# CHENMKO ENTERPRISE CO.,LTD

## SURFACE MOUNT ZENER

*SILICON PLANAR POWER ZENER DIODES*

*VOLTAGE RANGE 2.4V TO 91V*

**MMPZ5221BPT**

**THRU**

**MMPZ5270BPT**

Lead free devices

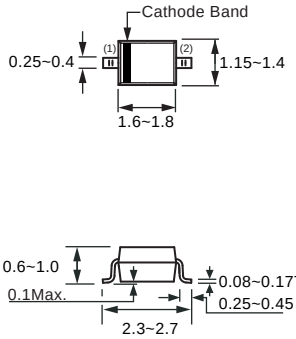
### FEATURE

* High temperature soldering type.
* ESD rating of class 3(>16 kV) per human body model.
* Silicon planar zener diodes.
* Silcon-oxide passivated junction.
* Low temperature coefficient voltage
* 225 mW Rating on FR-4 or FR-5 Board

### MECHANICAL

* Voild-free, Transfer-molded, Thermosetting plastic case
* SC-76/SOD-323 Packaging.
* Cathode indicated by polarity band.
* Mounting position: Any.

SC-76/SOD-323




Dimensions in millimeters

SC-76/SOD-323

### CIRCUIT


**MAXIMUM RATINGES** ( At $T_A$ = 25°C unless otherwise noted )

| RATINGS | SYMBOL | VALUE | UNITS |
|---|---|---|---|
| Zener Current ( see Table "Characteristics" ) | - | - | - |
| Max. Steady State Power Dissipation @$T_A$=25°C | $P_D$ | 225 | mW |
| Max. Operating Temperature Range | $T_J$ | -65 to +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -65 to +150 | °C |

**ELECTRICAL CHARACTERISTICS** ( At $T_A$ = 25°C unless otherwise noted )

| CHARACTERISTICS | SYMBOL | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | - | - | 550 | °C/W |
| Max. Instantaneous Forward Voltage at $I_F$= 10mA | $V_F$ | - | - | 0.9 | Volts |

2003-01

NOTES :
1. The JEDEC type numbers listd have a standaerd tolerance on the normal zener voltage of ±10%, Suffix B=±5%.
2. The zener impedance is derived from 1KHz AC voltage, which results when an AC current having an RMS value equal to 10% of DC zener current ($I_{ZT}$ or $I_{ZK}$) is superimposed on $I_{ZT}$ or $I_{ZK}$. Zener impedance is measured at two points to insure a sharp knee on the breakdown curve to eliminate unstable units.
3. Valid provided that electrodes at distance of 10mm from case are kept ambient temperature.
4. Measured under thermal equilibrium and DC test conditions.
5. The rating listd in the electrical characteristics table is maximum peak, non-repetitive, reverse surge current of 1/2 square wave or equivalent sine wave pulse of 1/120 second duration superimposed on the test current, $I_{ZT}$, per JEDEC registration.

