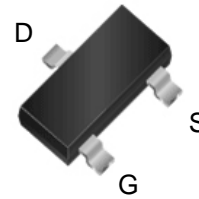
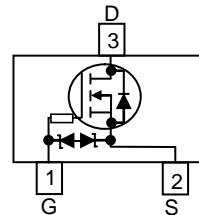


**WNM7002**
**Single N-Channel, 60V, 0.3A, Power MOSFET**
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

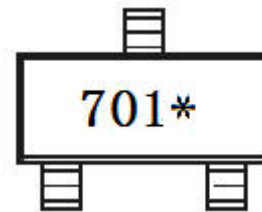
$V_{DS}$ (V)	Typical $R_{DS(on)}$ ( $\Omega$ )
60	3.7 @ $V_{GS}= 10V$
	3.8 @ $V_{GS}= 4.5V$
ESD protected	


**SOT-23**

**Pin configuration (Top view)**
**Descriptions**

The WNM7002 is N-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 WNM7002 is Pb-free.

**Features**

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-23



701 = Device Code

\* = Month

**Marking**
**Applications**

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

**Order information**

Device	Package	Shipping
WNM7002-3/TR	SOT-23	3000/Tape&Reel

**Absolute Maximum ratings**

Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	60		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current <sup>a d</sup>	$I_D$	$T_A=25^\circ\text{C}$	0.30	0.28	A
		$T_A=70^\circ\text{C}$	0.24	0.22	
Maximum Power Dissipation <sup>a d</sup>	$P_D$	$T_A=25^\circ\text{C}$	0.96	0.83	W
		$T_A=70^\circ\text{C}$	0.61	0.53	
Continuous Drain Current <sup>b d</sup>	$I_D$	$T_A=25^\circ\text{C}$	0.26	0.25	A
		$T_A=70^\circ\text{C}$	0.21	0.20	
Maximum Power Dissipation <sup>b d</sup>	$P_D$	$T_A=25^\circ\text{C}$	0.78	0.66	W
		$T_A=70^\circ\text{C}$	0.50	0.42	
Pulsed Drain Current <sup>c</sup>	$I_{DM}$	1.2		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**

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$t \leq 10 \text{ s}$	$R_{\theta JA}$	105	130	$^\circ\text{C/W}$
	Steady State		130	150	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$t \leq 10 \text{ s}$	$R_{\theta JA}$	130	160	
	Steady State		145	190	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	40	60	

