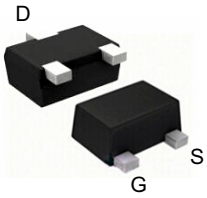
WNM2021FL

N-Channel, 20V, 0.89A, Small Signal MOSFET

Http://www.sh-willsemi.com

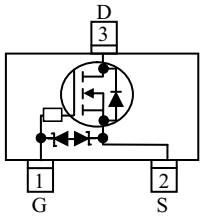
V_{DS} (V)	Rds(on) (Ω)
20	0.220@ V_{GS}=4.5V
	0.260@ V_{GS}=2.5V
	0.320@ V_{GS}=1.8V



SOT-323

Descriptions

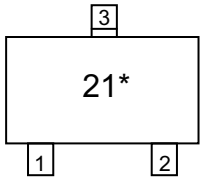
The WNM2021FL is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2021FL is Pb-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-323



21 = Device Code

* = Month (A~Z)

Marking

Applications

- DC-DC converter circuit
- Small Signal Switch
- Load Switch
- Level Shift

Order information

Device	Package	Shipping
WNM2021FL-3/TR	SOT-323	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}	±6		
Continuous Drain Current [a]	T_A=25°C	I_D	0.89	0.82	A
	T_A=70°C		0.71	0.65	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.37	0.31	W
	T_A=70°C		0.23	0.20	
Continuous Drain Current [b]	T_A=25°C	I_D	0.78	0.70	A
	T_A=70°C		0.62	0.56	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.29	0.23	W
	T_A=70°C		0.18	0.14	
Pulsed Drain Current [c]		I_{DM}	1.4		A
Operating Junction Temperature		T_J	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 ≤ 10 s	$R_{\theta JA}$	275	335	°C/W
	Steady State		325	395	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	375	430	
	Steady State		445	535	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	260	300	

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

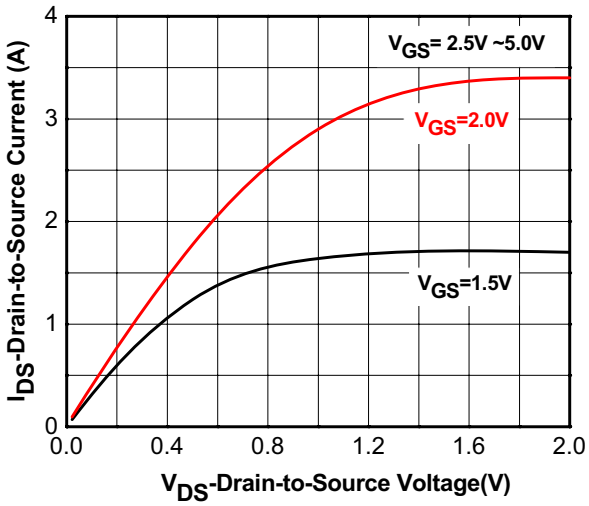
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

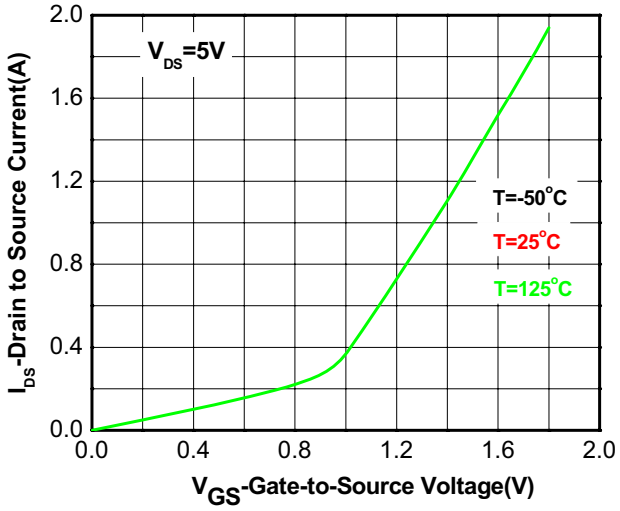
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =16 V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} =±5V			5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.45	0.58	0.85	V
Drain-to-source On-resistance	$R_{DS(on)}$	VGS = 4.5V, ID = 0.55A		220	310	mΩ
		VGS = 2.5V, ID = 0.45A		260	360	
		VGS = 1.8V, ID = 0.35A		320	460	
Forward Transconductance	g_{FS}	VDS = 5 V, ID = 0.55A		2.0		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 100 kHz, V_{DS} = 10 V		50		pF
Output Capacitance	C_{OSS}			13		
Reverse Transfer Capacitance	C_{RSS}			8		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 0.55A		1.15		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.06		
Gate-to-Source Charge	Q_{GS}			0.15		
Gate-to-Drain Charge	Q_{GD}			0.23		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{DD}=10V, V_{GS}=4.5V, I_D=0.55A, R_G=6Ω		22		ns
Rise Time	tr			80		
Turn-Off Delay Time	td(OFF)			700		
Fall Time	tf			380		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 0.35A	0.5	0.7	1.5	V

