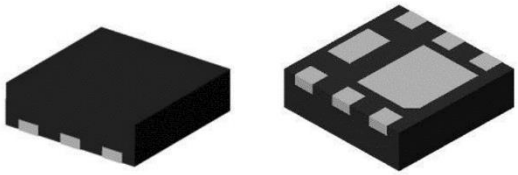
# WNM3602A

## SingleN-Channel, 30V,20.8A,Power MOSFET

http://www. omnivision-group.com

| $V_{DS}$ (V) | Max. $R_{DS(on)}$ (mΩ) |
|---|---|
| 30 | 4.7 @$V_{GS}$=10V |
| | 7.3 @$V_{GS}$=4.5V |



## Description

The WNM3602A is N-Channel enhancement MOS Field Effect Transistor. This N-Channel MOSFET is produced using advanced Split Gate Trench process that has been optimized for Rdson, switching performance and ruggedness.

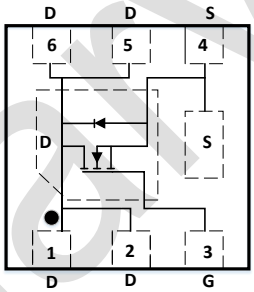
## Features

- Split Gate Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Package DFN2x2-6L

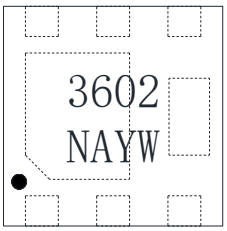
## Applications

- DC/DC converters
- Power supply converters circuit
- Power Switching for portable device

## DFN2x2-6L




**Pin configuration (Top view)**




3602 = Device Code
NA = Special Code
Y = Year
W = Week(A~Z)

**Marking**

## Order information

| Device | Package | Shipping |
|---|---|---|
| WNM3602A | DFN2x2-6L | 3000/Tape&Reel |

## Absolute Maximum ratings

| Parameter | | Symbol | Maximum | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current [e] | $T_A$=25°C | $I_D$ | 20.8 | A |
| | $T_A$=70°C | | 16.7 | |
| Pulsed Drain Current [c] | | $I_{DM}$ | 106 | A |
| Avalanche Energy L=0.3mH | | $E_{AS}$ | 40.8 | mJ |
| Power Dissipation [a] | $T_A$=25°C | $P_D$ | 3.6 | W |
| | $T_A$=70°C | | 2.3 | |
| Operating Junction Temperature | | $T_J$ | -55 to 150 | °C |
| Storage Temperature Range | | $T_{STG}$ | -55 to 150 | °C |

## Thermal resistance ratings

| Single Operation | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Maximum** | **Unit** |
| Junction-to-Ambient Thermal Resistance [a] | t ≤ 10 s | $R_{\theta JA}$ | 35 | °C/W |
| | Steady State | | 67 | |
| Junction-to-Ambient Thermal Resistance [b] | t ≤ 10 s | $R_{\theta JA}$ | 132 | |
| | Steady State | | 209 | |

**Note:**

a FR-4 board (38mm X 38mm X t1.6mm, 70um Copper) partially covered with copper (645mm2 area)

b FR-4 board (38mm X 38mm X t1.6mm, 70um Copper) minimum pad covered with copper

c Repetitive rating, ~10us pulse width, duty cycle ~1%, keep initial $T_J$ =25°C, the maximum allowed junction temperature of 150°C.

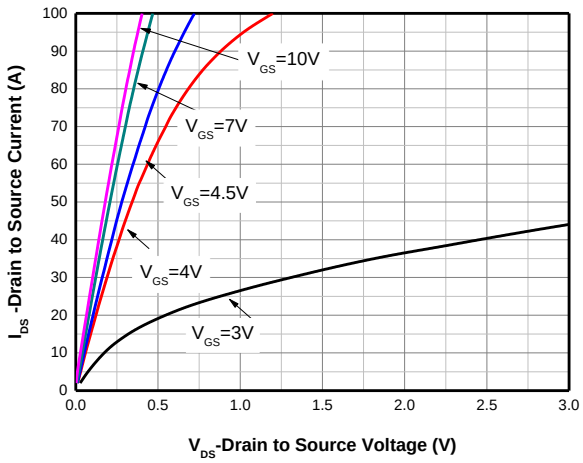
d The static characteristics are obtained using ~380us pulses, duty cycle ~1%.

e The power dissipation PD is based on Junction-to-Ambient thermal resistance $R_{\theta JA}$ t≤10s value and the $T_{J(MAX)}$=150°C.