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

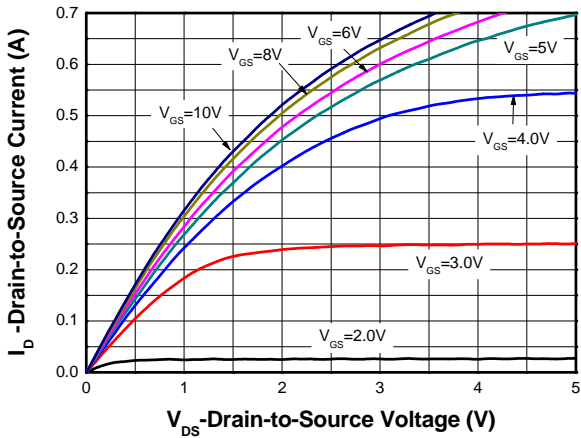
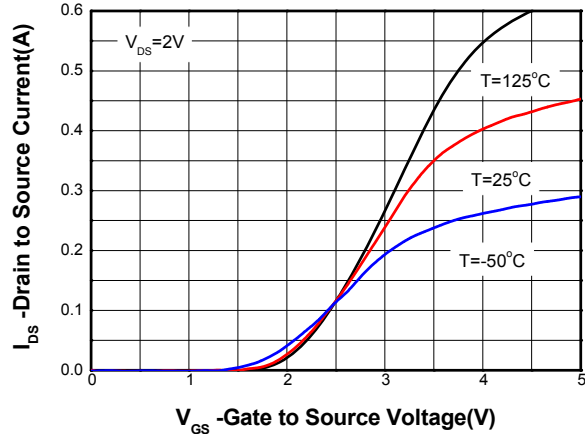
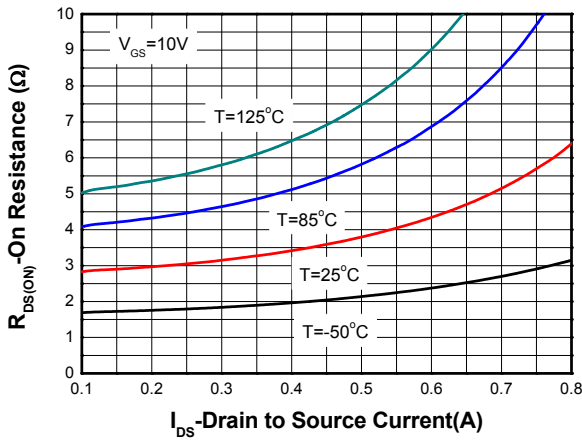
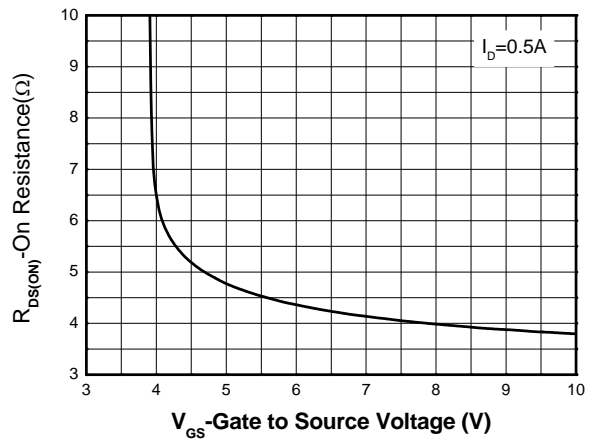
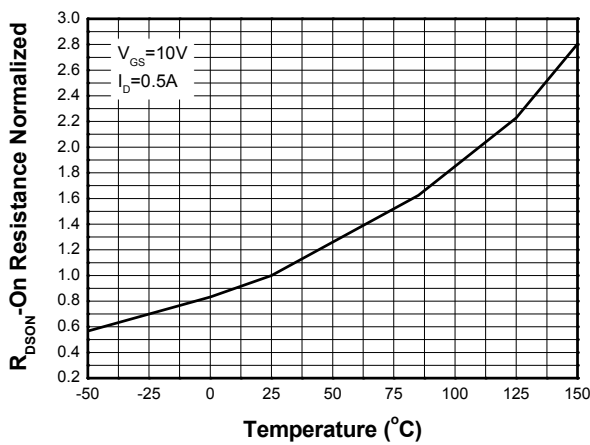
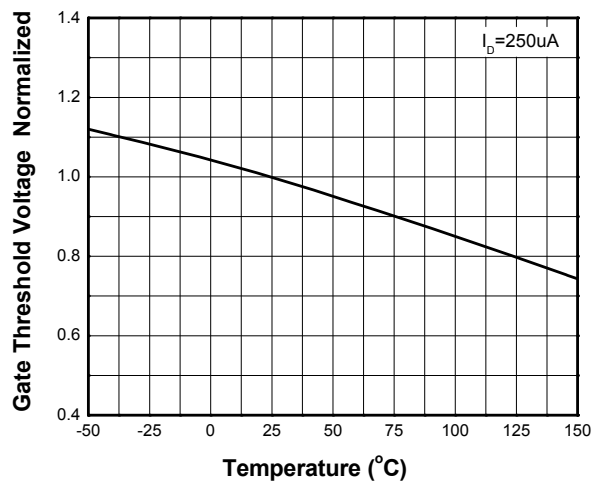
b Surface mounted on FR4 board using minimum pad size, 1oz copper

