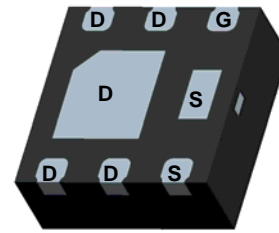
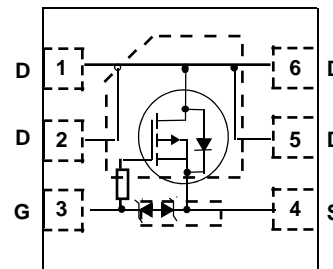


**WPM2065**
**Single P-Channel, -20V, -6.9A, Power MOSFET**
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

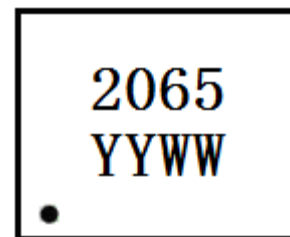
V <sub>DS</sub> (V)	Typical R <sub>ds(on)</sub> (Ω)
-20	0.017@ V <sub>GS</sub> =-4.5V
	0.022@ V <sub>GS</sub> =-2.5V
	0.032@ V <sub>GS</sub> =-1.8V
ESD Rating: 4000V HBM	


**DFN2X2-6L**
**Descriptions**

The WPM2065 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<sub>DS(ON)</sub> with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2065 is Pb-free and Halogen-free.


**Pin configuration (Top view)**
**Features**

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- HBM ESD protection > 4kV
- Small package DFN2X2-6L



2065 = Device Code  
 YY = Year  
 WW = Week

**Marking**
**Applications**

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

**Order information**

Device	Package	Shipping
WPM2065-6/TR	DFN2X2-6L	3000/Reel&Tape

**Absolute Maximum ratings**

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		$V_{DS}$	-20		V
Gate-Source Voltage		$V_{GS}$	$\pm 8$		
Continuous Drain Current <sup>a d</sup>	$T_A=25^\circ\text{C}$	$I_D$	-6.9	-6.2	A
	$T_A=70^\circ\text{C}$		-5.5	-5.0	
Maximum Power Dissipation <sup>a d</sup>	$T_A=25^\circ\text{C}$	$P_D$	1.7	1.4	W
	$T_A=70^\circ\text{C}$		1.1	0.9	
Continuous Drain Current <sup>b d</sup>	$T_A=25^\circ\text{C}$	$I_D$	-5.5	-4.4	A
	$T_A=70^\circ\text{C}$		-4.4	-3.5	
Maximum Power Dissipation <sup>b d</sup>	$T_A=25^\circ\text{C}$	$P_D$	1.1	0.7	W
	$T_A=70^\circ\text{C}$		0.7	0.4	
Pulsed Drain Current <sup>c</sup>		$I_{DM}$	-28		A
Operating Junction Temperature		$T_J$	-55 to 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 <sup>a</sup>	$t \leq 10 \text{ s}$	$R_{\theta JA}$	57	72	$^\circ\text{C/W}$
	Steady State		71	90	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$t \leq 10 \text{ s}$	$R_{\theta JA}$	89	115	
	Steady State		126	181	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	34	44	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