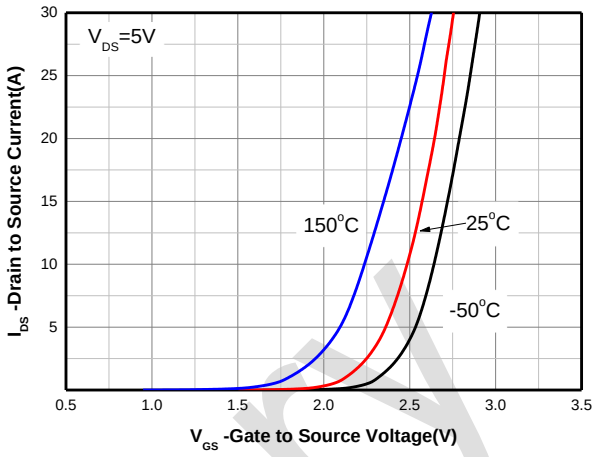
## Electronics Characteristics (Ta=25°C, unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-to-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 250uA | 30 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ =30V, $V_{GS}$ = 0V | | | 1 | uA |
| Gate-to-source Leakage Current | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20V | | | ±100 | nA |
| **ON CHARACTERISTICS** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 250uA | 1.2 | 1.6 | 2.2 | V |
| Drain-to-source On-resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ = 18A | | 3.7 | 4.7 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$=18A | | 5.4 | 7.3 | |
| **CHARGES, CAPACITANCES AND GATE RESISTANCE** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{GS}$ = 0V, f = 1.0MHz, $V_{DS}$ = 15 V | | 854.0 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 550.4 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 17.8 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 15V, $I_D$ = 18 A | | 16.2 | | nC |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}$ = 4.5V, $V_{DS}$ = 15V, $I_D$ = 18 A | | 7.8 | | |
| Gate-to-Source Charge | $Q_{GS}$ | $V_{GS}$ = 10V, $V_{DS}$ = 15V, $I_D$ = 18 A | | 3.3 | | |
| Gate-to-Drain Charge | $Q_{GD}$ | | | 1.9 | | |
| Gate Resistance | $R_g$ | f = 1MHz | | 2.0 | | Ω |
| **SWITCHING CHARACTERISTICS** | | | | | | |
| Turn-On Delay Time | td(ON) | $V_{GS}$ = 10V, $V_{DS}$ = 15 V, $I_D$ = 18A, $R_G$ = 3Ω | | 5.1 | | ns |
| Rise Time | tr | | | 49.0 | | |
| Turn-Off Delay Time | td(OFF) | | | 15.0 | | |
| Fall Time | tf | | | 3.8 | | |
| **BODY DIODE CHARACTERISTICS** | | | | | | |
| Forward Voltage | $V_{SD}$ | $V_{GS}$ = 0 V, $I_S$ = 1A | | 0.7 | 1.2 | V |
| Reverse Recovery Time | trr | IF=18A, di/dt=100A/us | | 24.8 | | nS |
| Reverse Recovery Charge | Qrr | | | 8.9 | | nC |

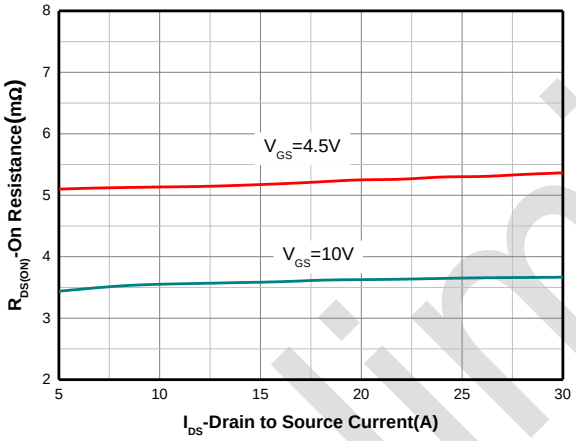
## Typical Characteristics (Ta=25°C, unless otherwise noted)



