

# 3R-8 Series

## Gas Discharge Tubes



### Additional Information



Resources




Accessories



Samples

### Agency Approvals

Agency	Agency File Number
	E527857

### Description

GDT (Gas Discharge Tubes) is placed in front of, and in parallel with, sensitive telecom equipment such as power lines, communication lines, signal lines and data transmission lines to help protect them from damage caused by transient surge voltages that may result from lightning strikes and equipment switching operations. These devices do not influence the signal in normal operation. However, in the event of an overvoltage surge, such as a lightning strike, the GDT switches to a low impedance state and diverts the energy away from the sensitive equipment. Our GDTs offer a high level of surge protection, a broad voltage range, low capacitance, and many form factors including new surface mount devices, which makes them suitable for applications such as Main Distribution Frame (MDF) modules, high data-rate telecom applications (e.g. ADSL, VDSL), and surge protection on power lines. Their low capacitance also results in less signal distortion. When used in a coordinated circuit protection solution with PolySwitch devices, they can help equipment manufacturers meet stringent safety regulatory standards.

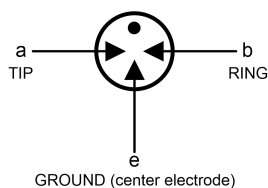
### Features

- Stable breakdown voltage
- High insulation resistance
- High current rating
- Low capacitance ( $\leq 1.5\text{pF}$ )
- Stable performance over life
- Large absorbing transient current capability
- Fast response time
- RoHS compliant
- Standard Size: 8.0mm\*10.0mm
- Meets MSL level 1, per J-STD-020
- Storage and operating temperature:  $-40^{\circ}\text{C} \sim +90^{\circ}\text{C}$

### Application

- Repeaters, Modems
- Subscriber protection
- Telephone Interface, Line cards
- Data communication equipment
- Line test equipment
- Branch exchange
- Subscriber protection
- Alarm system
- Tuner
- Antenna protection


### 3 Electrode GDT Graphical Symbol



# 3R-8 Series

## Gas Discharge Tubes

### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part Number		Device Marking Code	DC Spark-over Voltage	Maximum Impulse Spark-over Voltage	Nominal Impulse Discharge Current	Alternating Discharge Current	Impulse Life	Minimum Insulation Resistance		Maximum Capacitance	Agency Approvals 
			100V/s (V)	1000V/ $\mu\text{s}$ (V)	8/20 $\mu\text{s}$ , 10 times (kA)	50Hz, 1sec (A)	10/1000 $\mu\text{s}$ , 100A	Test Voltage	G $\Omega$	1MHz (pF)	
3R075ML-8	3R075MM-8	075	75 $\pm$ 20%	700	10	10	300 times	25VDC	1	1.5	✓
3R090ML-8	3R090MM-8	090	90 $\pm$ 20%	700	10	10	300 times	50VDC	1	1.5	✓
3R150ML-8	3R150MM-8	150	150 $\pm$ 20%	700	10	10	300 times	100VDC	1	1.5	✓
3R230ML-8	3R230MM-8	230	230 $\pm$ 20%	700	10	10	300 times	100VDC	1	1.5	✓
3R250ML-8	3R250MM-8	250	250 $\pm$ 20%	700	10	10	300 times	100VDC	1	1.5	✓
3R300ML-8	3R300MM-8	300	300 $\pm$ 20%	800	10	10	300 times	100VDC	1	1.5	✓
3R350ML-8	3R350MM-8	350	350 $\pm$ 20%	850	10	10	300 times	100VDC	1	1.5	✓
3R400ML-8	3R400MM-8	400	400 $\pm$ 20%	1000	10	10	300 times	250VDC	1	1.5	✓
3R470ML-8	3R470MM-8	470	470 $\pm$ 20%	1100	10	10	300 times	250VDC	1	1.5	✓
3R600ML-8	3R600MM-8	600	600 $\pm$ 20%	1200	10	10	300 times	250VDC	1	1.5	✓
3R075PL-8	3R075PM-8	075P	75 $\pm$ 20%	700	20	20	300 times	25VDC	1	1.5	✓
3R090PL-8	3R090PM-8	090P	90 $\pm$ 20%	700	20	20	300 times	50VDC	1	1.5	✓
3R150PL-8	3R150PM-8	150P	150 $\pm$ 20%	700	20	20	300 times	100VDC	1	1.5	✓
3R230PL-8	3R230PM-8	230P	230 $\pm$ 20%	700	20	20	300 times	100VDC	1	1.5	✓
3R250PL-8	3R250PM-8	250P	250 $\pm$ 20%	700	20	20	300 times	100VDC	1	1.5	✓
3R300PL-8	3R300PM-8	300P	300 $\pm$ 20%	800	20	20	300 times	100VDC	1	1.5	✓
3R350PL-8	3R350PM-8	350P	350 $\pm$ 20%	850	20	20	300 times	100VDC	1	1.5	✓
3R400PL-8	3R400PM-8	400P	400 $\pm$ 20%	1000	20	20	300 times	250VDC	1	1.5	✓
3R470PL-8	3R470PM-8	470P	470 $\pm$ 20%	1100	20	20	300 times	250VDC	1	1.5	✓
3R600PL-8	3R600PM-8	600P	600 $\pm$ 20%	1200	20	20	300 times	250VDC	1	1.5	✓