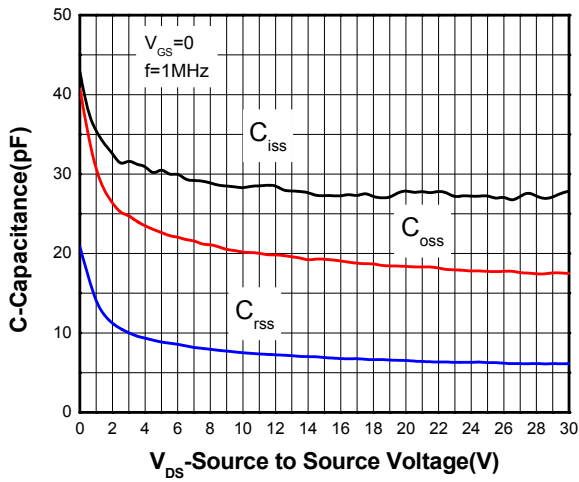
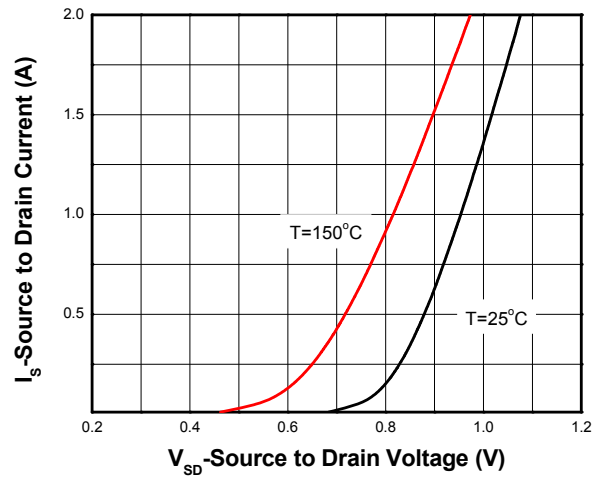
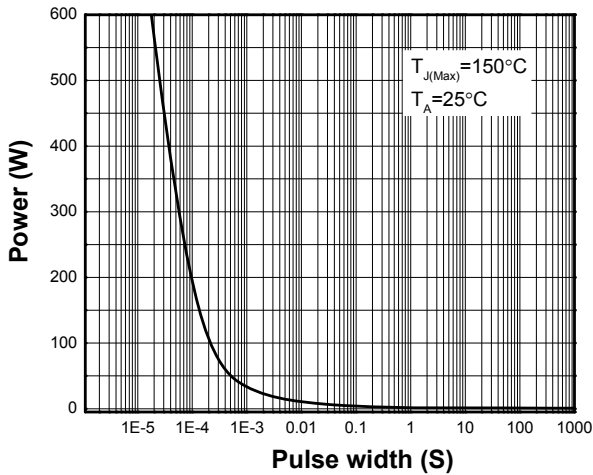
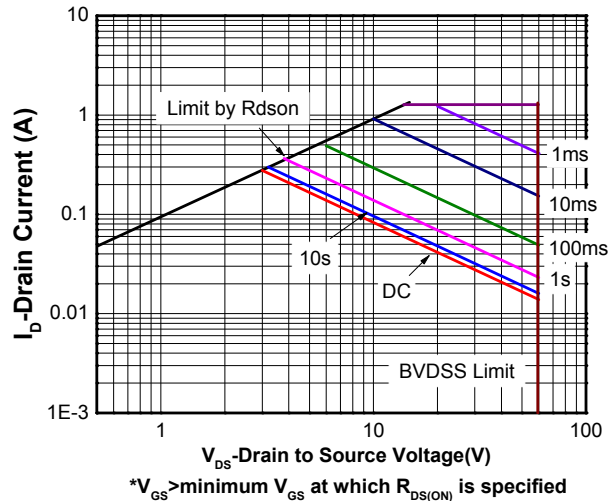
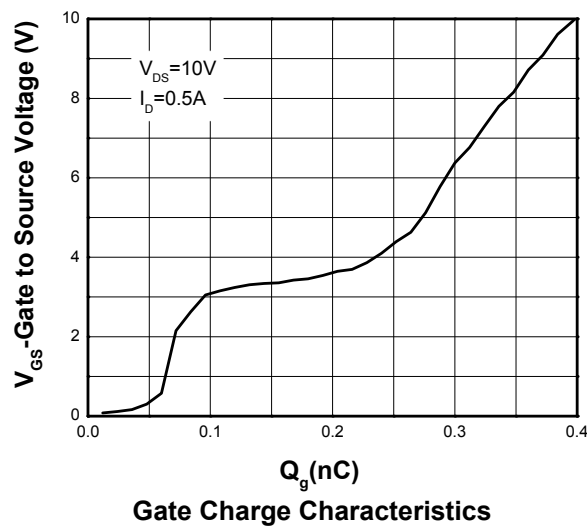
c Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu\text{s}$ , Duty Cycle=1%

