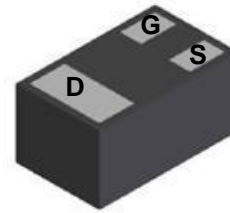
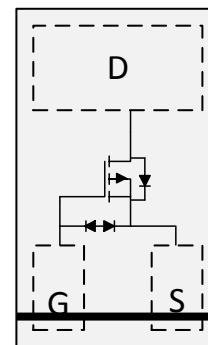


**WPM2092A**
**Single P-Channel, -20V, -1.2A, Power MOSFET**
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

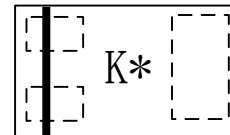
V <sub>DS</sub> (V)	Typical R <sub>DS(on)</sub> (mΩ)
-20	230@ V <sub>GS</sub> =-4.5V
	320@ V <sub>GS</sub> =-2.8V
	355@ V <sub>GS</sub> =-2.5V
	650@ V <sub>GS</sub> =-1.8V
ESD Rating: 2000V HBM	


**DFN1006-3L**
**Descriptions**

The WPM2092A 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 WPM2092A is Pb-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)**


K = 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
WPM2092A-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		$V_{GS}$	$\pm 10$		
Continuous Drain Current <sup>a</sup>	$T_A=25^\circ\text{C}$	$I_D$	-1.20	-1.03	A
	$T_A=70^\circ\text{C}$		-0.97	-0.82	
Maximum Power Dissipation <sup>a</sup>	$T_A=25^\circ\text{C}$	$P_D$	0.86	0.62	W
	$T_A=70^\circ\text{C}$		0.55	0.40	
Continuous Drain Current <sup>b</sup>	$T_A=25^\circ\text{C}$	$I_D$	-0.70	-0.65	A
	$T_A=70^\circ\text{C}$		-0.56	-0.52	
Maximum Power Dissipation <sup>b</sup>	$T_A=25^\circ\text{C}$	$P_D$	0.28	0.25	W
	$T_A=70^\circ\text{C}$		0.18	0.16	
Pulsed Drain Current <sup>c</sup>		$I_{DM}$	-1.5		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>	$t \leq 10 \text{ s}$	$R_{\theta JA}$	73	146	$^\circ\text{C/W}$
	Steady State		101	202	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$t \leq 10 \text{ s}$	$R_{\theta JA}$	201	402	
	Steady State		253	506	

a The value of  $R_{\theta JA}$  is measured with the device mounted on 1-inch<sup>2</sup> (6.45cm<sup>2</sup>) with 2oz. (0.071mm thick) Copper pad on a 1.5\*1.5 inch<sup>2</sup>, 0.06-inch thick FR4 PCB, in a still air environment with  $T_A = 25^\circ\text{C}$ . The value in any given application is determined by the user's specific board design.

