WNM4009

Single N-Channel, 110V, 1.7A, Power MOSFET

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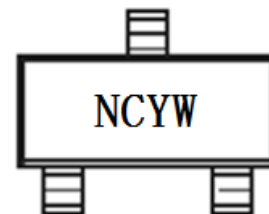| V_{DS} (V)	Typical Rds(on) (Ω)
110	0.235@ V_{GS}=10V
	0.260@ V_{GS}=4.5V

SOT-23

Descriptions

The WNM4009 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 WNM4009 is Pb-free and Halogen-free.
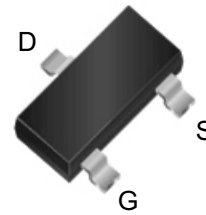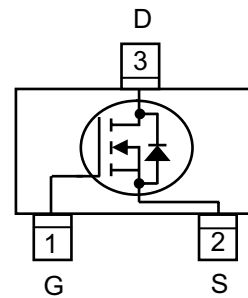
Pin configuration (Top view)

Features

● Trench Technology

● Supper high density cell design

● Excellent ON resistance for higher DC current

● Small package SOT-23

NC   = Device Code

Y   = Year

W   = Week

Marking

Applications

● Driver for Relay, Solenoid, Motor, LED etc.

● DC-DC converter circuit

● Power Switch

● Load Switch

● Charging

Order information

Device	Package	Shipping
WNM4009-3/TR	SOT-23	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	1S	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	110			V
Gate-Source Voltage		V_{GS}	± 20			
Continuous Drain Current [a][d]	T_A=25°C	I_D	2.03	1.70	1.45	A
	T_A=70°C		1.62	1.36	1.16	
Maximum Power Dissipation [a][d]	T_A=25°C	P_D	2.27	1.60	1.15	W
	T_A=70°C		1.45	1.02	0.74	
Continuous Drain Current [b][d]	T_A=25°C	I_D	1.88	1.50	1.34	A
	T_A=70°C		1.5	1.20	1.07	
Maximum Power Dissipation [b][d]	T_A=25°C	P_D	1.95	1.25	1.00	W
	T_A=70°C		1.25	0.80	0.64	
Pulsed Drain Current [c]		I_{DM}	7			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

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 1 s	$R_{\theta JA}$	40	55	°C/W
	t ≤ 10 s		60	78	
	Steady State		88	108	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 1 s	$R_{\theta JA}$	50	64	
	t ≤ 10 s		85	100	
	Steady State		105	125	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	60	75	

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<380µs, Duty Cycle<2%

d   Maximum junction temperature T_J=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}	$V_{GS} = 0V$, $I_D = 250uA$	110			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 90V$, $V_{GS} = 0V$			1	uA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0 V$, $V_{GS} = \pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = 250uA$	1	1.9	2.5	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 1.5A$		235	310	mΩ
		$V_{GS} = 4.5V$, $I_D = 1.3A$		260	350	
Forward Trans conductance	g_{fs}	$V_{DS} = 10V$, $I_D = 3A$		1.1		S
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	$V_{GS} = 0 V$,		317		pF
Output Capacitance	C_{OSS}	f = 1.0 MHz,		28		
Reverse Transfer Capacitance	C_{RSS}	$V_{DS} = 25 V$		14		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10 V$,		7.5		nC
Threshold Gate Charge	$Q_{G(TH)}$	$V_{DD} = 80 V$,		0.7		
Gate-to-Source Charge	Q_{GS}	$I_D = 1.5 A$		1.1		
Gate-to-Drain Charge	Q_{GD}			2.1		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	$V_{GS} = 10 V$,		11.8		ns
Rise Time	tr	$V_{DD} = 50 V$,		13.2		
Turn-Off Delay Time	td(OFF)	$R_L = 50 \ \Omega$,		32.8		
Fall Time	tf	$R_G = 3.3 \ \Omega$		4.8		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0 V$, $I_S = 1A$		0.8	1.2	V