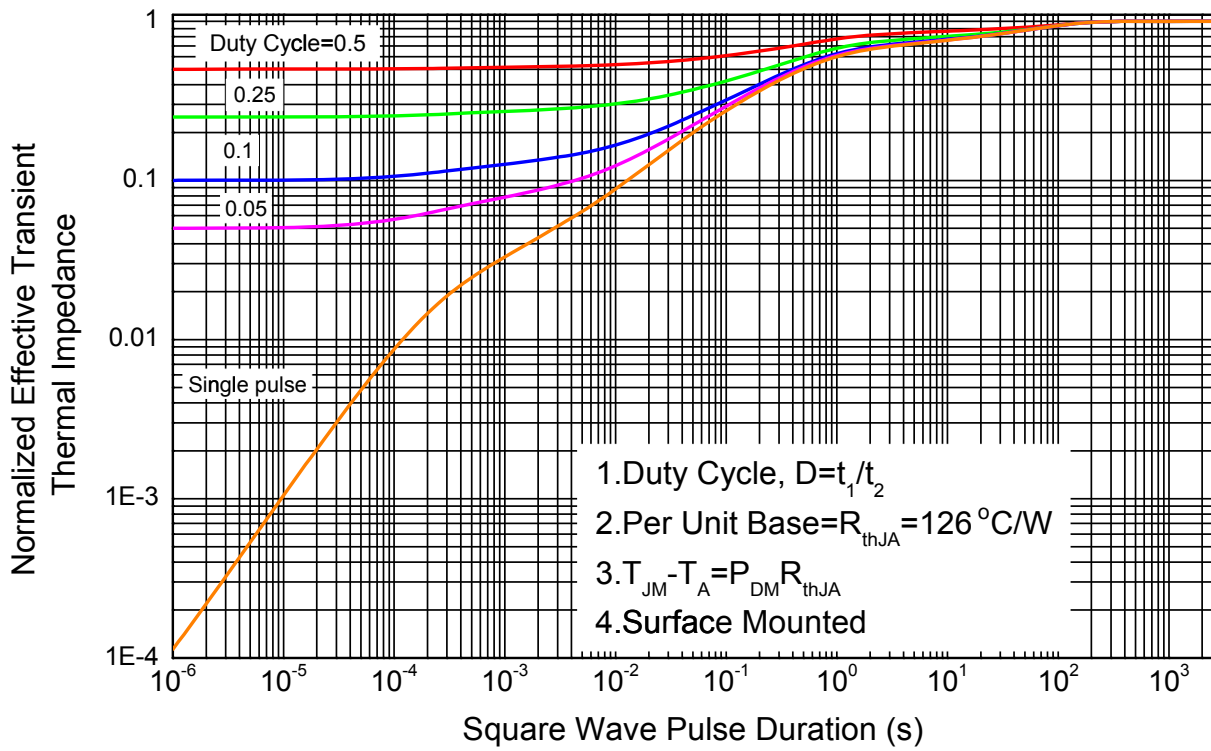
d Repetitive rating, pulse width limited by junction temperature  $T_J=150^\circ\text{C}$ .

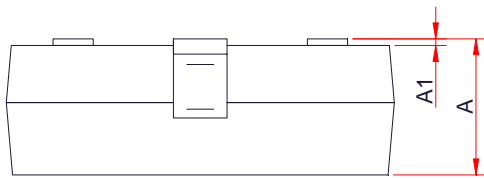
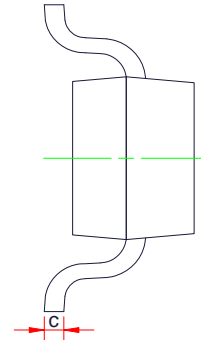
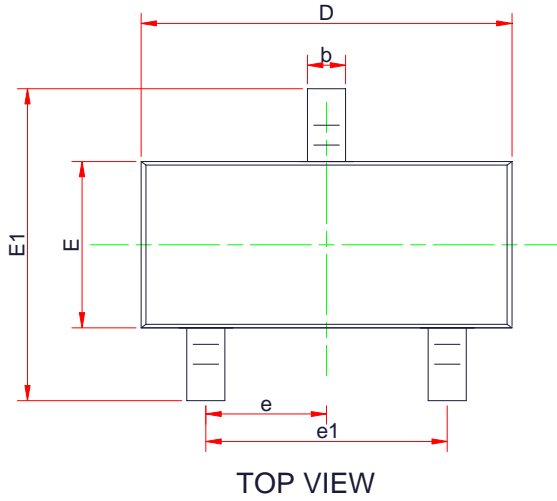
**Electronics Characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 5$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	1.0	1.4	2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 0.3\text{ A}$		3.7	4.7	$\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 0.2\text{ A}$		3.8	5.6	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 25\text{ V}$		14.4		pF
Output Capacitance	$C_{OSS}$			5.1		
Reverse Transfer Capacitance	$C_{RSS}$			0.27		
Total Gate Charge1	$Q_{G(4.5V\text{ TOT})}$	$V_{GS} = 4.5\&10\text{ V}, V_{DS} = 15\text{ V}, I_D = 0.5\text{ A}$		0.26		nC
Total Gate Charge2	$Q_{G(10V\text{ TOT})}$			0.41		
Threshold Gate Charge	$Q_{G(TH)}$			0.06		
Gate-to-Source Charge	$Q_{GS}$			0.1		
Gate-to-Drain Charge	$Q_{GD}$			0.14		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 10\text{ V}, V_{DS} = 30\text{ V}, R_L = 60\ \Omega, R_G = 25\ \Omega$		5.2		ns
Rise Time	$t_r$			17.2		
Turn-Off Delay Time	$t_d(OFF)$			32.4		
Fall Time	$t_f$			19.0		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 200\text{ mA}$		0.8	1.2	V

