

**WPM2083**
**Single P-Channel, -20V, -2.4A, Power MOSFET**
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

$V_{DS}$ (V)	Typical $R_{DS(on)}$ (m $\Omega$ )
-20	81 @ $V_{GS}=-4.5V$
	110 @ $V_{GS}=-2.5V$

**Descriptions**

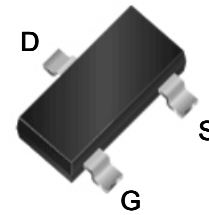
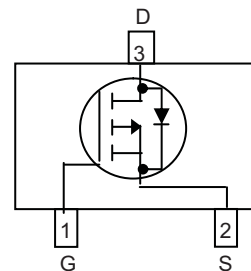
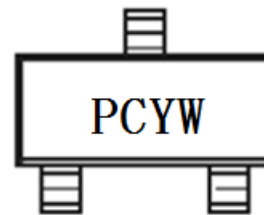
The WPM2083 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2083 is Pb-free and Halogen-free.

**Features**

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

**Applications**

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


**SOT-23**

**Pin configuration (Top view)**


PC = Device Code  
 Y = Year  
 W = Week(A~z)

**Marking**
**Order information**

Device	Package	Shipping
WPM2083-3/TR	SOT-23	3000/Tape&Reel

**Absolute Maximum ratings**

Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	-20		V	
Gate-Source Voltage	$V_{GS}$	±8			
Continuous Drain Current <sup>a d</sup>	$I_D$	$T_A=25^{\circ}C$	-2.4	-2.2	A
		$T_A=70^{\circ}C$	-1.9	-1.8	
Maximum Power Dissipation <sup>a d</sup>	$P_D$	$T_A=25^{\circ}C$	0.9	0.8	W
		$T_A=70^{\circ}C$	0.6	0.5	
Continuous Drain Current <sup>b d</sup>	$I_D$	$T_A=25^{\circ}C$	-2.2	-2.0	A
		$T_A=70^{\circ}C$	-1.7	-1.6	
Maximum Power Dissipation <sup>b d</sup>	$P_D$	$T_A=25^{\circ}C$	0.8	0.6	W
		$T_A=70^{\circ}C$	0.5	0.4	
Pulsed Drain Current <sup>c</sup>	$I_{DM}$	-10		A	
Operating Junction Temperature	$T_J$	-55 to 150		°C	
Lead Temperature	$T_L$	260		°C	
Storage Temperature Range	$T_{stg}$	-55 to 150		°C	

**Thermal resistance ratings**

Single Operation					
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$R_{\theta JA}$	$t \leq 10$ s	105	135	°C/W
		Steady State	120	155	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$R_{\theta JA}$	$t \leq 10$ s	130	160	
		Steady State	145	190	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	60	75		

