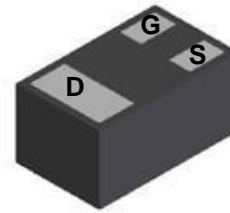
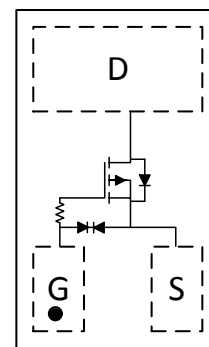


WPM2049
Single P-Channel, -20V, -0.51A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

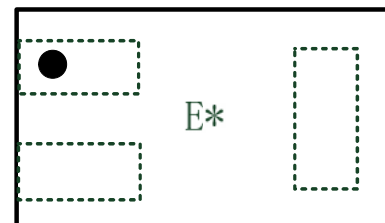
| V_{DS} (V) | Typical $R_{DS(on)}$ () |
|--------------|--------------------------|
| -20 | 0.480@ $V_{GS}=-4.5V$ |
| | 0.620@ $V_{GS}=-2.5V$ |
| | 0.780@ $V_{GS}=-1.8V$ |


DFN1006-3L
Descriptions

The WPM2049 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2049 is Pb-free and Halogen-free.


Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package DFN1006-3L

Pin configuration (Top view)


E = Device Code

* = Month (A~Z)

Marking
Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

| Device | Package | Shipping |
|--------------|------------|---------------|
| WPM2049-3/TR | DFN1006-3L | 10K/Reel&Tape |

Absolute Maximum ratings

| Parameter | | Symbol | 10 S | Steady State | Unit |
|--|------------------------|-----------|------------|--------------|------------------|
| Drain-Source Voltage | | V_{DS} | -20 | | V |
| Gate-Source Voltage | | V_{GS} | ± 5 | | |
| Continuous Drain Current ^{a d} | $T_A=25^\circ\text{C}$ | I_D | -0.51 | -0.47 | A |
| | $T_A=70^\circ\text{C}$ | | -0.41 | -0.38 | |
| Maximum Power Dissipation ^{a d} | $T_A=25^\circ\text{C}$ | P_D | 0.31 | 0.27 | W |
| | $T_A=70^\circ\text{C}$ | | 0.20 | 0.17 | |
| Continuous Drain Current ^{b d} | $T_A=25^\circ\text{C}$ | I_D | -0.48 | -0.45 | A |
| | $T_A=70^\circ\text{C}$ | | -0.38 | -0.36 | |
| Maximum Power Dissipation ^{b d} | $T_A=25^\circ\text{C}$ | P_D | 0.28 | 0.24 | W |
| | $T_A=70^\circ\text{C}$ | | 0.18 | 0.15 | |
| Pulsed Drain Current ^c | | I_{DM} | -1.2 | | A |
| Operating Junction Temperature | | T_J | 150 | | $^\circ\text{C}$ |
| Lead Temperature | | T_L | 260 | | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{stg} | -55 to 150 | | $^\circ\text{C}$ |

Thermal resistance ratings

| Parameter | | Symbol | Typical | Maximum | Unit |
|---|--------------|----------|---------|---------|--------------------|
| Junction-to-Ambient Thermal Resistance ^a | t 10 s | R_{JA} | 340 | 395 | $^\circ\text{C/W}$ |
| | Steady State | | 390 | 455 | |
| Junction-to-Ambient Thermal Resistance ^b | t 10 s | R_{JA} | 387 | 441 | |
| | Steady State | | 445 | 505 | |
| Junction-to-Case Thermal Resistance | | R_{JC} | 240 | 285 | |

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR4 board using minimum pad size, 1oz copper