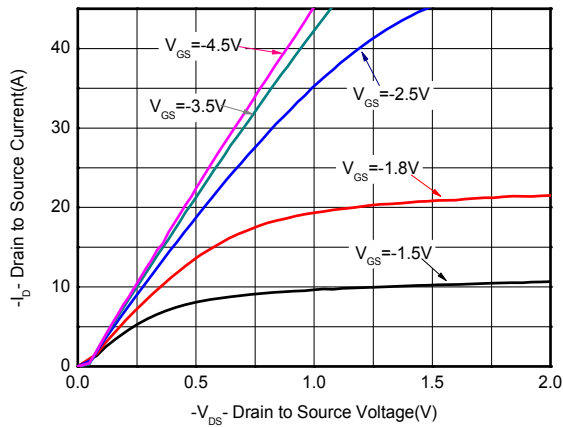
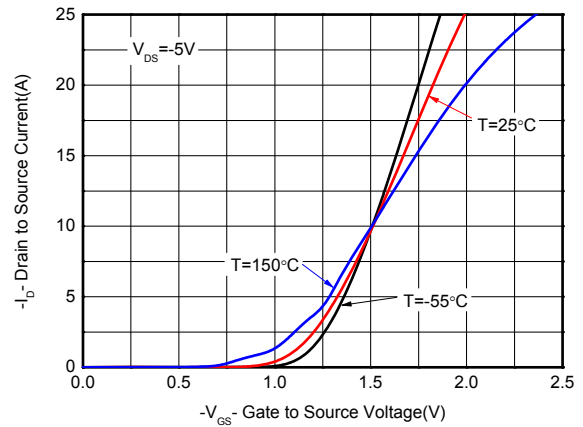
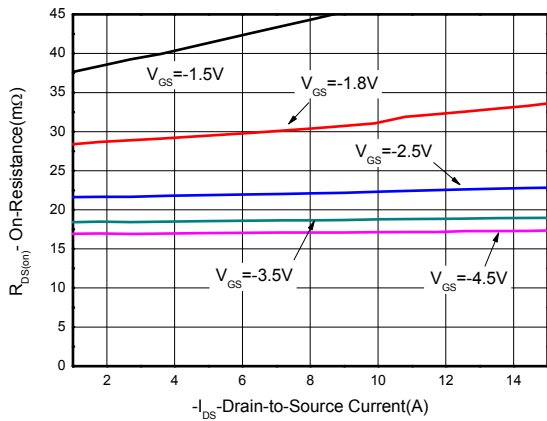
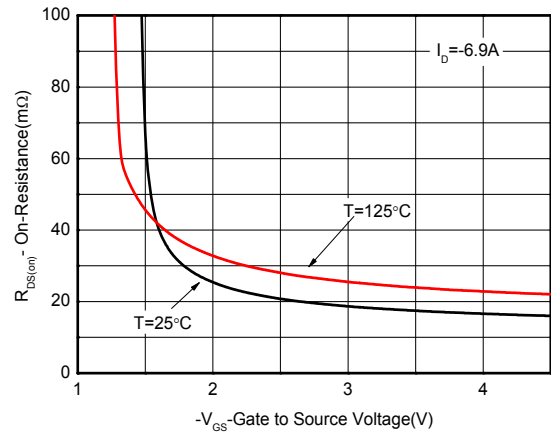
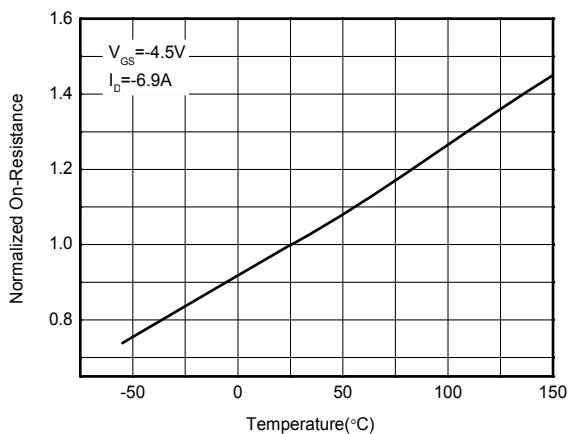
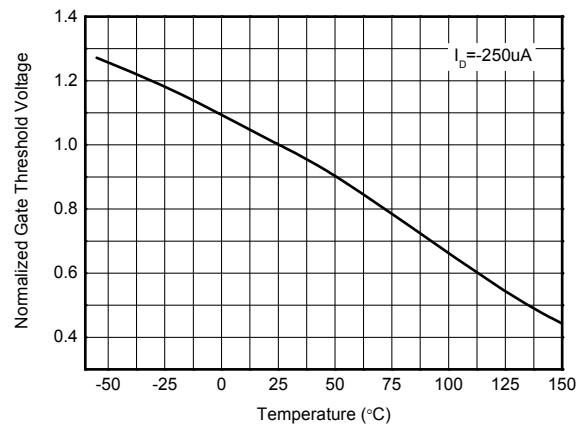
b Surface mounted on FR-4 board using minimum pad size, 1oz copper

