE 5) (Amps)	MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> ( $\mu$ A)
	UNI	BI		MIN	MAX				
P4SMAJ5.0	AD	WD	5.0	6.40	7.82	10	9.6	41.7	800
P4SMAJ5.0A	AE	WE	5.0	6.40	7.07	10	9.2	43.5	800
P4SMAJ6.0	AF	WF	6.0	6.67	8.15	10	11.4	35.1	800
P4SMAJ6.0A	AG	WG	6.0	6.67	7.37	10	10.3	38.8	800
P4SMAJ6.5	AH	WH	6.5	7.22	8.82	10	12.3	32.5	500
P4SMAJ6.5A	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500
P4SMAJ7.0	AL	WL	7.0	7.78	9.51	10	13.3	30.1	200
P4SMAJ7.0A	AM	WM	7.0	7.78	8.60	10	12.0	33.3	200
P4SMAJ7.5	AN	WN	7.5	8.33	10.3	1.0	14.3	28.0	100
P4SMAJ7.5A	AP	WP	7.5	8.33	9.21	1.0	12.9	31.0	100
P4SMAJ8.0	AQ	WQ	8.0	8.89	10.9	1.0	15.0	26.7	50.0
P4SMAJ8.0A	AR	WR	8.0	8.89	9.83	1.0	13.6	29.4	50.0
P4SMAJ8.5	AS	WS	8.5	9.44	11.5	1.0	15.9	25.2	10.0
P4SMAJ8.5A	AT	WT	8.5	9.44	10.4	1.0	14.4	27.8	10.0
P4SMAJ9.0	AU	WU	9.0	10.0	12.2	1.0	16.9	23.7	5.0
P4SMAJ9.0A	AV	WV	9.0	10.0	11.1	1.0	15.4	26.0	5.0
P4SMAJ10	AW	WW	10.0	11.1	13.6	1.0	18.8	21.3	5.0
P4SMAJ10A	AX	WX	10.0	11.1	12.3	1.0	17.0	23.5	5.0
P4SMAJ11	AY	WY	11.0	12.2	14.9	1.0	20.1	19.9	5.0
P4SMAJ11A	AZ	WZ	11.0	12.2	13.5	1.0	18.2	22.0	5.0
P4SMAJ12	BD	XD	12.0	13.3	16.3	1.0	22.0	18.2	5.0
P4SMAJ12A	BE	XE	12.0	13.3	14.7	1.0	19.9	20.1	5.0
P4SMAJ13	BF	XF	13.0	14.4	17.6	1.0	23.8	16.8	5.0
P4SMAJ13A	BG	XG	13.0	14.4	15.9	1.0	21.5	18.6	5.0
P4SMAJ14	BH	XH	14.0	15.6	19.1	1.0	25.8	15.5	5.0
P4SMAJ14A	BK	XK	14.0	15.6	17.2	1.0	23.2	17.2	5.0
P4SMAJ15	BL	XL	15.0	16.7	20.4	1.0	26.9	14.9	5.0
P4SMAJ15A	BM	XM	15.0	16.7	18.5	1.0	24.4	16.4	5.0