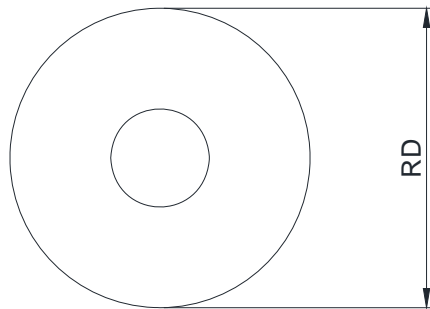
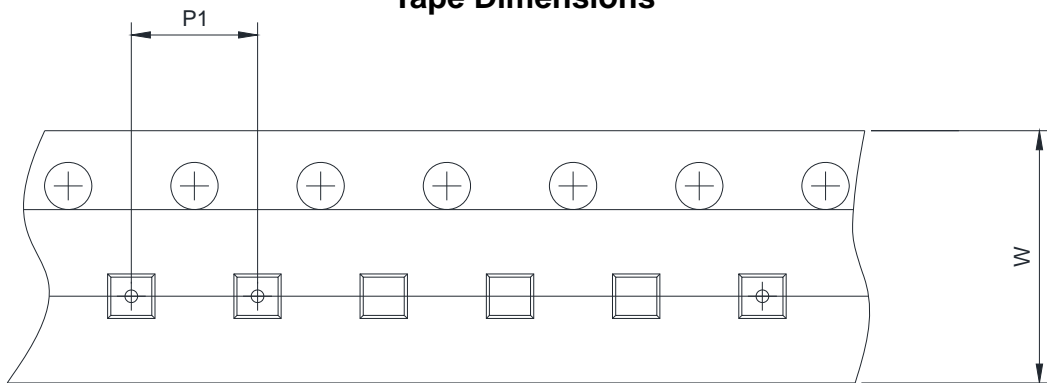
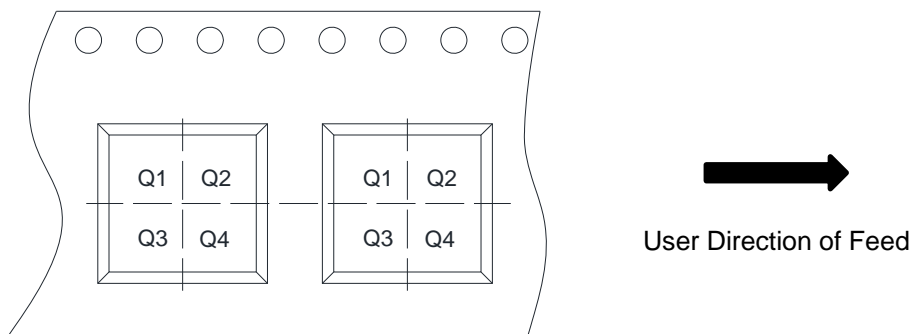
**Typical Characteristics (Ta=25°C, unless otherwise noted)**

**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**

**Single pulse power**

**Safe operating power**


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


**Package outline dimensions**
**SOT-23**

**SIDE VIEW**

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.89	1.10	1.30
A1	0.00	-	0.10
b	0.30	0.43	0.55
c	0.05	-	0.20
D	2.70	2.90	3.10
E	1.15	1.33	1.50
E1	2.10	2.40	2.70
e	0.95 Typ.		
e1	1.70	1.90	2.10

**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 type="checkbox"/> Q1	<input type="checkbox"/> Q2 <input checked="" type="checkbox"/> Q3 <input type="checkbox"/> Q4



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