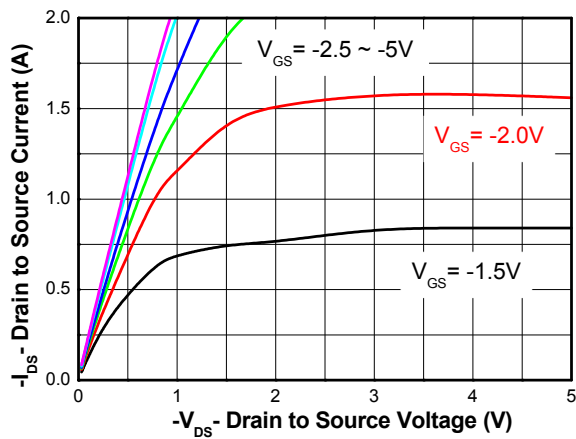
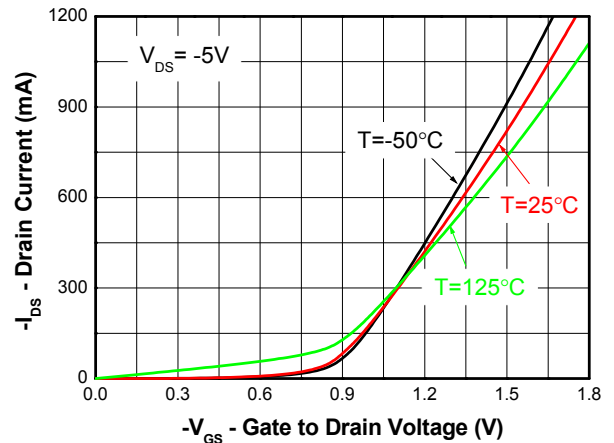
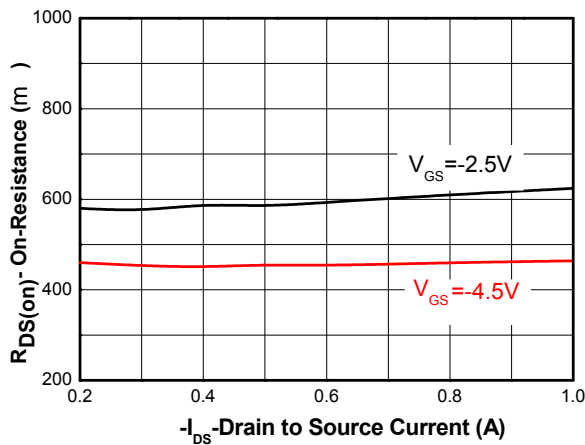
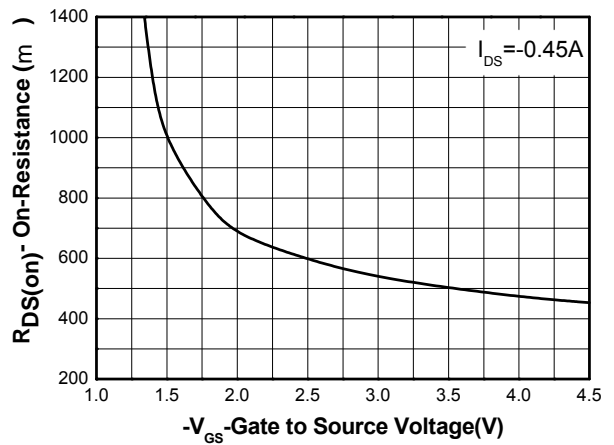
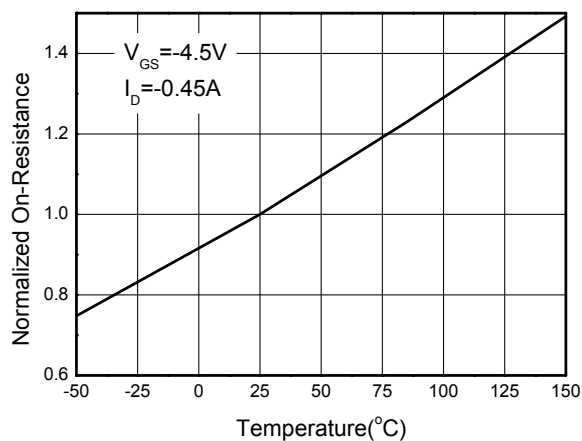
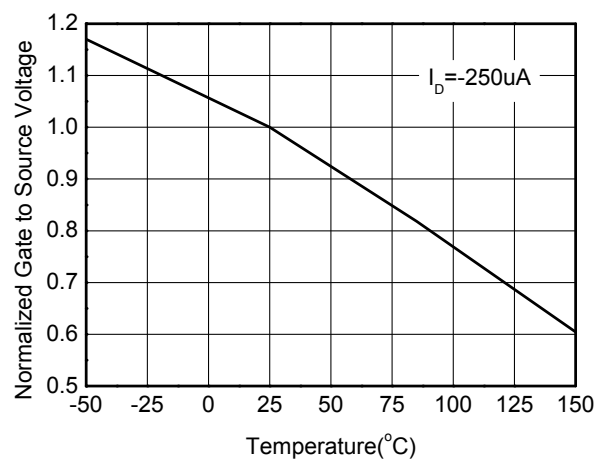
c Pulse width < 380 μs , Single pulse