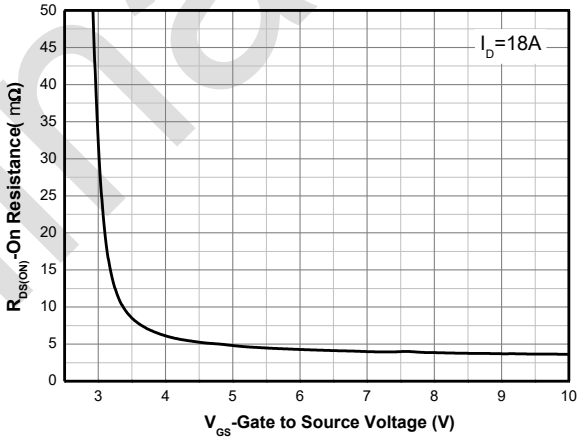

Output Characteristics [d]



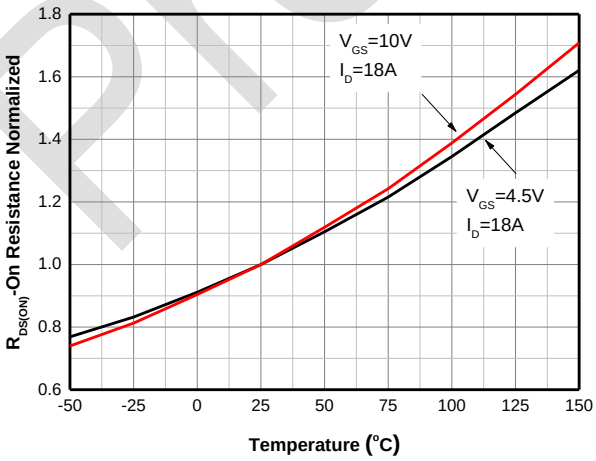

Transfer Characteristics [d]



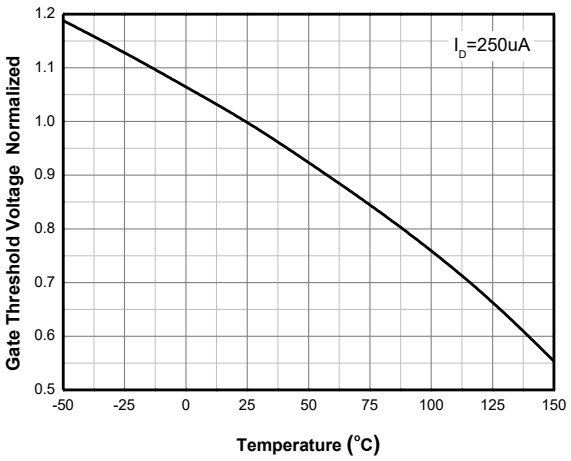

On-Resistance vs. Drain Current [d]



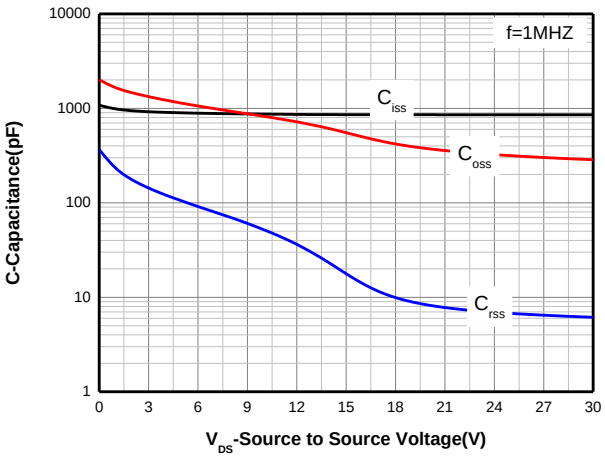

On-Resistance vs. $V_{GS}$ [d]