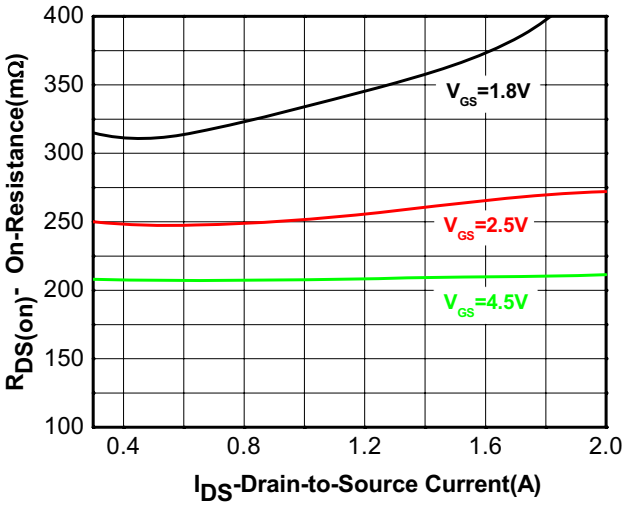
Typical Characteristics (Ta=25°C, unless otherwise noted)



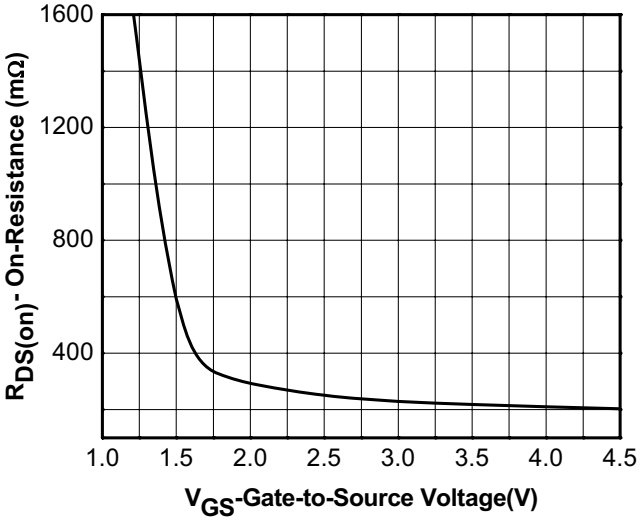
Output characteristics



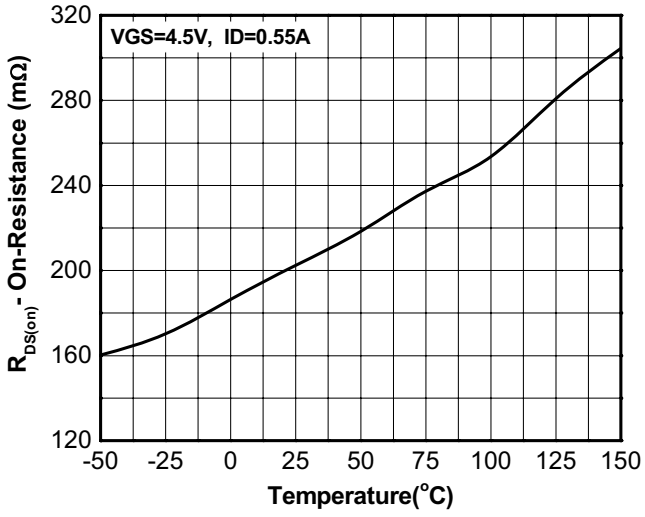
Transfer characteristics