Typical Characteristics (Ta=25°C, unless otherwise noted)
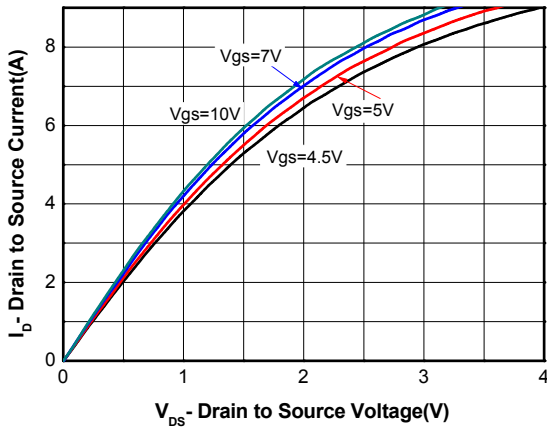
Output characteristics
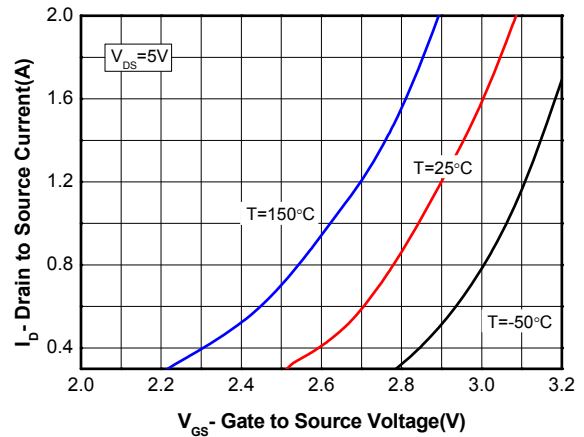
Transfer characteristics
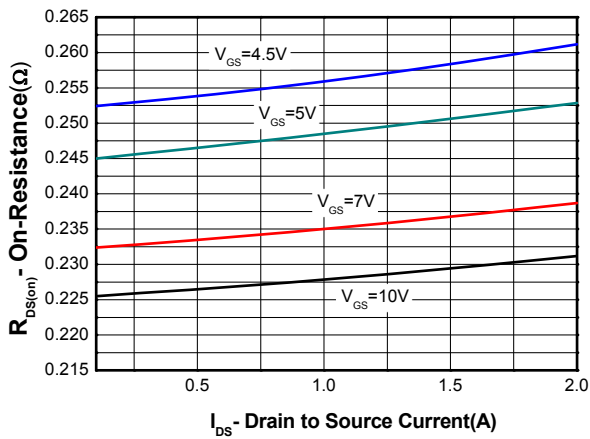
On-Resistance vs. Drain current
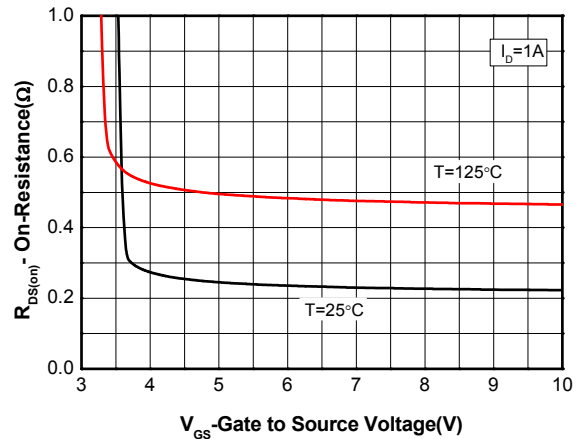