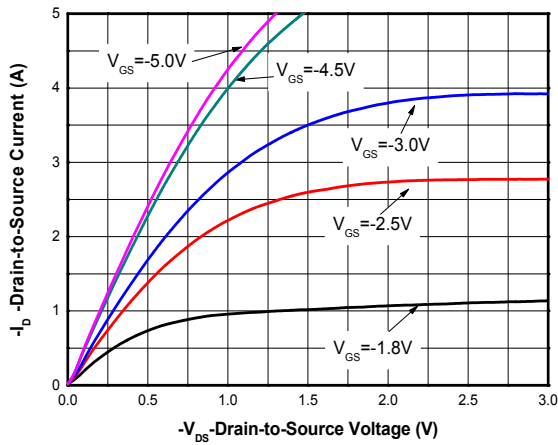
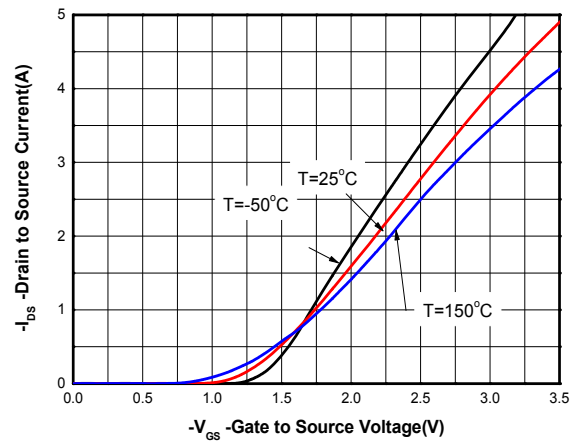
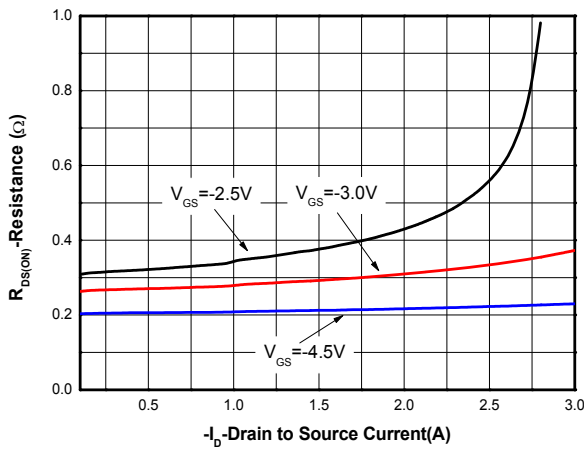
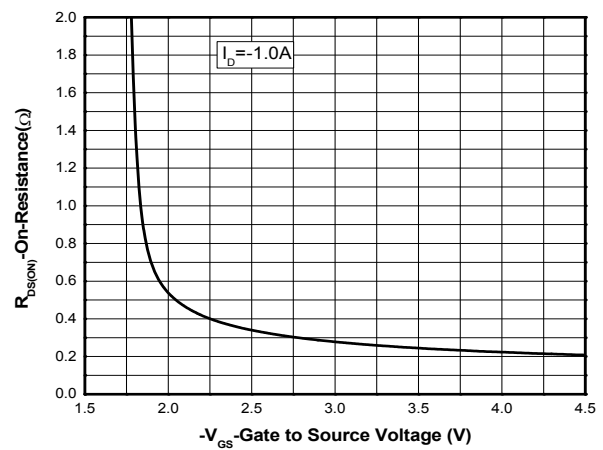
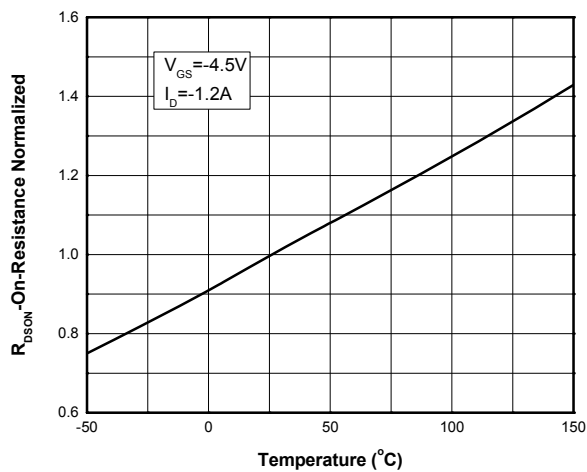
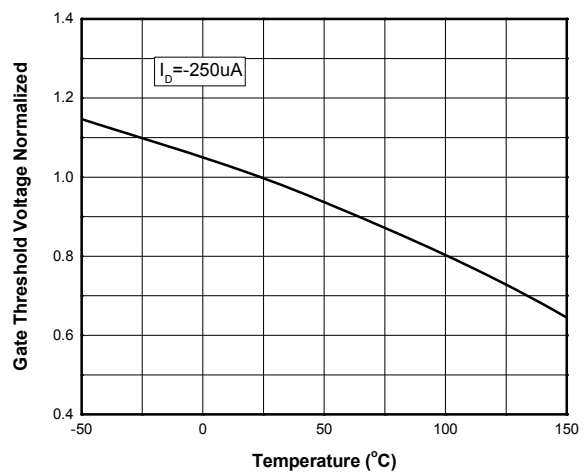
b The power dissipation  $P_D$  is based on Junction-to-Ambient thermal resistance  $R_{\theta JA}$   $t \leq 10\text{s}$  value and the  $T_{J(MAX)} = 150^\circ\text{C}$ .