# 3R-8 Series

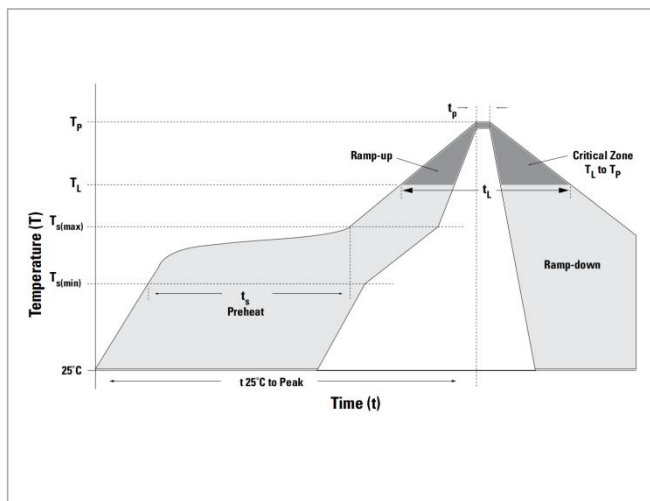
## Gas Discharge Tubes

### Test Methods and Results

Items	Test Method	Standard
DC Spark-over Voltage	measured with voltage ramp $dv/dt=100V/s$ .	To meet the specified value
Maximum Impulse Spark-over Voltage	measured with voltage ramp $dv/dt=1000V/\mu s$ .	To meet the specified value
Impulse Discharge Current	applied through center electrode with $8/20\mu s$ waveform, for 10 times with 3min interval time, which will be equally divided between each side electrode to center electrode, without causing the DC breakdown voltage to change more than 25% from its initial measured value.	To meet the specified value
Alternating Discharge Current	Rated RMS value of AC current at 50Hz, 1 sec. for 10 times with interval time 3 min. DC spark-over voltage shall not change more than $\pm 25\%$ from its initial value. Test is between each side electrode and center electrode.	To meet the specified value
Insulation Resistance	measured between each side electrodes and center electrode.	To meet the specified value
Capacitance	measured between each side electrodes and center electrode. Test frequency: 1MHz	To meet the specified value

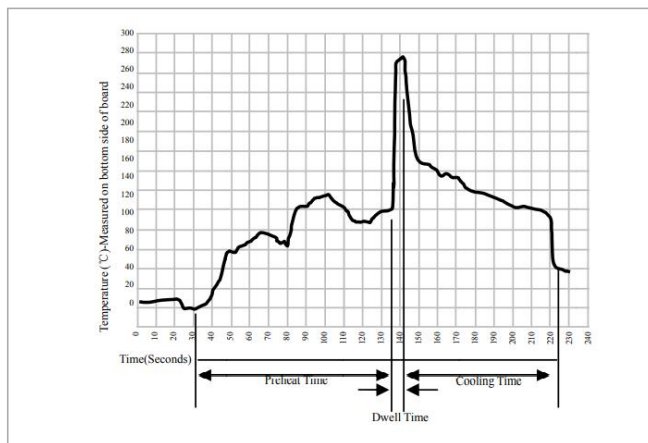
### Soldering Parameters (Reflow Soldering)