On-Resistance vs. Gate-to-Source voltage
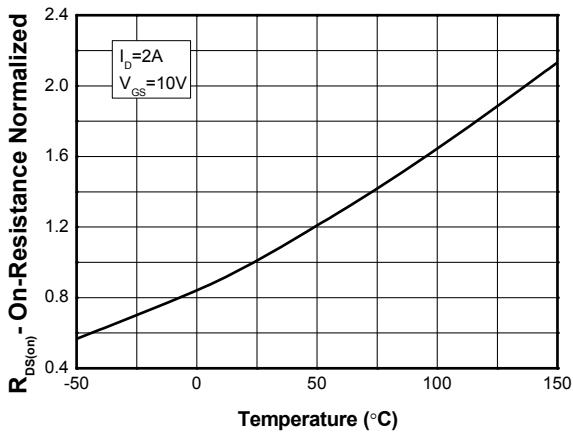
On-Resistance vs. Junction temperature
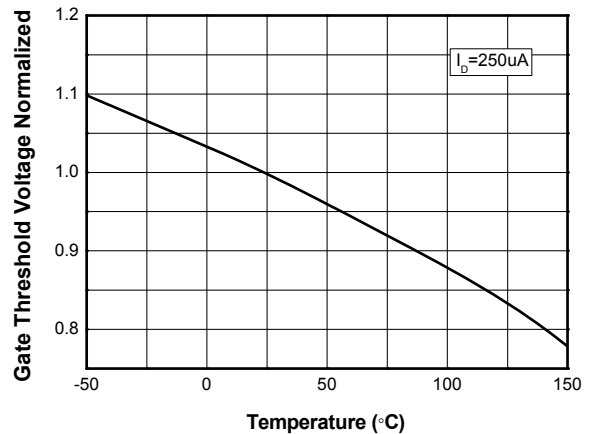
Threshold voltage vs.Junction temperature
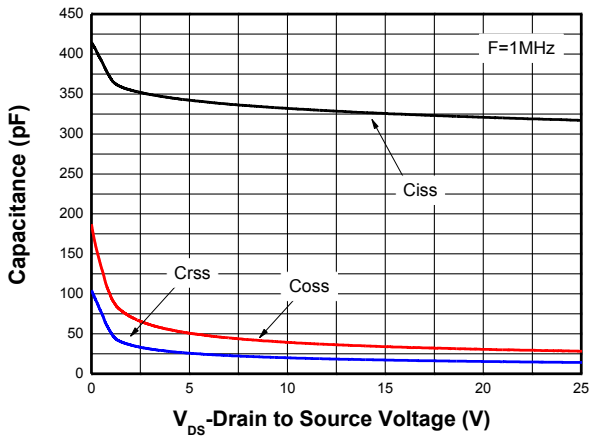
Capacitance
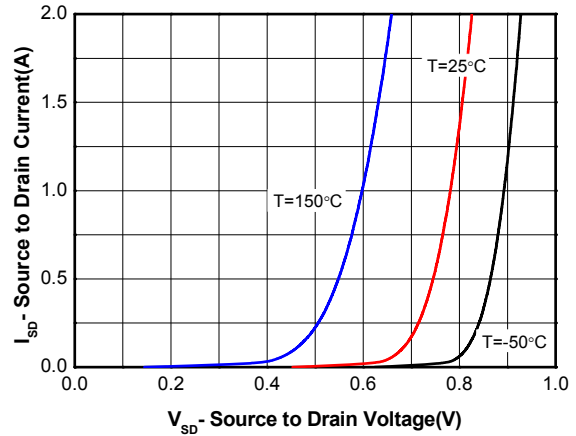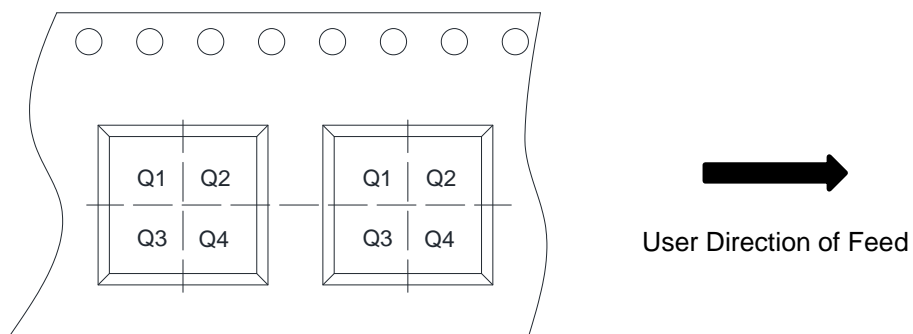