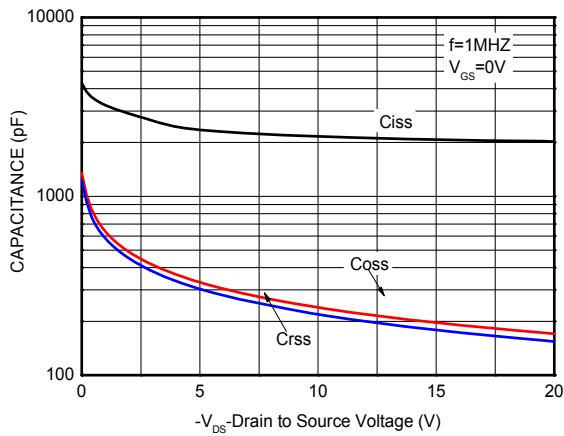
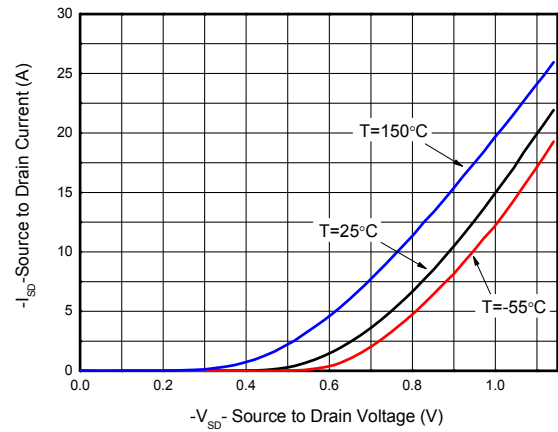
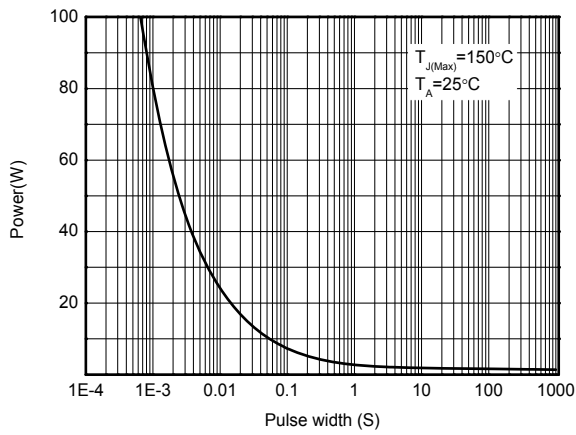
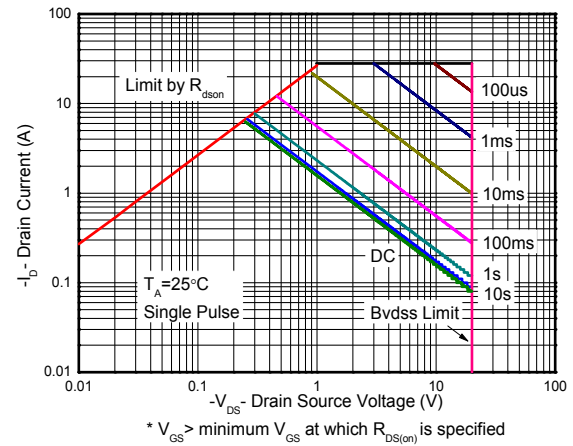
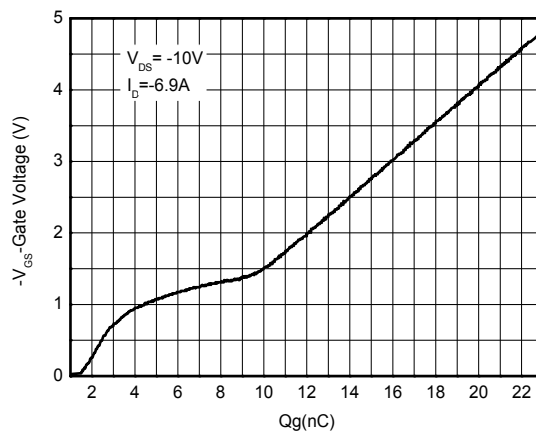
c Pulse width < 380 $\mu\text{s}$ , Duty Cycle < 2%