# ELECTRICAL CHARACTERISTICS ( MMPZ5221BPT THRU MMPZ5270BPT )

| TYPE | Zener voltage $V_Z$ (V) @ $I_{ZT}$ | | | Test current | Maximum Zener impedance | | | Maximum reverse leakage current | | Type temperature coefficient at $T_A$= 25°C $\theta_{VZ}$ (%/°C) | Maximum regulator current at $T_A$= 50°C $I_{ZM}$ (mA) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Nom | Max | | $Z_{ZT}$ at $I_{ZT}$ | $Z_{ZK}$ | at $I_{ZK}$ | $I_R$ | at $V_R$ | | |
| | Volts | Volts | Volts | $I_{ZT}$ (mA) | (Ω) | (Ω) | (mA) | (uA) | (V) | | |
| MMPZ5221BPT | 2.280 | 2.4 | 2.520 | 5 | 100 | 1800 | 0.25 | 100 | 1 | -0.085 | 85 |
| MMPZ5222BPT | 2.375 | 2.5 | 2.625 | 5 | 100 | 1800 | 0.25 | 100 | 1 | -0.085 | 82 |
| MMPZ5223BPT | 2.565 | 2.7 | 2.835 | 5 | 100 | 1900 | 0.25 | 75 | 1 | -0.080 | 76 |
| MMPZ5224BPT | 2.660 | 2.8 | 2.940 | 5 | 100 | 1900 | 0.25 | 75 | 1 | -0.080 | 73 |
| MMPZ5225BPT | 2.850 | 3.0 | 3.150 | 5 | 95 | 2000 | 0.25 | 50 | 1 | -0.075 | 68 |
| MMPZ5226BPT | 3.135 | 3.3 | 3.465 | 5 | 95 | 2200 | 0.25 | 25 | 1 | -0.070 | 62 |
| MMPZ5227BPT | 3.420 | 3.6 | 3.780 | 5 | 90 | 2300 | 0.25 | 15 | 1 | -0.065 | 57 |
| MMPZ5228BPT | 3.705 | 3.9 | 4.095 | 5 | 90 | 2400 | 0.25 | 10 | 1 | -0.060 | 52 |
| MMPZ5229BPT | 4.085 | 4.3 | 4.515 | 5 | 88 | 2500 | 0.25 | 5 | 1 | -0.055 | 48 |
| MMPZ5230BPT | 4.465 | 4.7 | 4.935 | 5 | 70 | 2200 | 0.25 | 3 | 1.5 | +0.030 | 44 |
| MMPZ5231BPT | 4.845 | 5.1 | 5.355 | 5 | 50 | 2050 | 0.25 | 2 | 2 | +0.030 | 40 |
| MMPZ5232BPT | 5.320 | 5.6 | 5.880 | 5 | 25 | 1800 | 0.25 | 5 | 3 | +0.038 | 36 |
| MMPZ5233BPT | 5.700 | 6.0 | 6.300 | 5 | 25 | 1800 | 0.25 | 5 | 3 | +0.038 | 34 |
| MMPZ5234BPT | 5.890 | 6.2 | 6.510 | 5 | 10 | 1300 | 0.25 | 1 | 4 | +0.045 | 33 |
| MMPZ5235BPT | 6.460 | 6.8 | 7.140 | 5 | 8 | 750 | 0.25 | 1 | 5.2 | +0.050 | 30 |
| MMPZ5236BPT | 7.125 | 7.5 | 7.875 | 5 | 7 | 600 | 0.25 | 0.5 | 6 | +0.058 | 27 |
| MMPZ5237BPT | 7.790 | 8.2 | 8.610 | 5 | 7 | 600 | 0.25 | 0.5 | 6.5 | +0.062 | 25 |
| MMPZ5238BPT | 8.265 | 8.7 | 9.135 | 5 | 7 | 600 | 0.25 | 0.5 | 6.5 | +0.065 | 23 |
| MMPZ5239BPT | 8.645 | 9.1 | 9.555 | 5 | 10 | 600 | 0.25 | 0.1 | 7 | +0.068 | 22 |
| MMPZ5240BPT | 9.500 | 10 | 10.50 | 5 | 15 | 600 | 0.25 | 0.1 | 8 | +0.075 | 20 |
| MMPZ5241BPT | 10.45 | 11 | 11.55 | 5 | 18 | 600 | 0.25 | 0.1 | 8.4 | +0.076 | 18 |
| MMPZ5242BPT | 11.40 | 12 | 12.60 | 5 | 22 | 600 | 0.25 | 0.1 | 9.1 | +0.077 | 17 |
| MMPZ5243BPT | 12.35 | 13 | 13.65 | 5 | 25 | 600 | 0.25 | 0.1 | 9.9 | +0.079 | 16 |
| MMPZ5244BPT | 13.30 | 14 | 14.70 | 5 | 25 | 600 | 0.25 | 0.1 | 10 | +0.082 | 14 |
| MMPZ5245BPT | 14.25 | 15 | 15.75 | 5 | 32 | 600 | 0.25 | 0.1 | 11 | +0.082 | 13 |
| MMPZ5246BPT | 15.20 | 16 | 16.80 | 5 | 36 | 600 | 0.25 | 0.1 | 12 | +0.083 | 12.5 |
| MMPZ5247BPT | 16.15 | 17 | 17.85 | 5 | 36 | 600 | 0.25 | 0.1 | 13 | +0.084 | 12.1 |
| MMPZ5248BPT | 17.10 | 18 | 18.90 | 5 | 42 | 600 | 0.25 | 0.1 | 14 | +0.085 | 11.2 |
| MMPZ5249BPT | 18.05 | 19 | 19.95 | 5 | 42 | 600 | 0.25 | 0.1 | 14 | +0.086 | 10.8 |
| MMPZ5250BPT | 19.00 | 20 | 21.00 | 5 | 48 | 600 | 0.25 | 0.1 | 16 | +0.086 | 10.3 |
| MMPZ5251BPT | 20.90 | 22 | 23.10 | 5 | 55 | 600 | 0.25 | 0.1 | 17 | +0.087 | 9.4 |
| MMPZ5252BPT | 22.80 | 24 | 25.20 | 5 | 62 | 600 | 0.25 | 0.1 | 18 | +0.088 | 8.6 |
| MMPZ5253BPT | 23.75 | 25 | 26.25 | 5 | 62 | 600 | 0.25 | 0.1 | 19 | +0.089 | 7.6 |
| MMPZ5254BPT | 25.65 | 27 | 28.35 | 5 | 70 | 600 | 0.25 | 0.1 | 21 | +0.090 | 7.5 |
| MMPZ5255BPT | 26.60 | 28 | 29.40 | 5 | 44 | 600 | 0.25 | 0.1 | 21 | +0.091 | 7.3 |
| MMPZ5256BPT | 28.50 | 30 | 31.50 | 5 | 78 | 600 | 0.25 | 0.1 | 23 | +0.091 | 6.8 |
| MMPZ5257BPT | 31.35 | 33 | 34.65 | 5 | 88 | 700 | 0.25 | 0.1 | 25 | +0.092 | 6.2 |