Body diode forward voltage

Single pulse power

*V_{GS}>minimum V_{GS} at which $R_{DS(ON)}$ is specified
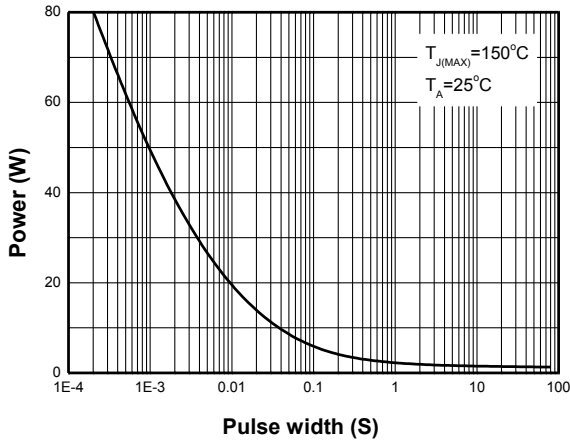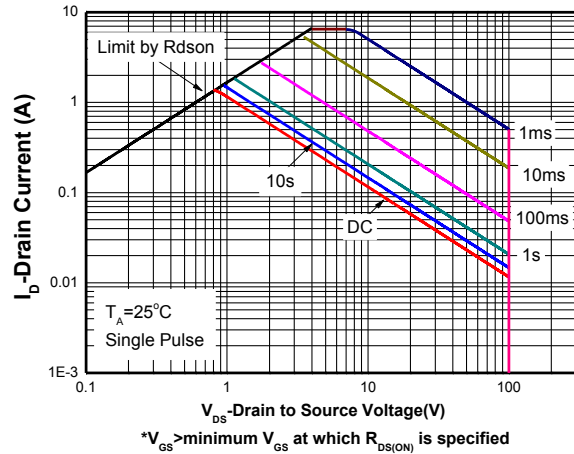
Safe operating power
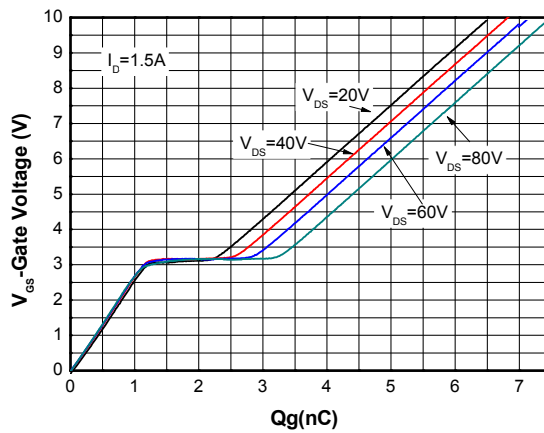
Gate charge Characteristics
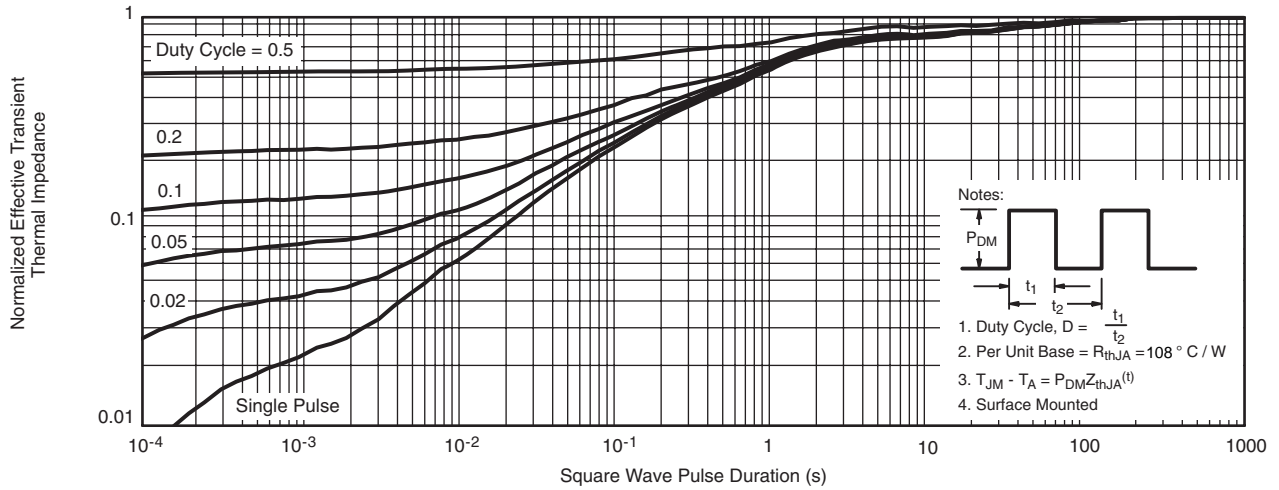
Transient thermal response (Junction-to-Ambient)