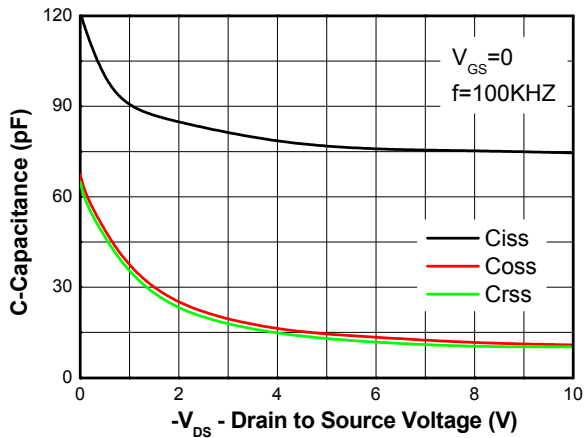
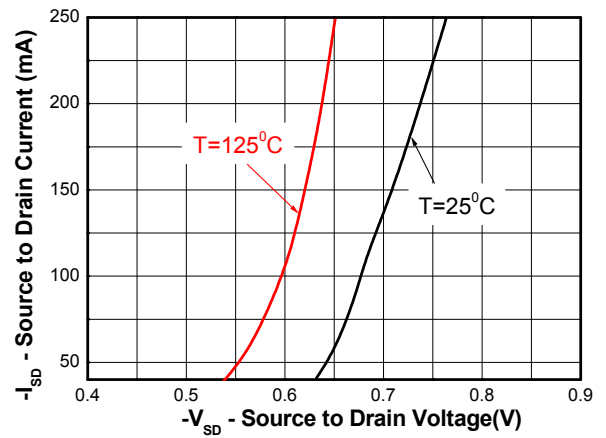
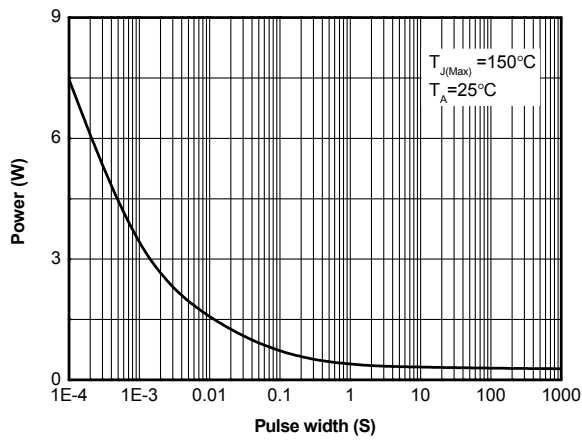
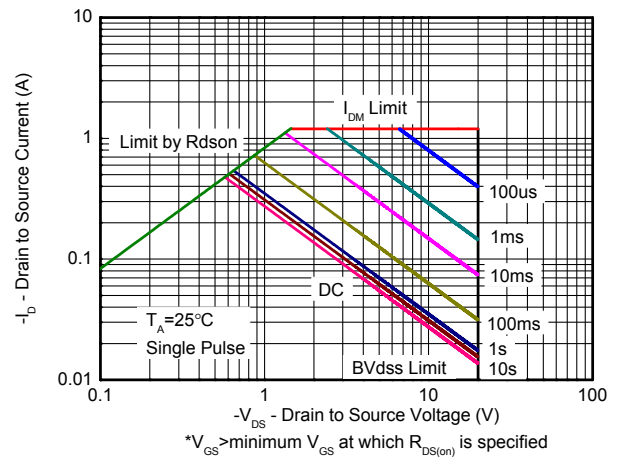
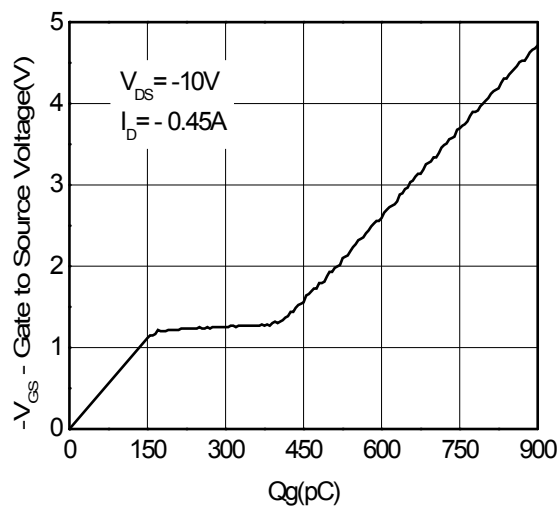
d Maximum junction temperature $T_J=150^\circ\text{C}$.