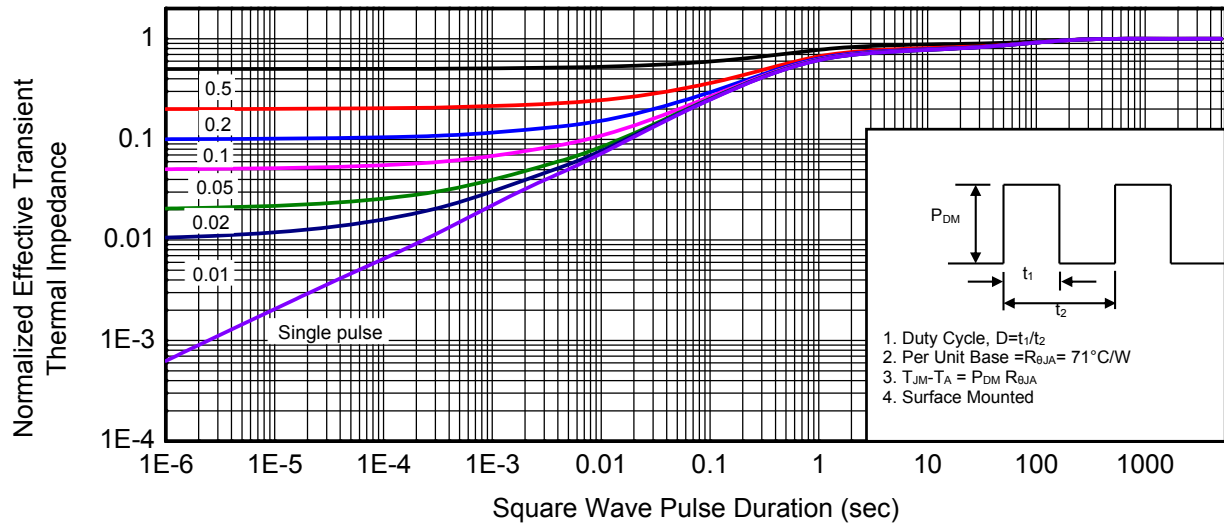
d Maximum junction temperature  $T_J=150^\circ\text{C}$ .