Reflow Condition		Pb-Free Assembly
Pre Heat	-Temperature Min ( $T_{s\ min}$ )	150°C
	-Temperature Max ( $T_{s\ max}$ )	200°C
	-Time (min to max) ( $t_s$ )	60-180 secs
Average ramp-up rate(Liquidus Temp ( $T_L$ ) to peak		3°C/second max.
$T_{s\ (max)}$ to $T_L$ -Ramp-up Rate		3°C/second max.
Reflow	-Temperature ( $T_L$ ) (Liquidus)	217°C
	-Time (min to max) ( $t_L$ )	60-150 seconds
Peak Temperature ( $T_p$ )		260°C
Time within 5°C of actual Peak Temperature ( $t_p$ )		20-40 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature		8 minutes max.
Do not exceed		260°C



### Soldering Parameters (Wave Soldering)

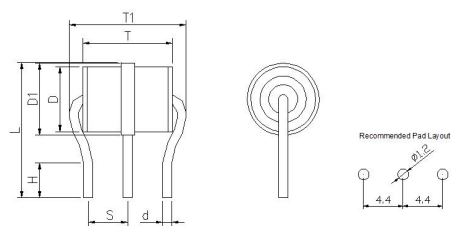
Item	Conditions
Temperature minimum	100°C
Temperature maximum	150°C
Preheat Time	60~180 seconds
Solder Pot Temperature	280°C Maximum
Solder Dwell Time	2~5 seconds



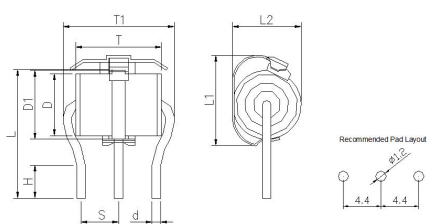
# 3R-8 Series

## Gas Discharge Tubes

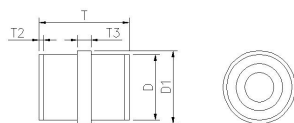
### Dimensions



L type



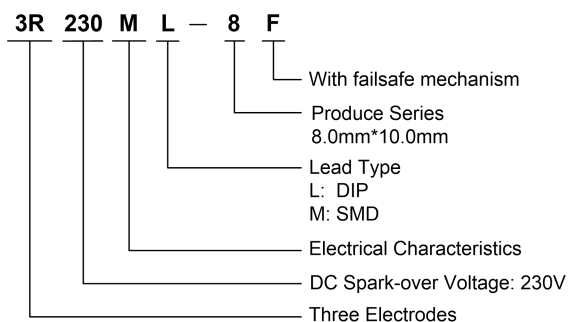
L-F type



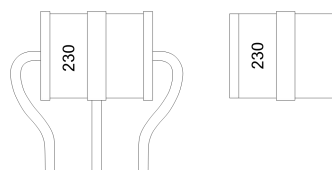
M type

Symbol	Millimeters	Inches
D	$7.2 \pm 0.3$	$0.283 \pm 0.012$
D1	$8.0 \pm 0.3$	$0.315 \pm 0.012$
T	$10.0 \pm 0.5$	$0.394 \pm 0.020$
T1	$13.5 + 0.5 / - 1.0$	$0.531 + 0.020 / - 0.039$
T2	$0.5 \pm 0.2$	$0.020 \pm 0.008$
T3	$1.6 \pm 0.2$	$0.063 \pm 0.008$
L	$15.0 \pm 0.5$	$0.591 \pm 0.020$
H	$4.5 + 1.5 / - 0$	$0.177 + 0.059 / - 0$
S	$4.4 \pm 0.4$	$0.173 \pm 0.016$
d	$1.0 \pm 0.1$	$0.039 \pm 0.004$
L1	$9.8 \pm 0.4$	$0.386 \pm 0.016$
L2	$8.1 \pm 0.3$	$0.319 \pm 0.012$