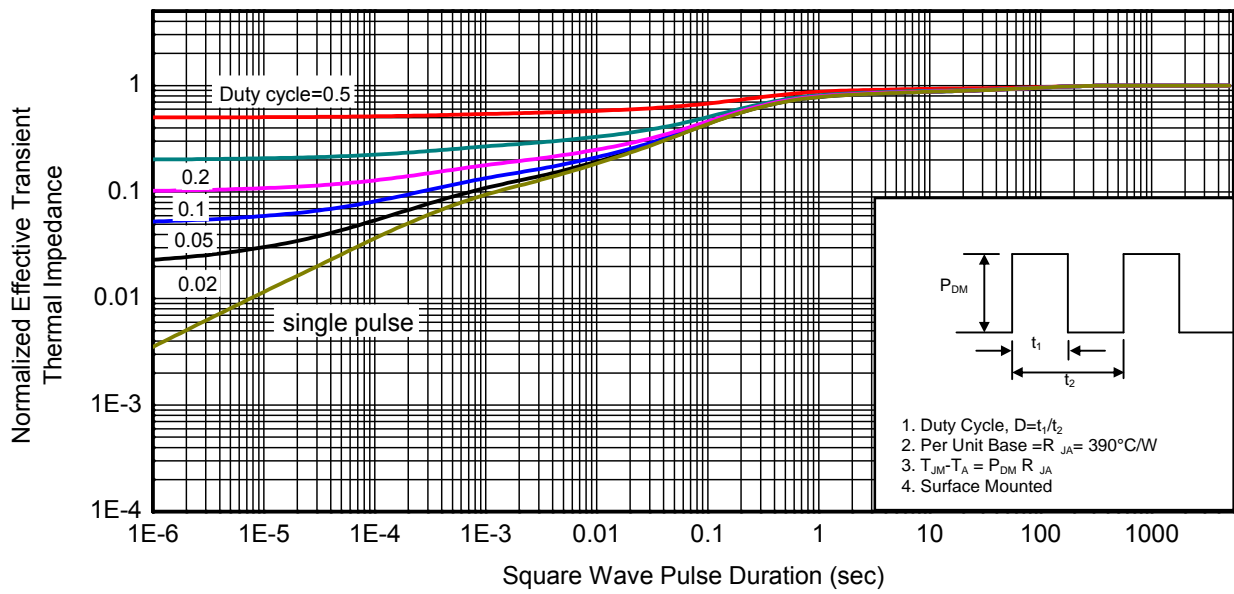
e Pulse test: Pulse width < 380 us duty cycle < 2%.