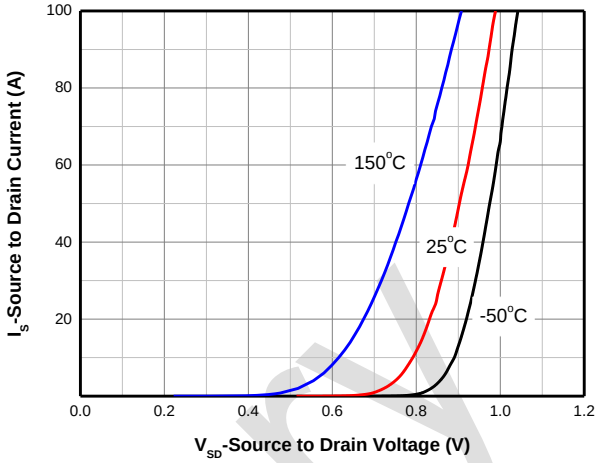

On-Resistance vs. Junction Temperature [d]



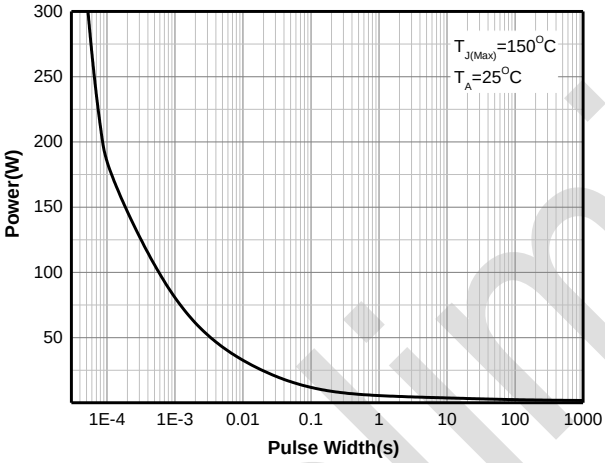

Threshold Voltage vs. Temperature



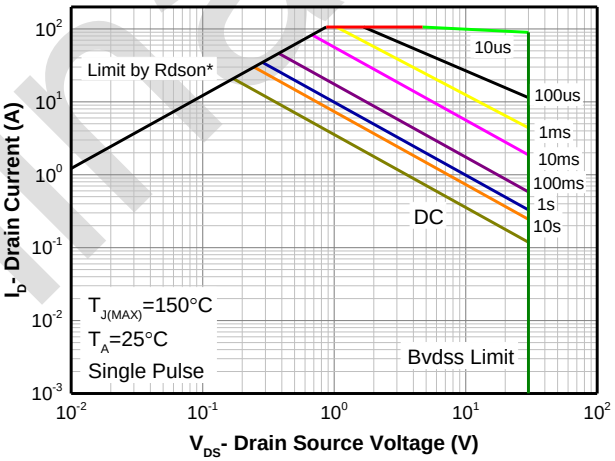

Capacitance



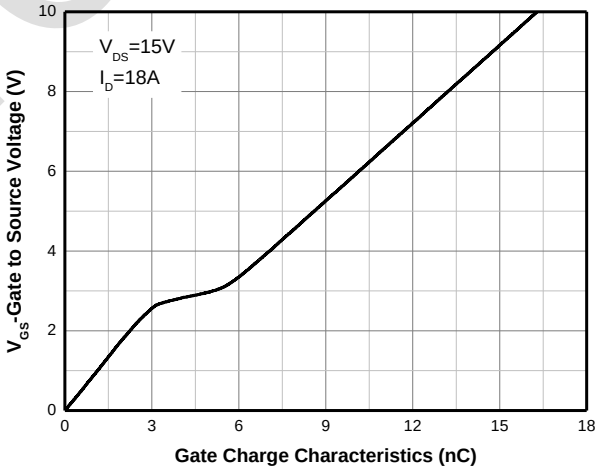

Body Diode Forward Voltage [d]