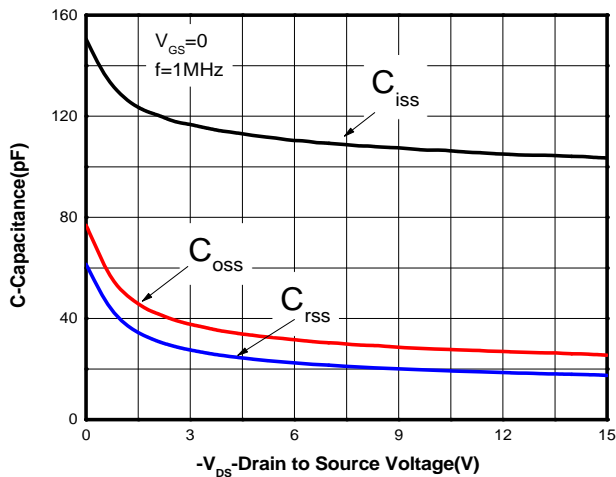
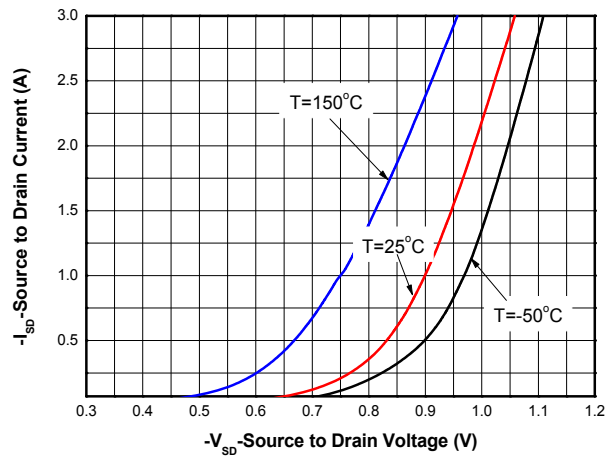
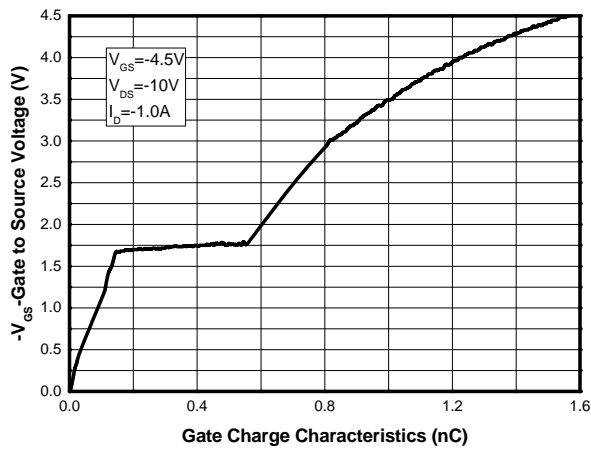
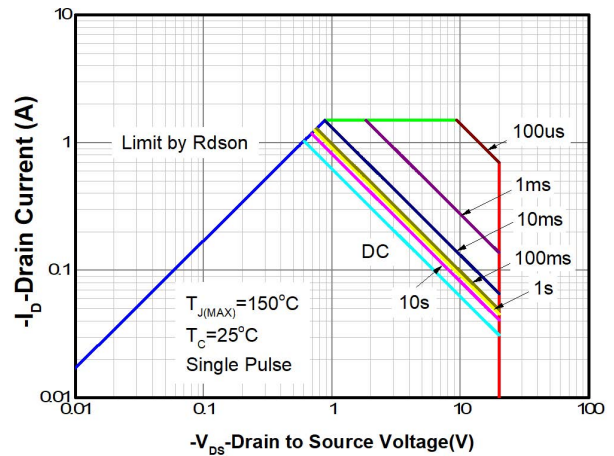
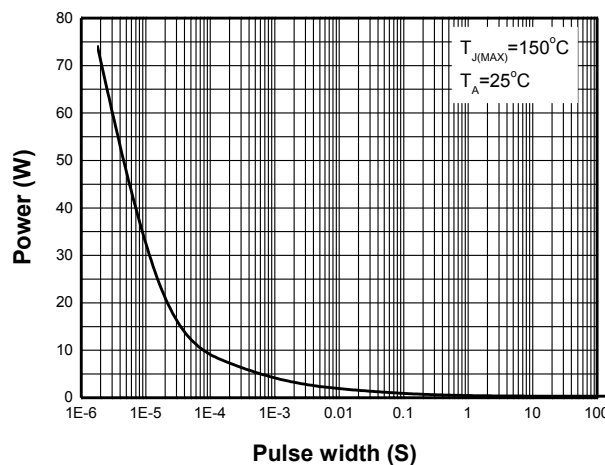
c Repetitive rating,  $\sim 10\mu\text{s}$  pulse width, duty cycle  $\sim 1\%$ , keep initial  $T_J = 25^\circ\text{C}$ , the maximum allowed junction temperature of  $150^\circ\text{C}$ .