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

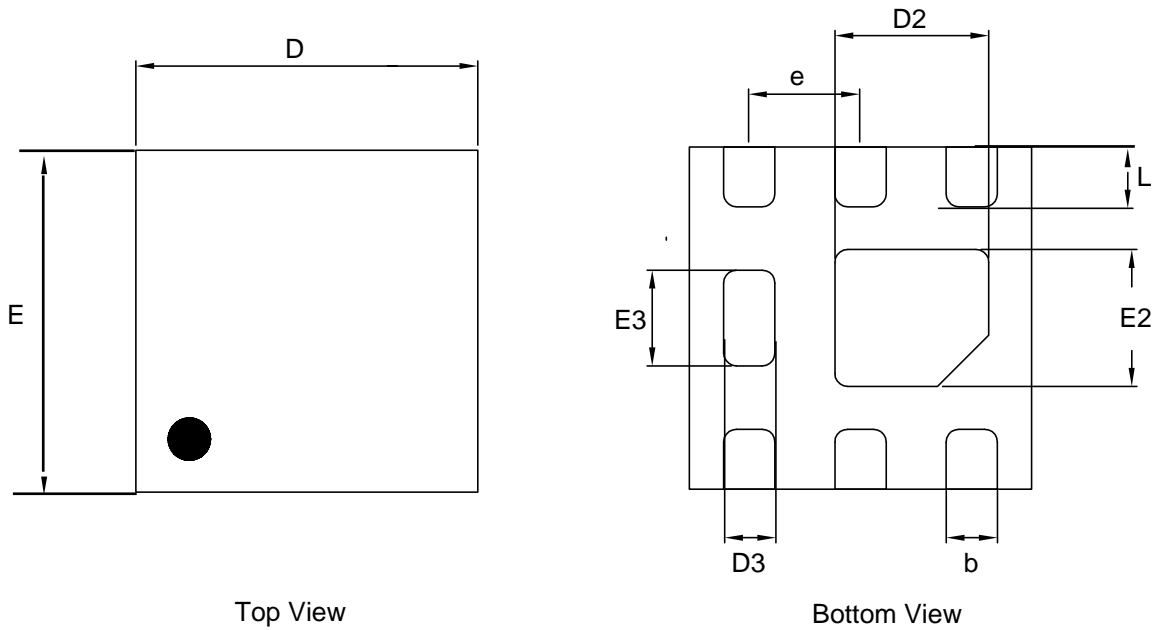
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -16V, V_{GS} = 0V$			-1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 8V$			$\pm 5$	$\mu A$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-0.45	-0.65	-1.0	V
Drain-to-source On-resistance <sup>b, c</sup>	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -6.9A$		17	24	m $\Omega$
		$V_{GS} = -2.5V, I_D = -6.1A$		22	29	
		$V_{GS} = -1.8V, I_D = -5.3A$		32	45	
Forward Trans conductance	$g_{fs}$	$V_{DS} = -5.0V, I_D = -6.9A$		50		S
<b>CAPACITANCES, CHARGES</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0V,$ $f = 1.0\text{ MHz},$ $V_{DS} = -10V$		2026		pF
Output Capacitance	$C_{OSS}$			225		
Reverse Transfer Capacitance	$C_{RSS}$			201		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5V,$ $V_{DD} = -10V,$ $I_D = -6.9A$		23		nC
Threshold Gate Charge	$Q_{G(TH)}$			2.5		
Gate-to-Source Charge	$Q_{GS}$			4		
Gate-to-Drain Charge	$Q_{GD}$			6		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = -4.5V,$ $V_{DD} = -10V,$ $R_L = 3\Omega,$ $R_G = 6\Omega$		40		ns
Rise Time	$t_r$			76		
Turn-Off Delay Time	$t_d(OFF)$			284		
Fall Time	$t_f$			244		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = -6.9A$		-0.8	-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**

**Gate charge Characteristics**



**Transient thermal response (Junction-to-Ambient)**

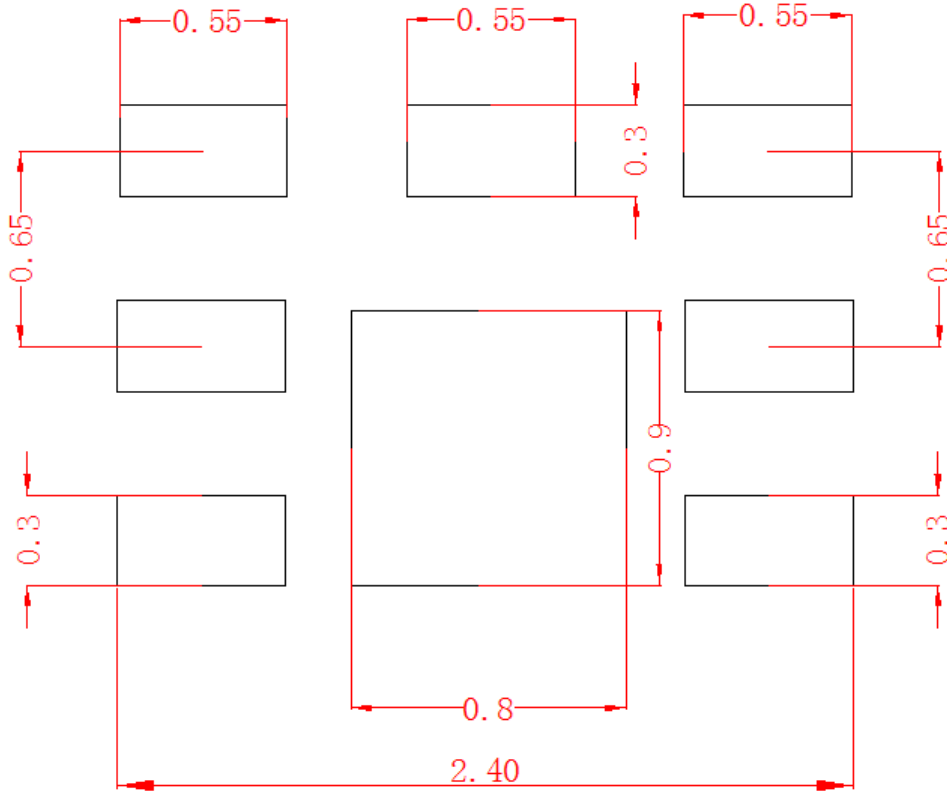
**Package outline dimensions**
**DFN2X2-6L**