Electronics Characteristics (Ta=25°C, unless otherwise noted)

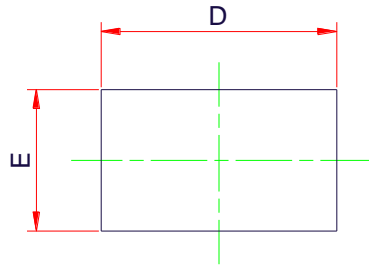
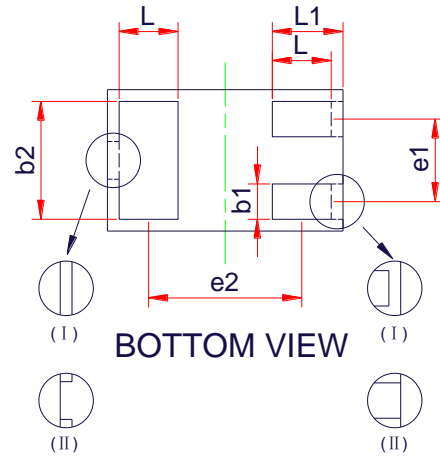
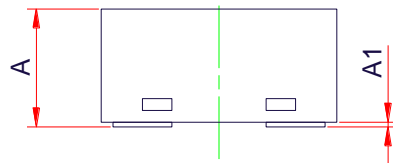
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|--------------|--|-------|-------|---------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-to-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$ | -20 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$ | | | -1 | μA |
| Gate-to-source Leakage Current | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$ | | | ± 5 | μA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = -250\mu\text{A}$ | -0.45 | -0.55 | -0.85 | V |
| Drain-to-source On-resistance ^e | $R_{DS(on)}$ | $V_{GS} = -4.5\text{ V}, I_D = -0.45\text{ A}$ | | | 850 | m |
| | | $V_{GS} = -2.5\text{ V}, I_D = -0.35\text{ A}$ | | | 1050 | |
| | | $V_{GS} = -1.8\text{ V}, I_D = -0.25\text{ A}$ | | | 1300 | |
| Forward Transconductance | g_{FS} | $V_{DS} = -5\text{ V}, I_D = -0.45\text{ A}$ | | | 15 | S |
| CHARGES, CAPACITANCES AND GATE RESISTANCE | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS} = 0\text{ V}, f = 100\text{ KHz}, V_{DS} = -10\text{ V}$ | | 74.5 | | pF |
| Output Capacitance | C_{OSS} | | | 10.8 | | |
| Reverse Transfer Capacitance | C_{RSS} | | | 10.2 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -0.45\text{ A}$ | | 0.88 | | nC |
| Threshold Gate Charge | $Q_{G(TH)}$ | | | 0.07 | | |
| Gate-to-Source Charge | Q_{GS} | | | 0.15 | | |
| Gate-to-Drain Charge | Q_{GD} | | | 0.28 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | $t_d(ON)$ | $V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -0.45\text{ A}, R_G = 6$ | | 45 | | ns |
| Rise Time | t_r | | | 140 | | |
| Turn-Off Delay Time | $t_d(OFF)$ | | | 1500 | | |
| Fall Time | t_f | | | 2100 | | |
| BODY DIODE CHARACTERISTICS | | | | | | |
| Forward Voltage | V_{SD} | $V_{GS} = 0\text{ V}, I_S = -0.15\text{ A}$ | | | -1.5 | V |

Typical Characteristics (Ta=25°C, unless otherwise noted)