P4SMAJ16	BN	XN	16.0	17.8	21.8	1.0	28.8	13.9	5.0
P4SMAJ16A	BP	XP	16.0	17.8	19.7	1.0	26.0	15.4	5.0
P4SMAJ17	BQ	XQ	17.0	18.9	23.1	1.0	30.5	13.1	5.0
P4SMAJ17A	BR	XR	17.0	18.9	20.9	1.0	27.6	14.5	5.0
P4SMAJ18	BS	XS	18.0	20.0	24.4	1.0	32.2	12.4	5.0
P4SMAJ18A	BT	XT	18.0	20.0	22.1	1.0	29.2	13.7	5.0
P4SMAJ20	BU	XU	20.0	22.2	27.1	1.0	35.8	11.2	5.0
P4SMAJ20A	BV	XV	20.0	22.2	24.5	1.0	32.4	12.3	5.0
P4SMAJ22	BW	XW	22.0	24.4	29.8	1.0	39.4	10.2	5.0
P4SMAJ22A	BX	XX	22.0	24.4	26.9	1.0	35.5	11.3	5.0
P4SMAJ24	BY	XY	24.0	26.7	32.6	1.0	43.0	9.3	5.0
P4SMAJ24A	BZ	XZ	24.0	26.7	29.5	1.0	38.9	10.3	5.0
P4SMAJ26	CD	YD	26.0	28.9	35.3	1.0	46.6	8.6	5.0
P4SMAJ26A	CE	YE	26.0	28.9	31.9	1.0	42.1	9.5	5.0
P4SMAJ28	CF	YF	28.0	31.1	38.0	1.0	50.1	8.0	5.0
P4SMAJ28A	CG	YG	28.0	31.1	34.4	1.0	45.4	8.8	5.0
P4SMAJ30	CH	YH	30.0	33.3	40.7	1.0	53.5	7.5	5.0
P4SMAJ30A	CK	YK	30.0	33.3	36.8	1.0	48.4	8.3	5.0
P4SMAJ33	CL	YL	33.0	36.7	44.9	1.0	59.0	6.8	5.0
P4SMAJ33A	CM	YM	33.0	36.7	40.6	1.0	53.3	7.5	5.0
P4SMAJ36	CN	YN	36.0	40.0	48.9	1.0	64.3	6.2	5.0
P4SMAJ36A	CP	YP	36.0	40.0	44.2	1.0	58.1	6.9	5.0
P4SMAJ40	CQ	YQ	40.0	44.4	54.3	1.0	71.4	5.6	5.0
P4SMAJ40A	CR	YR	40.0	44.4	49.1	1.0	64.5	6.2	5.0
P4SMAJ43	CS	YS	43.0	47.8	58.4	1.0	76.7	5.2	5.0
P4SMAJ43A	CT	YT	43.0	47.8	52.8	1.0	69.4	5.8	5.0
P4SMAJ45	CU	YU	45.0	50.0	61.1	1.0	80.3	5.0	5.0
P4SMAJ45A	CV	YV	45	50.0	55.3	1.0	72.7	5.5	5.0
P4SMAJ48	CW	YW	48	53.3	65.1	1.0	85.5	4.7	5.0
P4SMAJ48A	CX	YX	48	53.3	58.9	1.0	77.4	5.2	5.0