Package outline dimensions

SOT-23
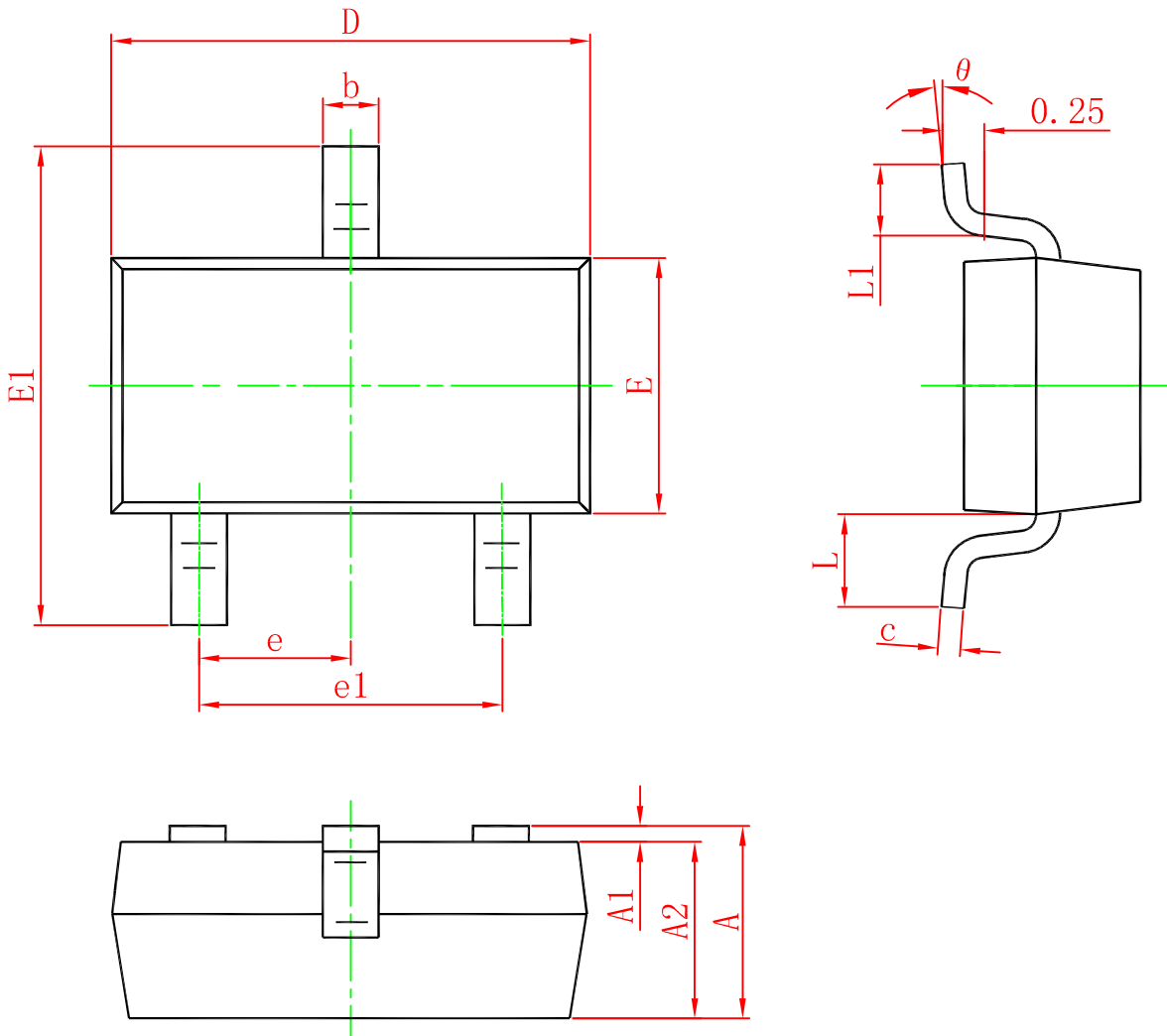
Symbol	Dimensions In Millimeters	
	Min.	**Max.**
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 (Typ.)	
e1	1.800	2.000
L	0.550 (Typ.)	
L1	0.300	0.500
θ	0°	8°