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

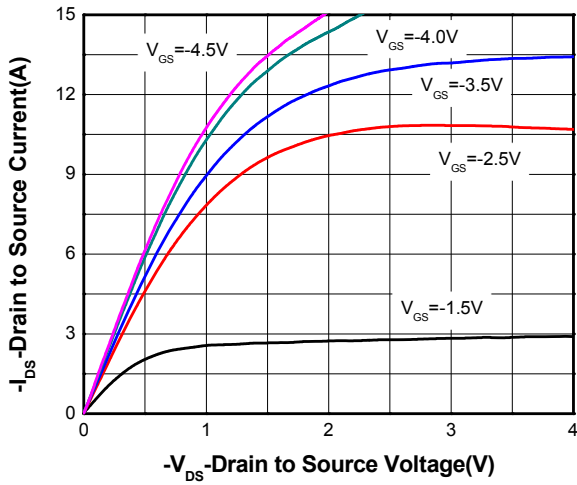
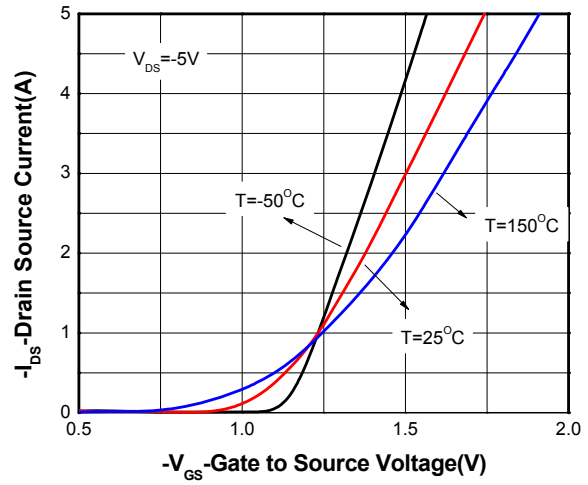
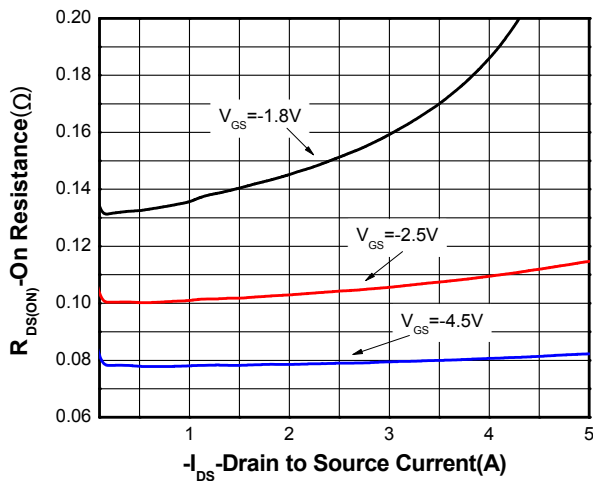
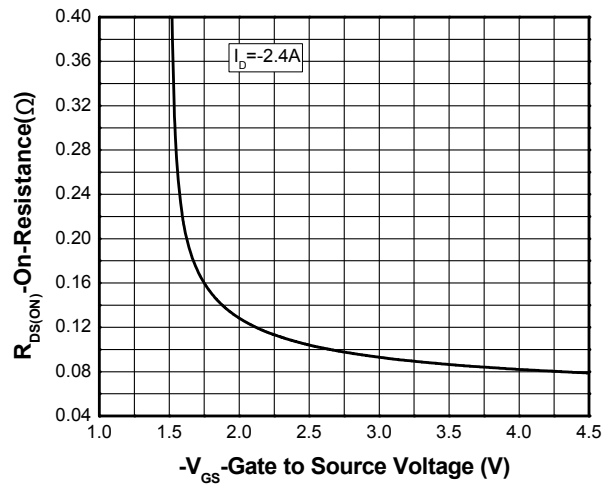
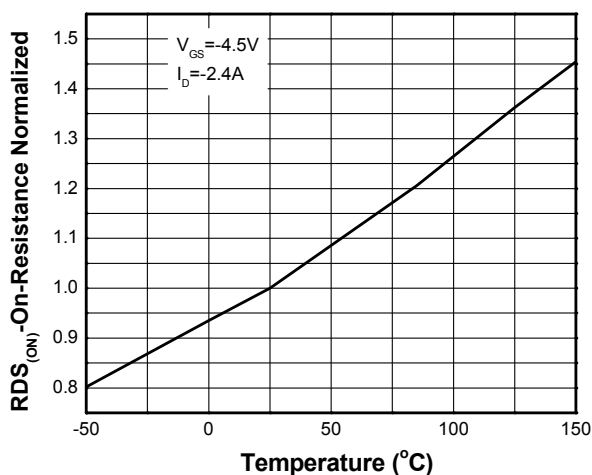
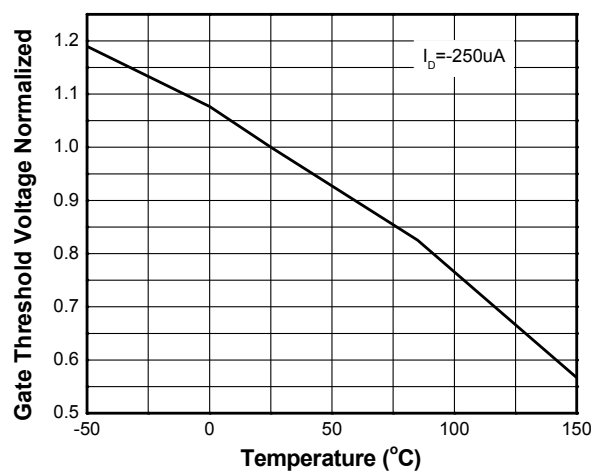
b Surface mounted on FR4 board using minimum pad size, 1oz copper