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

FIG. 1 - PEAK PULSE POWER RATING CURVE

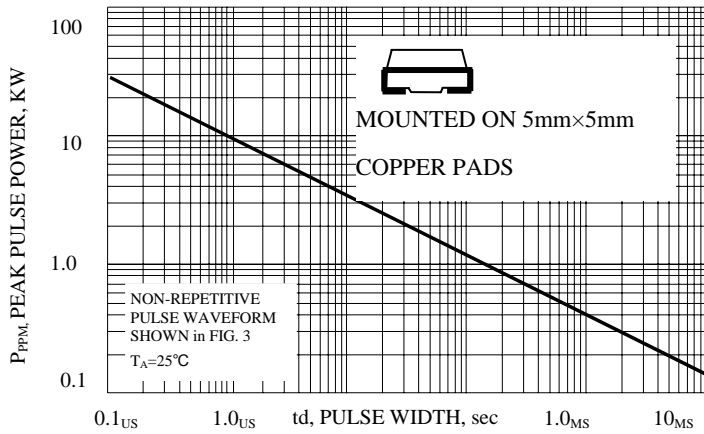


FIG. 2 - PULSE DERATING CURVE

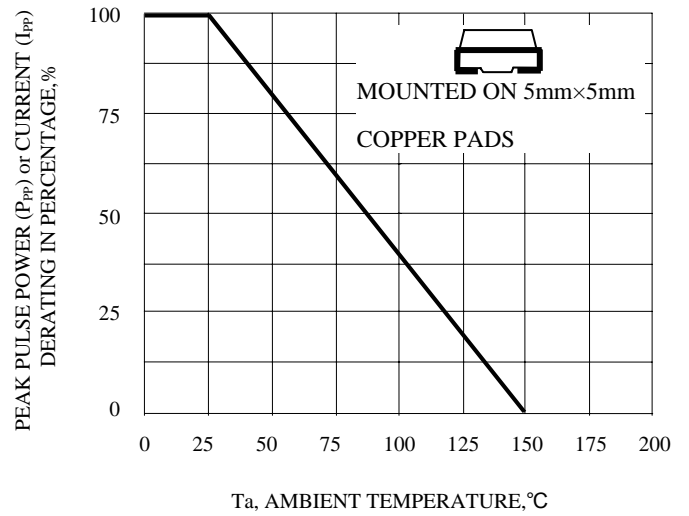


FIG. 3 - PULSE WAVEFORM

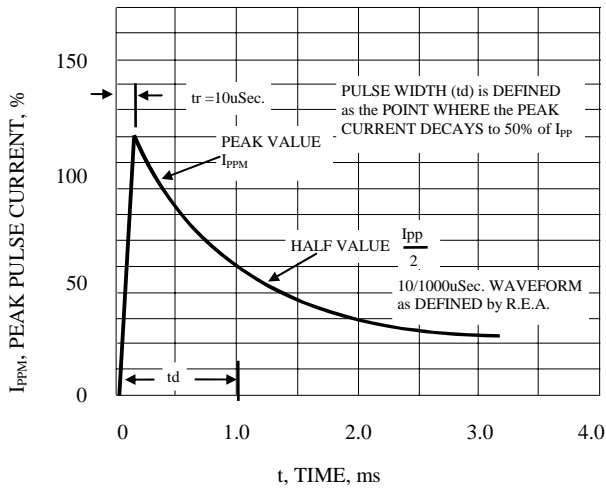


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

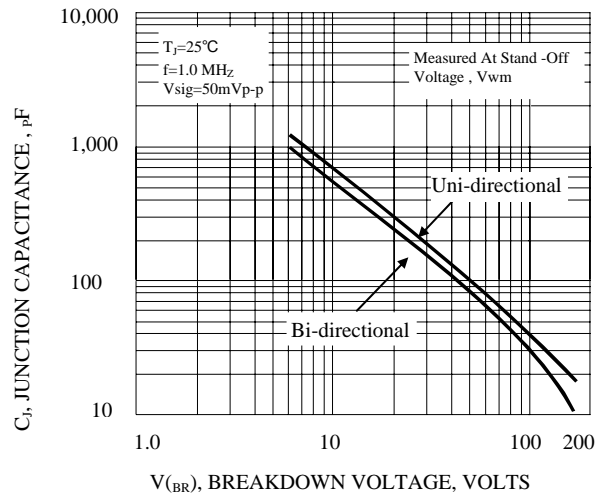


FIG. 5 - STEADY STATE POWER DERATING CURVE

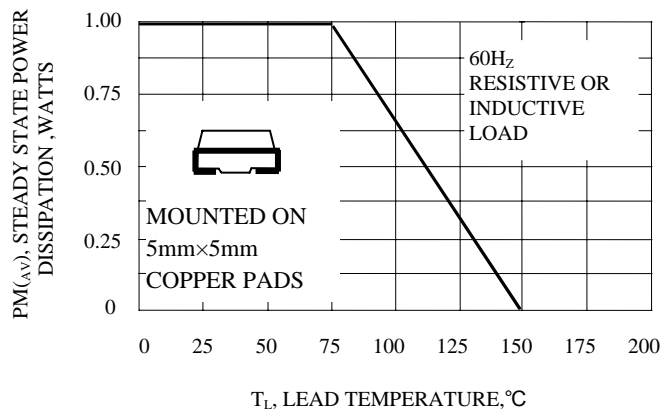


FIG. 6 - MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