Top View

Bottom View

Side View

Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.203 Ref.		
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D2	0.85	0.90	0.95
E2	0.75	0.80	0.85
D3	0.25	0.30	0.35
E3		0.56	
b	0.25	0.30	0.35
L	0.30	0.35	0.40
e	0.65 BSC.		

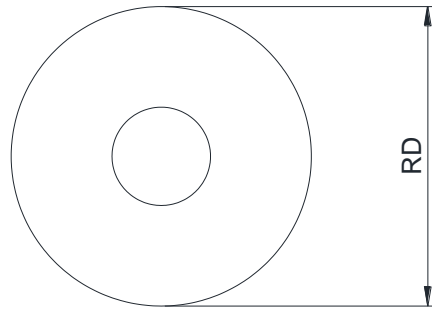
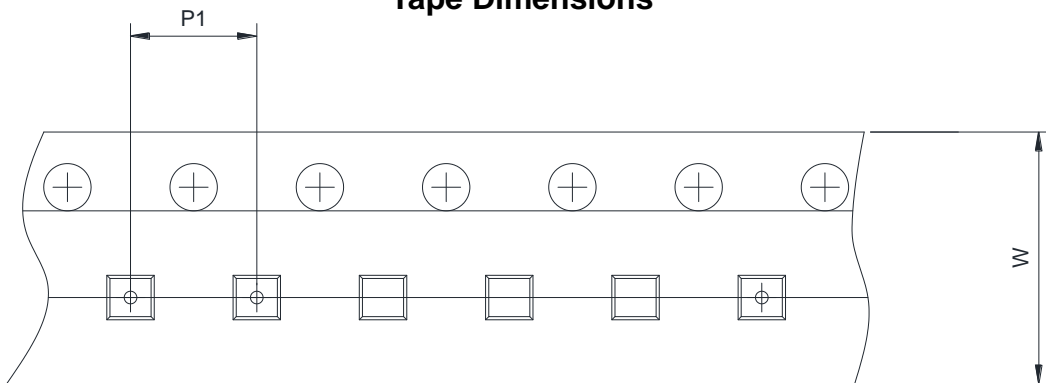
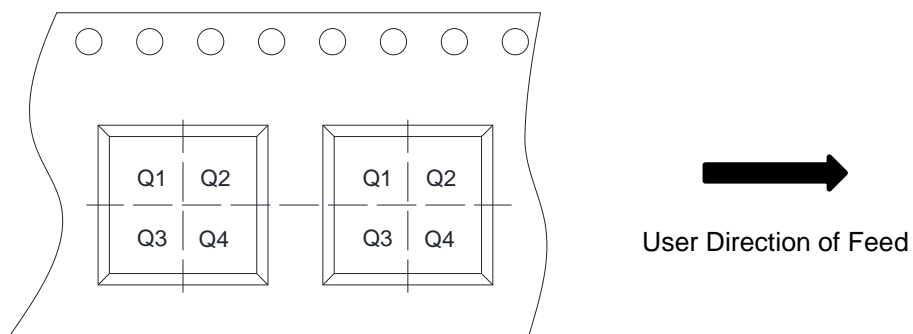
**Suggested Pad Layout**


Unit:mm

**Notes:**

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.



**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 type="checkbox"/> 2mm	<input checked="" type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4