# ELECTRICAL CHARACTERISTICS ( MMPZ5221BPT THRU MMPZ5270BPT )

| TYPE | Zener voltage $V_Z$ (V) @ $I_{ZT}$ | | | Test current | Maximum Zener impedance | | | Maximum reverse leakage current | | Type temperature coefficient at $T_A$= 25°C $\theta_{VZ}$ (%/°C) | Maximum regulator current at $T_A$= 50°C $I_{ZM}$ (mA) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Nom | Max | | $Z_{ZT}$ at $I_{ZT}$ | $Z_{ZK}$ | at $I_{ZK}$ | $I_R$ | at $V_R$ | | |
| | Volts | Volts | Volts | $I_{ZT}$ (mA) | (Ω) | (Ω) | (mA) | (uA) | (V) | | |
| MMPZ5258BPT | 34.20 | 36 | 37.80 | 5 | 95 | 700 | 0.25 | 0.1 | 27 | +0.093 | 5.8 |
| MMPZ5259BPT | 37.05 | 39 | 40.95 | 5 | 130 | 800 | 0.25 | 0.1 | 30 | +0.094 | 5.4 |
| MMPZ5260BPT | 40.85 | 43 | 45.15 | 3.0 | 93 | 900 | 0.25 | 0.1 | 33 | +0.095 | 4.9 |
| MMPZ5261BPT | 44.65 | 47 | 49.35 | 2.7 | 105 | 1000 | 0.25 | 0.1 | 36 | +0.095 | 4.5 |
| MMPZ5262BPT | 48.45 | 51 | 53.55 | 2.5 | 125 | 1100 | 0.25 | 0.1 | 39 | +0.096 | 4.2 |
| MMPZ5263BPT | 53.20 | 56 | 58.80 | 2.2 | 150 | 1300 | 0.25 | 0.1 | 43 | +0.096 | 3.8 |
| MMPZ5264BPT | 57.00 | 60 | 63.00 | 2.1 | 170 | 1400 | 0.25 | 0.1 | 46 | +0.097 | 3.5 |
| MMPZ5265BPT | 58.90 | 62 | 65.10 | 2.0 | 185 | 1400 | 0.25 | 0.1 | 47 | +0.097 | - |
| MMPZ5266BPT | 64.60 | 68 | 71.40 | 1.8 | 230 | 1600 | 0.25 | 0.1 | 52 | +0.097 | - |
| MMPZ5267BPT | 71.25 | 75 | 78.75 | 1.7 | 270 | 1700 | 0.25 | 0.1 | 56 | +0.098 | - |
| MMPZ5268BPT | 77.90 | 82 | 86.10 | 1.5 | 330 | 2000 | 0.25 | 0.1 | 62 | +0.098 | - |
| MMPZ5269BPT | 82.65 | 87 | 91.35 | 1.4 | 370 | 2200 | 0.25 | 0.1 | 68 | +0.099 | - |
| MMPZ5270BPT | 86.45 | 91 | 95.55 | 1.4 | 400 | 2300 | 0.25 | 0.1 | 69 | +0.099 | - |

# RATING CHARACTERISTIC CURVES ( MMPZ5221BPT THRU MMPZ5270BPT )

FIG. 1 - TEMPERATURE COEFFICIENTS)
(TEMPERATURE RANGE 55°C TO +150°C)

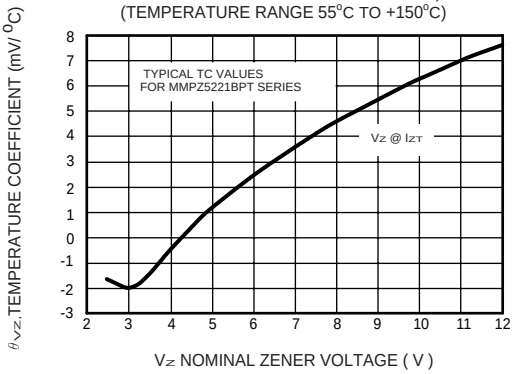



FIG. 2 - TEMPERATURE COEFFICIENTS)
(TEMPERATURE RANGE 55°C TO +150°C)