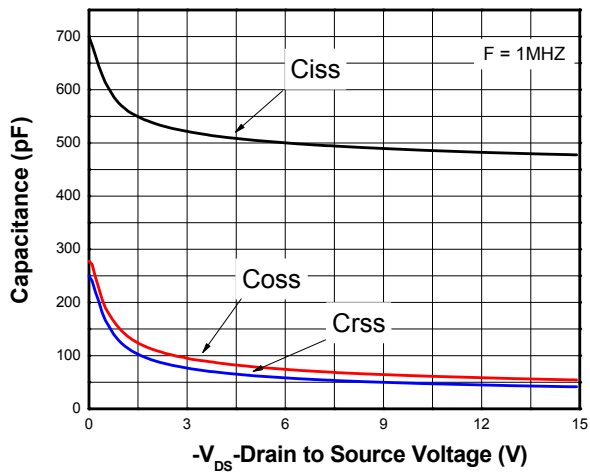
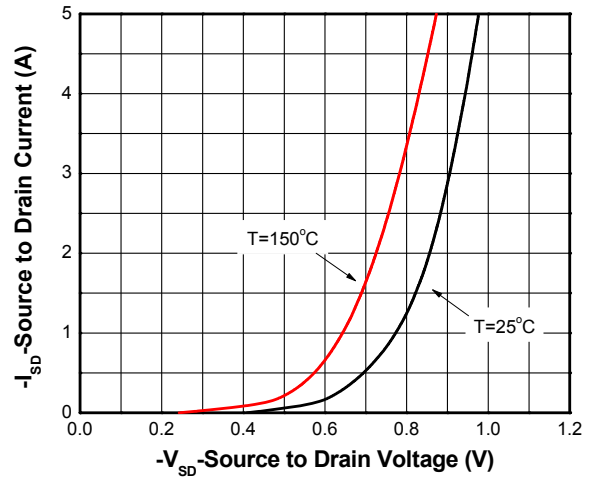
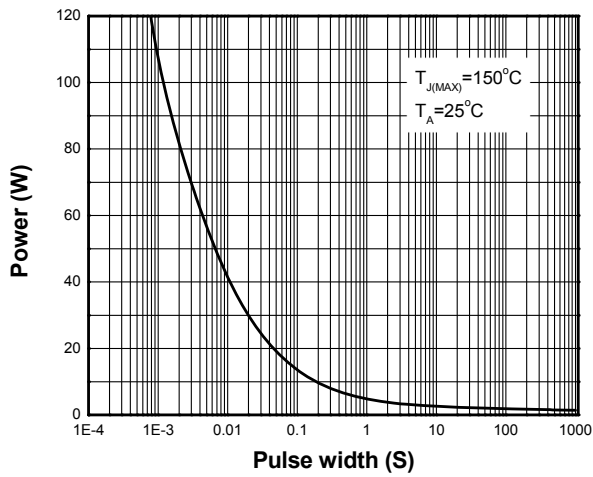
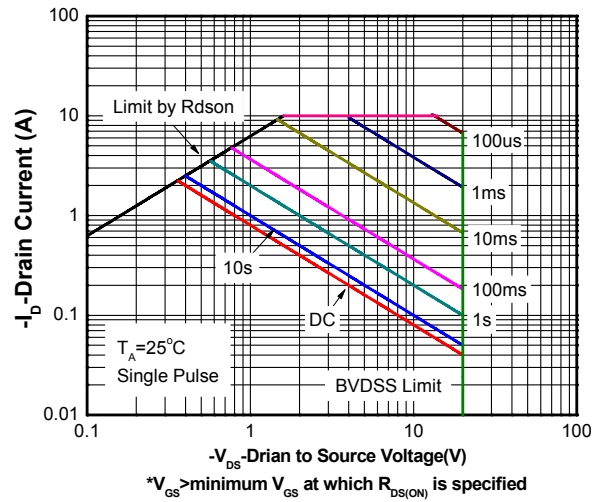
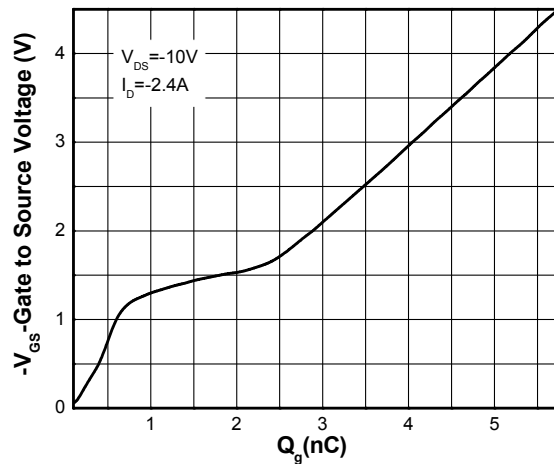
c Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu s$ , Duty Cycle=1%