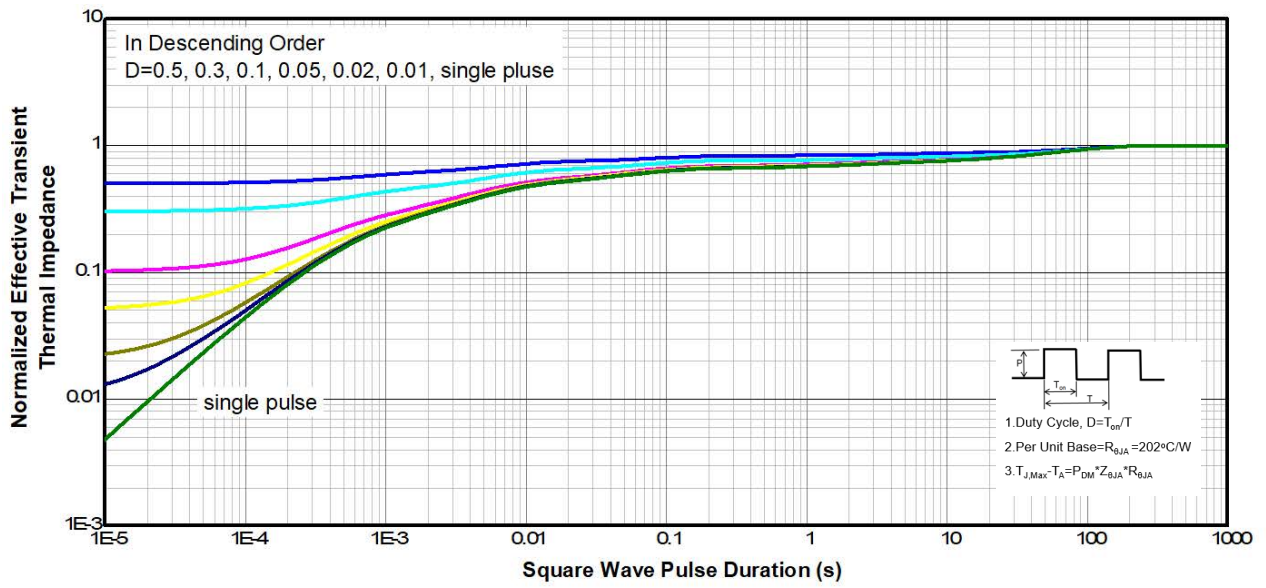
d The static characteristics are obtained using  $\sim 380\mu\text{s}$  pulses, duty cycle  $\sim 1\%$ .

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

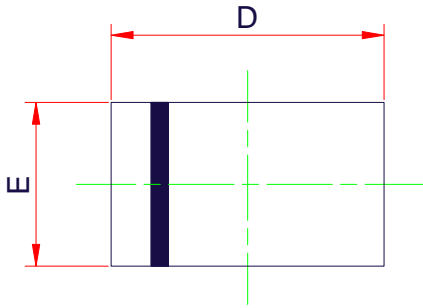
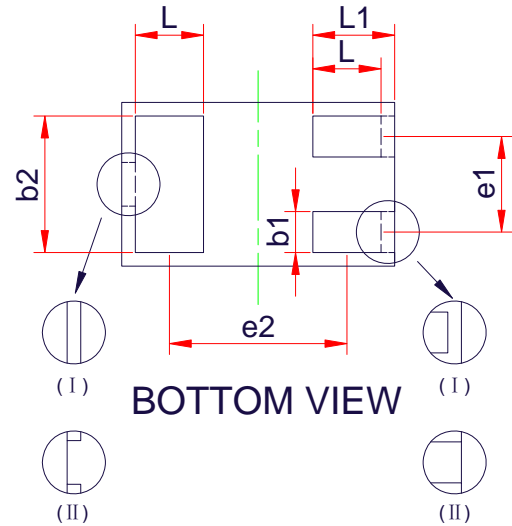
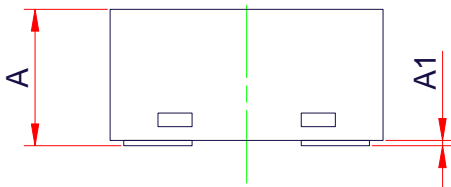
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 1$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu\text{A}$	-0.45	-0.7	-1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -1.2\text{ A}$		230	390	m $\Omega$
		$V_{GS} = -2.8\text{ V}, I_D = -0.8\text{ A}$		320	480	
		$V_{GS} = -2.5\text{ V}, I_D = -0.6\text{ A}$		355	620	
		$V_{GS} = -1.8\text{ V}, I_D = -0.5\text{ A}$		650	790	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = -15\text{ V}$		104		pF
Output Capacitance	$C_{OSS}$			25		
Reverse Transfer Capacitance	$C_{RSS}$			19		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -1\text{ A}$		1.1		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.25		
Gate-to-Source Charge	$Q_{GS}$			0.38		
Gate-to-Drain Charge	$Q_{GD}$			0.47		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, R_G = 6\ \Omega, I_D = -1\text{ A}$		7.2		ns
Rise Time	$t_r$			7.5		
Turn-Off Delay Time	$t_d(OFF)$			18.5		
Fall Time	$t_f$			10.7		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = -0.5\text{ A}$	-0.5	-0.8	-1.2	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**