Output characteristics

Transfer characteristics

On-Resistance vs. Drain current

On-Resistance vs. Gate-to-Source voltage

On-Resistance vs. Junction temperature

Threshold voltage vs. Temperature

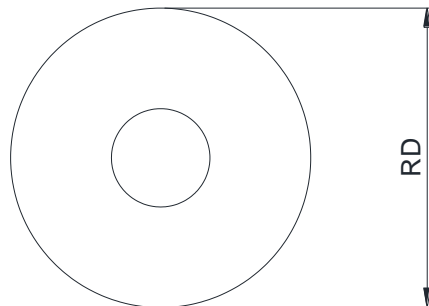
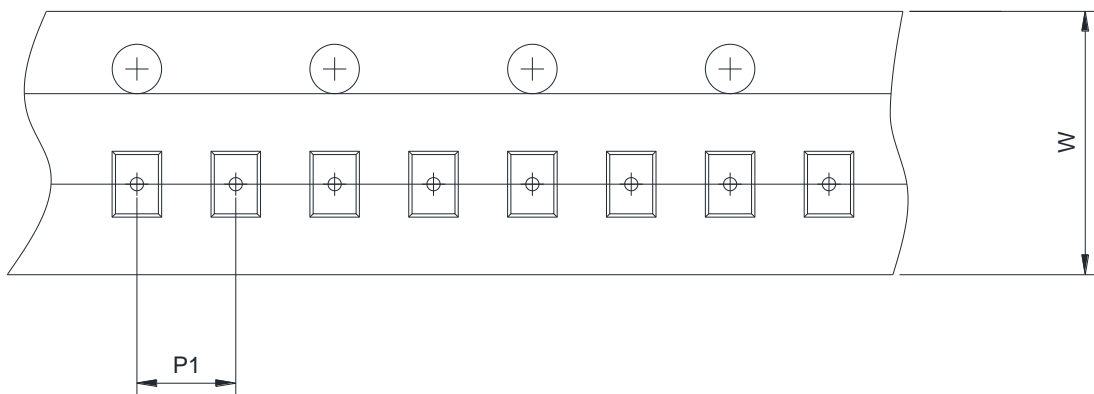
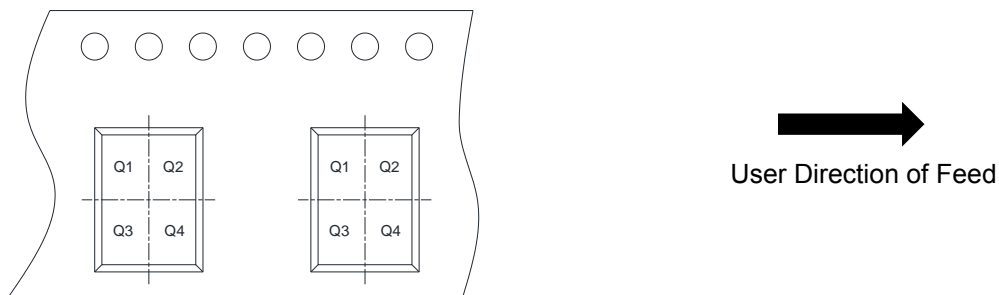

Capacitance

Body diode forward voltage

Single pulse power

Safe operating power




Transient thermal response (Junction-to-Ambient)

Package outline dimensions
DFN1006 3L

TOP VIEW

BOTTOM VIEW

SIDE VIEW

| Symbol | Dimensions in Millimeters | | |
|--------|---------------------------|------|------|
| | Min. | Typ. | Max. |
| A | 0.36 | - | 0.50 |
| A1 | 0.00 | - | 0.05 |
| D | 0.95 | 1.00 | 1.05 |
| E | 0.55 | 0.60 | 0.65 |
| b1 | 0.10 | 0.15 | 0.20 |
| b2 | 0.40 | 0.50 | 0.60 |
| L | 0.20 | 0.25 | 0.30 |
| L1 | 0.20 | 0.30 | 0.40 |
| e1 | 0.35Ref | | |
| e2 | 0.65 Ref | | |

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape


| | | | |
|------|---|---|--|
| RD | Reel Dimension | <input checked="" type="checkbox"/> 7inch | <input type="checkbox"/> 13inch |
| W | Overall width of the carrier tape | <input checked="" type="checkbox"/> 8mm | <input type="checkbox"/> 12mm <input type="checkbox"/> 16mm |
| P1 | Pitch between successive cavity centers | <input checked="" type="checkbox"/> 2mm | <input type="checkbox"/> 4mm <input type="checkbox"/> 8mm |
| Pin1 | Pin1 Quadrant | <input type="checkbox"/> Q1 | <input checked="" type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4 |