### Part Numbering System



### Part Marking System



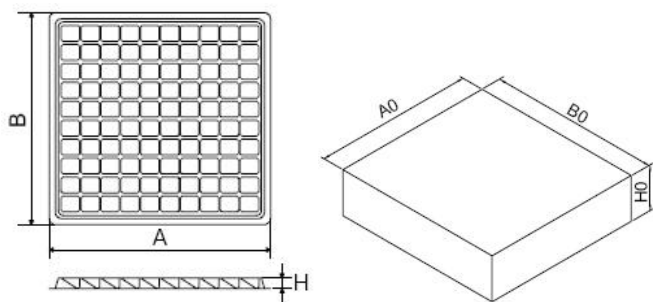
# 3R-8 Series

## Gas Discharge Tubes

### Packaging Specification

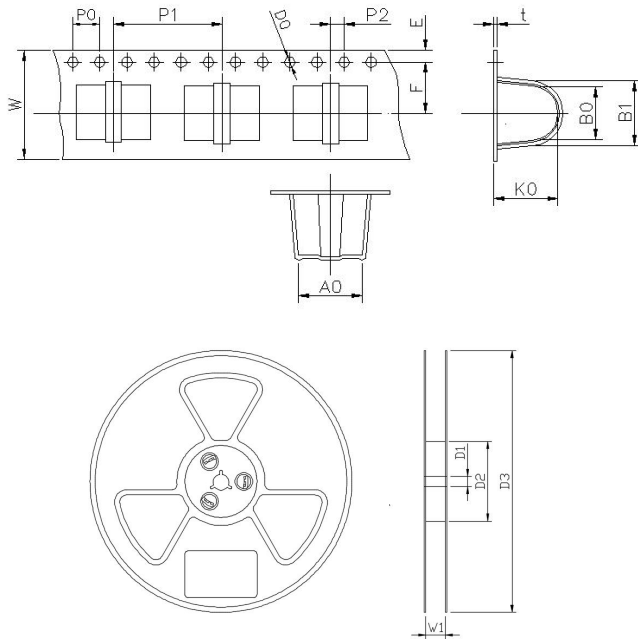
Part number	Quantity	Packaging Option
3RxxxXL-8	500	Bulk - 100pcs per tray, 5 trays per inner box
3RxxxXM-8	300	Tape & Reel - 16mm tape/13" reel

### Axial Packing (Tray & Inner box)



Symbol	Millimeters	Inches
A	$220.0 \pm 2.0$	$8.661 \pm 0.079$
B	$215.0 \pm 2.0$	$8.465 \pm 0.079$
H	$12.0 \pm 0.5$	$0.472 \pm 0.020$
A0	$225.0 \pm 2.0$	$8.858 \pm 0.079$
B0	$210.0 \pm 2.0$	$8.268 \pm 0.079$
H0	$60.0 \pm 2.0$	$2.362 \pm 0.079$

### SMD Packing (Tape & Reel)



Symbol	Millimeters	Inches
W	$16.0 \pm 0.2$	$0.630 \pm 0.008$
P0	$4.0 \pm 0.1$	$0.157 \pm 0.004$
P1	$16.0 \pm 0.1$	$0.630 \pm 0.004$
P2	$2.0 \pm 0.1$	$0.079 \pm 0.004$
D0	$1.55 \pm 0.1$	$0.061 \pm 0.004$
E	$1.75 \pm 0.1$	$0.069 \pm 0.004$
F	$7.5 \pm 0.1$	$0.295 \pm 0.004$
A0	$11.0 \pm 0.1$	$0.433 \pm 0.004$
K0	$8.9 \pm 0.1$	$0.350 \pm 0.004$
B0	$8.5 \pm 0.1$	$0.335 \pm 0.004$
B1	$9.5 \pm 0.1$	$0.374 \pm 0.004$
t	$0.5 \pm 0.05$	$0.020 \pm 0.002$
D1	$13.3 \pm 1.0$	$0.524 \pm 0.039$
D2	$100.0 \pm 2.0$	$3.937 \pm 0.079$
D3	$330.0 \pm 2.0$	$12.992 \pm 0.079$
W1	$16.5 \pm 0.5$	$0.650 \pm 0.020$

**Disclaimer Notice** - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Liown products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.liownsemi.com>