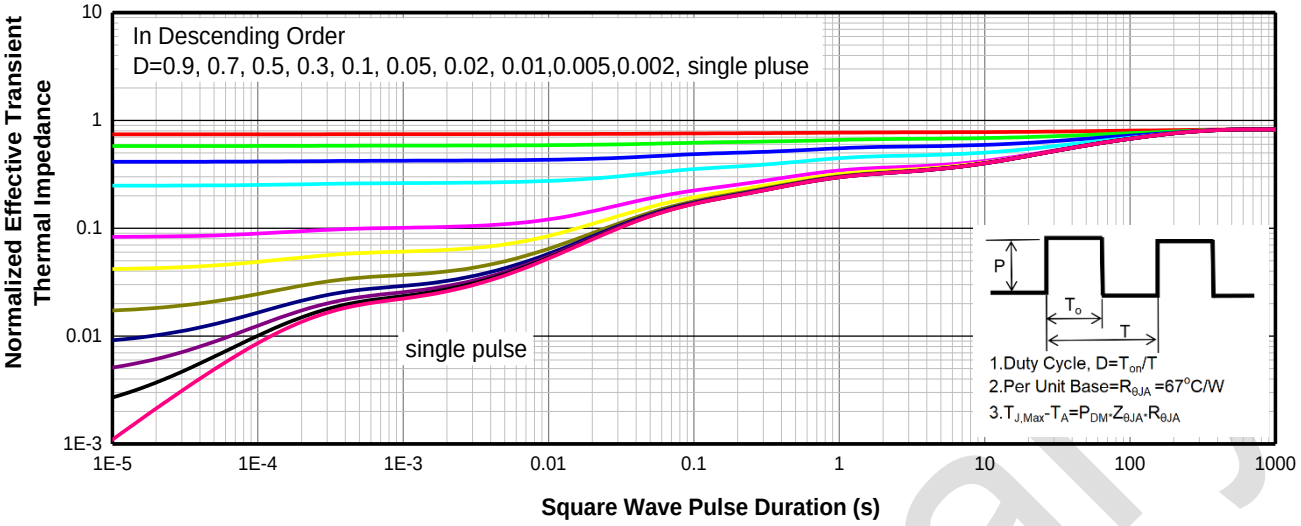

Single Pulse power




Safe Operating Area



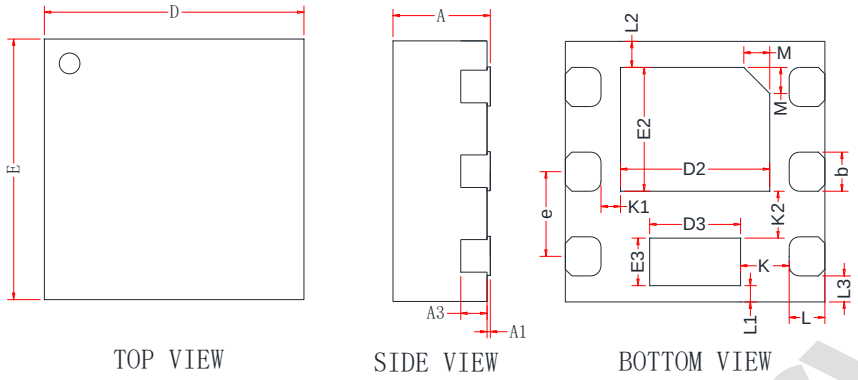

Gate Charge Characteristics

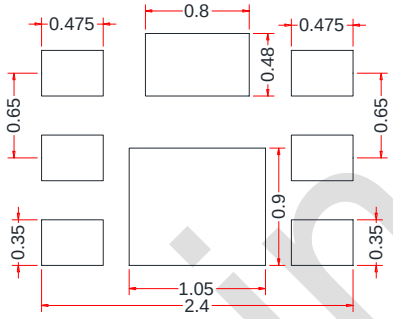



**Transient Thermal Response (Junction-Ambient)**

## PACKAGE OUTLINE DIMENSIONS

### DFN2x2-6L

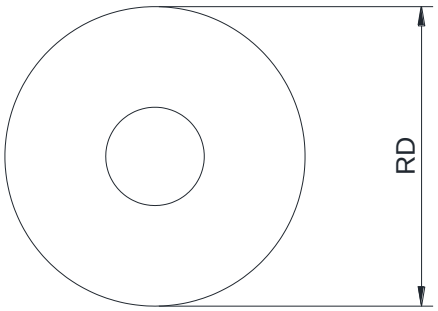


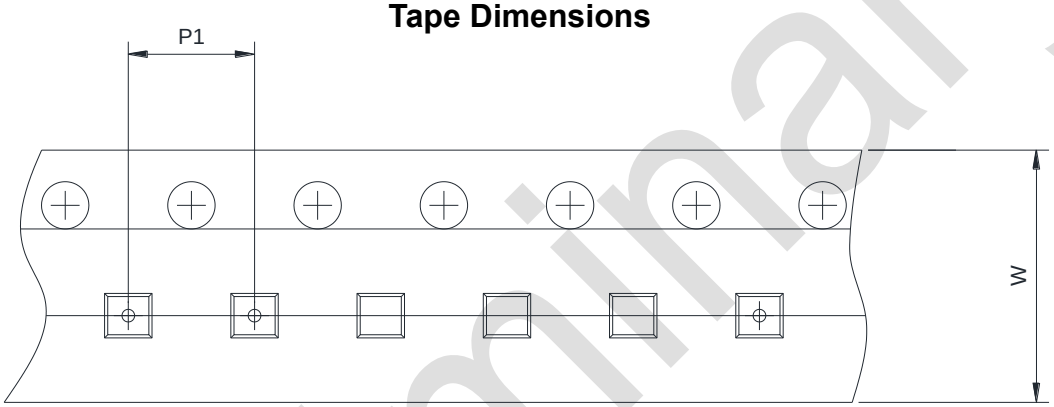

| Symbol | Dimensions in Millimeters | | |
|---|---|---|---|
| | Min. | Typ. | Max. |
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| A3 | | 0.203 Ref. | |
| b | 0.25 | 0.30 | 0.35 |
| D | 1.95 | 2.00 | 2.05 |
| E | 1.95 | 2.00 | 2.05 |
| D2 | 1.05 | 1.15 | 1.25 |
| E2 | 0.85 | 0.95 | 1.05 |
| D3 | 0.60 | 0.70 | 0.80 |