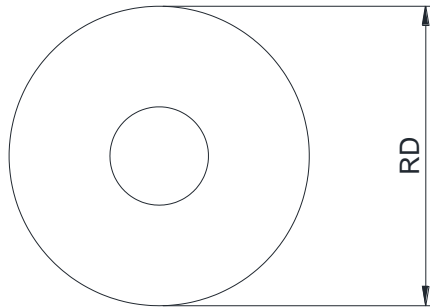
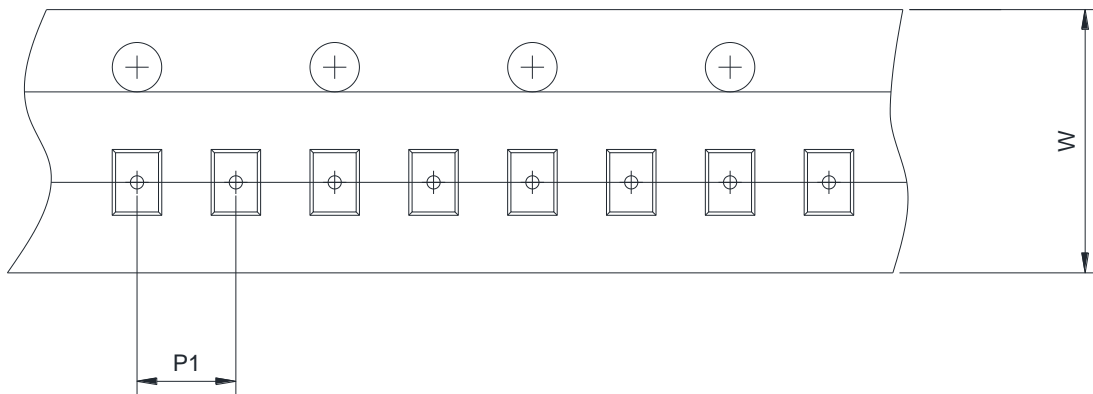
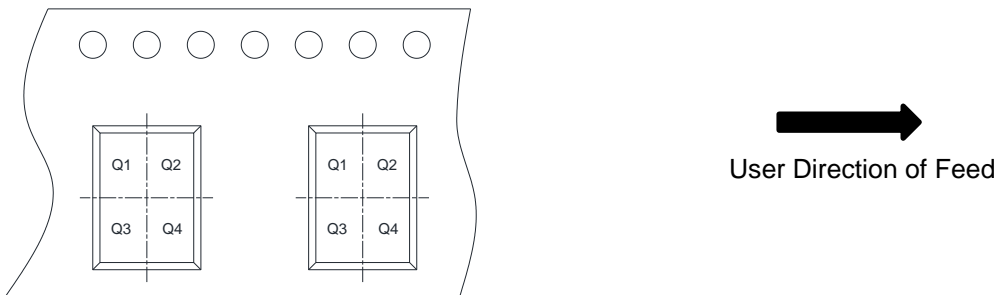

**Capacitance**

**Body diode forward voltage**

**Gate Charge Characteristics**

**Safe operating power**

**Single pulse 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	0.35 BSC		
e2	0.65 BSC		

**Package outline dimensions**
**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 type="checkbox"/> Q2 <input checked="" type="checkbox"/> Q3 <input checked="" type="checkbox"/> Q4



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