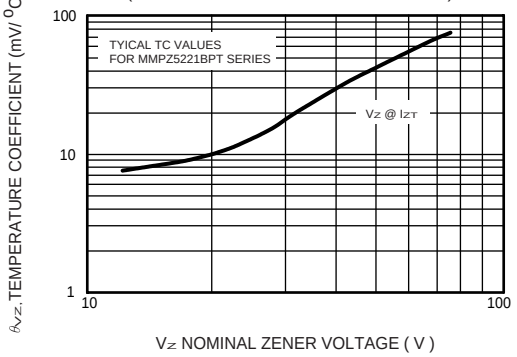



FIG. 3 - EFFECT OF ZENER VOLTAGE ON
ZENER IMPEDANCE

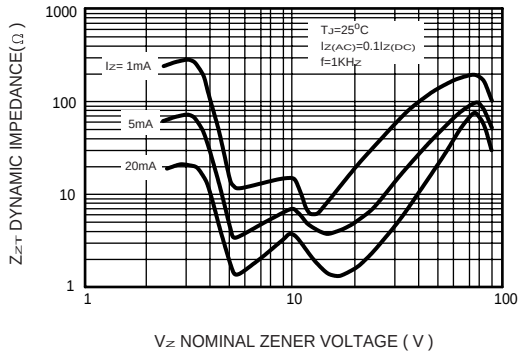
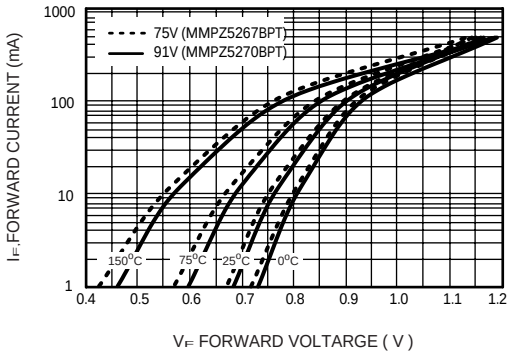



FIG. 4 - TYPICAL FORWARD VOLTAGE



# RATING CHARACTERISTIC CURVES ( MMPZ5221BPT THRU MMPZ5270BPT )

FIG. 5 - TYPICAL CAPACITANCE

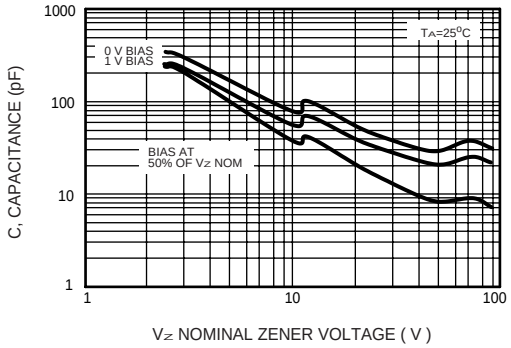



FIG. 6 - TYPICAL LEAKAGE CURRENT

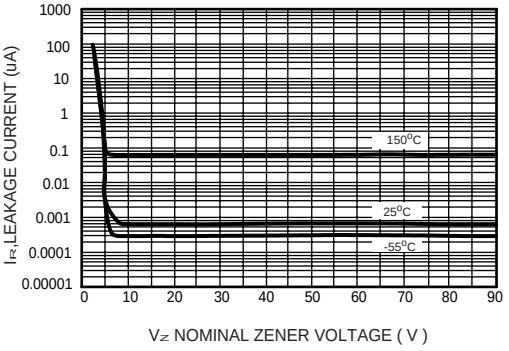



FIG. 7 - ZENER VOLTAGE VERSUS ZENER CURRENT (VZ UP TO 12V)

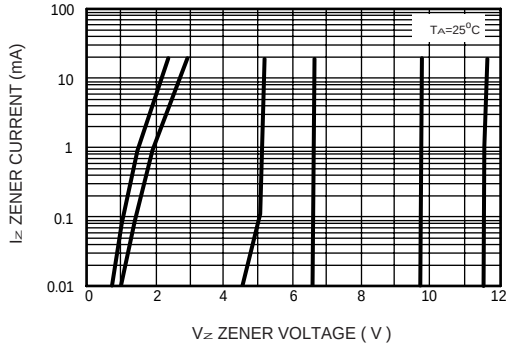



FIG. 8 - ZENER VOLTAGE VERSUS ZENER CURRENT (12V TO 91V)