| E3 | 0.265 | 0.365 | 0.465 |
| e | 0.55 | 0.65 | 0.75 |
| K | | 0.37 REF | |
| K1 | | 0.15 REF | |
| K2 | | 0.36 REF | |
| L | 0.225 | 0.275 | 0.325 |
| L1 | | 0.125 REF | |
| L3 | | 0.20 REF | |
| L3 | | 0.20 REF | |
| M | | 0.20 REF | |

## TAPE AND REEL INFORMATION

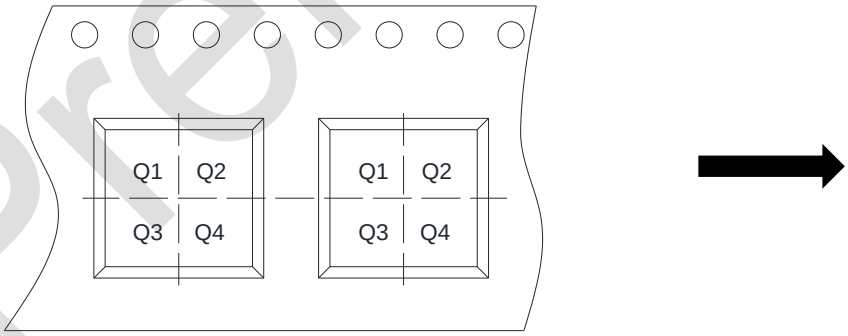
### Reel Dimensions




### Tape Dimensions




### Quadrant Assignments For PIN1 Orientation In Tape




| | | | | | |
|---|---|---|---|---|---|
| RD | Reel Dimension | ☑ 7inch | ☐ 13inch | | |
| W | Overall width of the carrier tape | ☑ 8mm | ☐ 12mm | ☐ 16mm | |
| P1 | Pitch between successive cavity centers | ☐ 2mm | ☑ 4mm | ☐ 8mm | |
| Pin1 | Pin1 Quadrant | ☑ Q1 | ☐ Q2 | ☐ Q3 | ☐ Q4 |