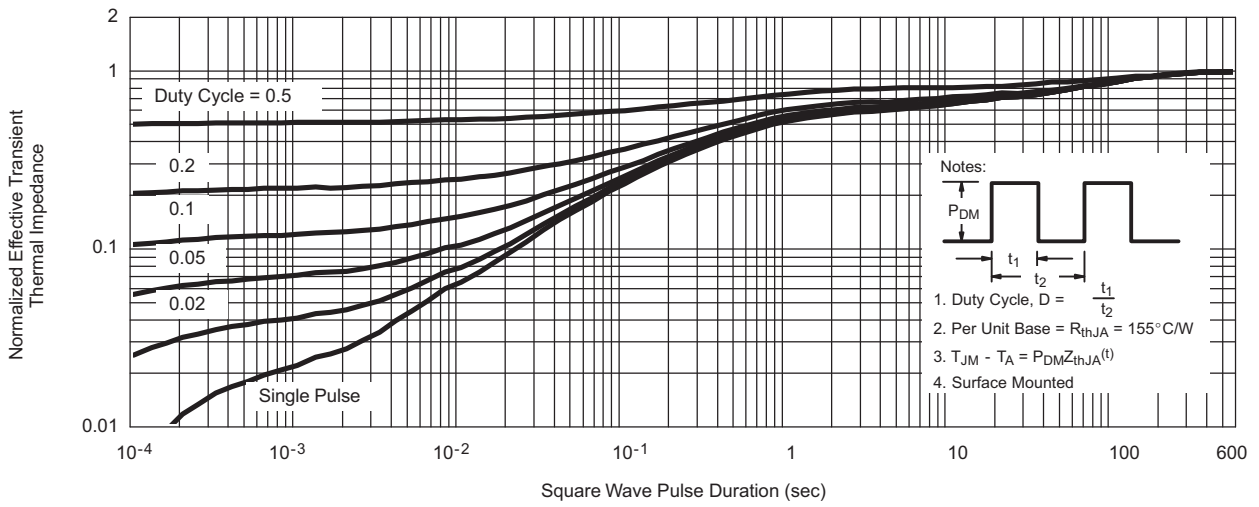
d Repetitive rating, pulse width limited by junction temperature  $T_J=150^{\circ}C$ .

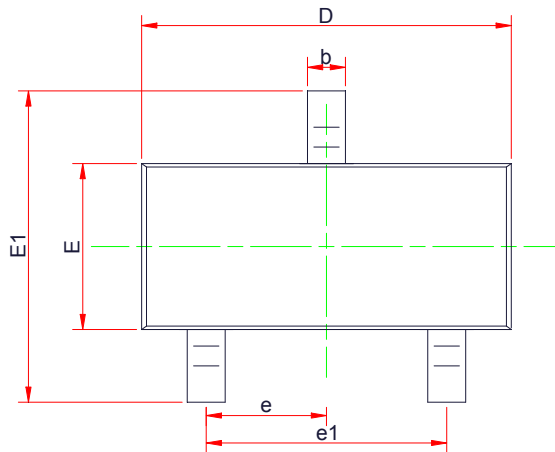
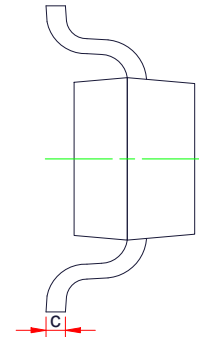
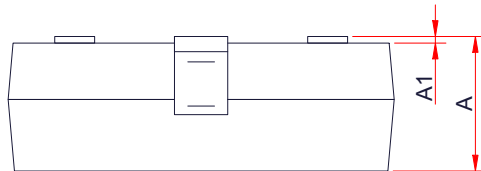
**Electronics Characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$	-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	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu\text{A}$	-0.4	-0.65	-1	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -2.4\text{ A}$		81	110	m $\Omega$
		$V_{GS} = -2.5\text{ V}, I_D = -2.0\text{ A}$		103	150	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = -10\text{ V}$		486		pF
Output Capacitance	$C_{OSS}$			62		
Reverse Transfer Capacitance	$C_{RSS}$			48		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -2.4\text{ A}$		5.8		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.5		
Gate-to-Source Charge	$Q_{GS}$			0.7		
Gate-to-Drain Charge	$Q_{GD}$			1.6		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = -4.5\text{ V}, V_{DS} = -6\text{ V}, I_D = -1\text{ A}, R_G = 6\Omega$		9.8		ns
Rise Time	$t_r$			4.4		
Turn-Off Delay Time	$t_d(OFF)$			35		
Fall Time	$t_f$			7.4		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = -2.4\text{ A}$		-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**