APE AND REEL INFORMATION

Reel Dimensions
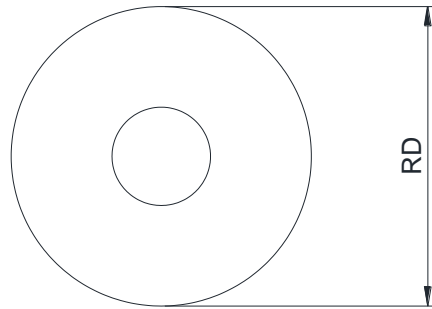
Tape Dimensions
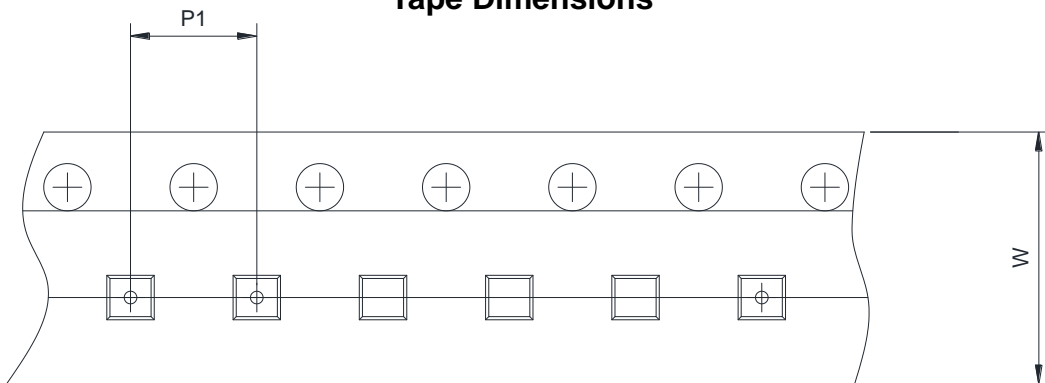
Quadrant Assignments For PIN1 Orientation In Tape

| Q1 | Q2 |
| Q3 | Q4 |

User Direction of Feed

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

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