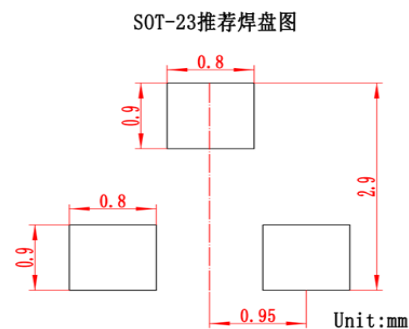
**Transient thermal response (Junction-to-Ambient)**


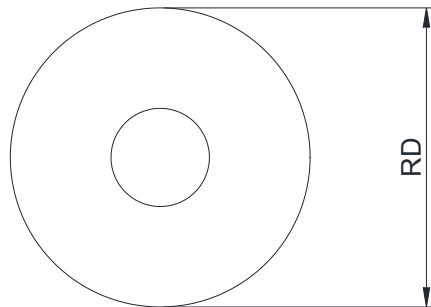
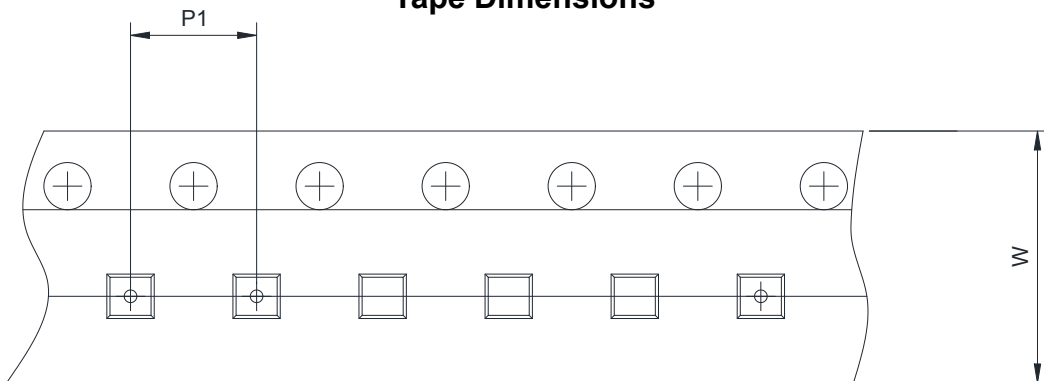
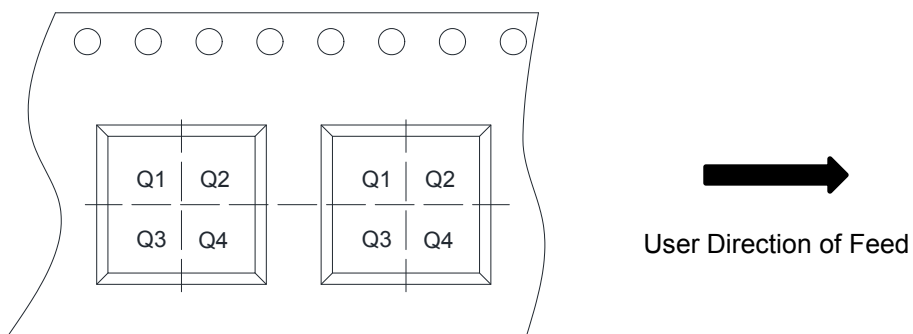
**Package outline dimensions**
**SOT-23**

**TOP VIEW**

**SIDE VIEW**

**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

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