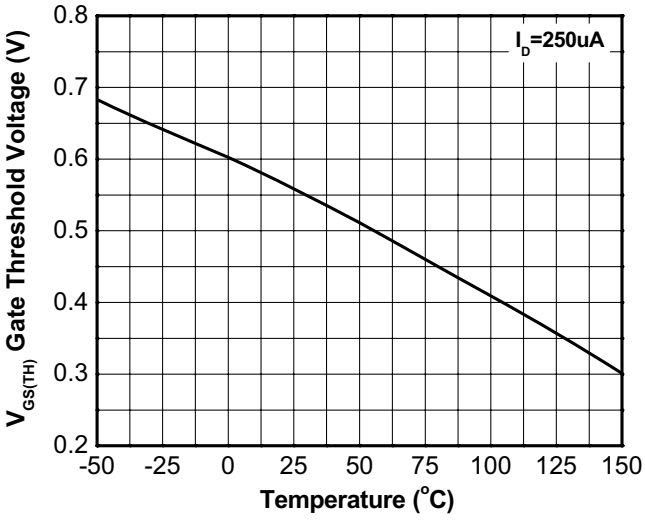
On-Resistance vs. Drain current



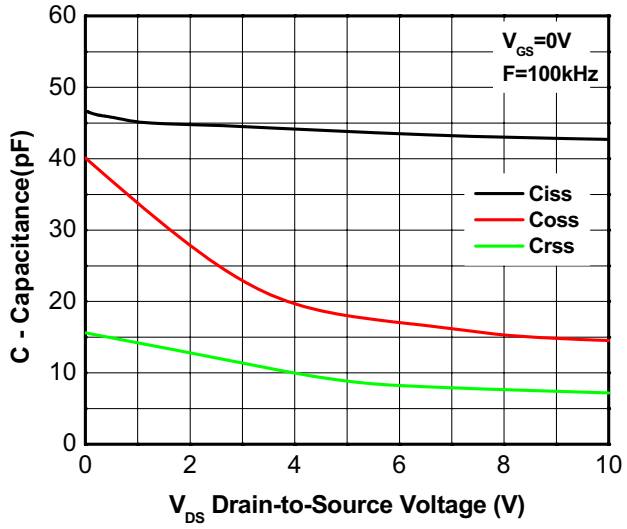
On-Resistance vs. Gate-to-Source voltage



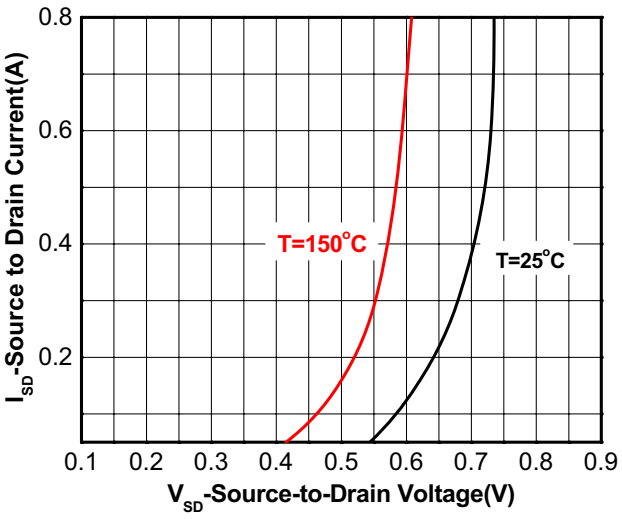
On-Resistance vs. Junction temperature



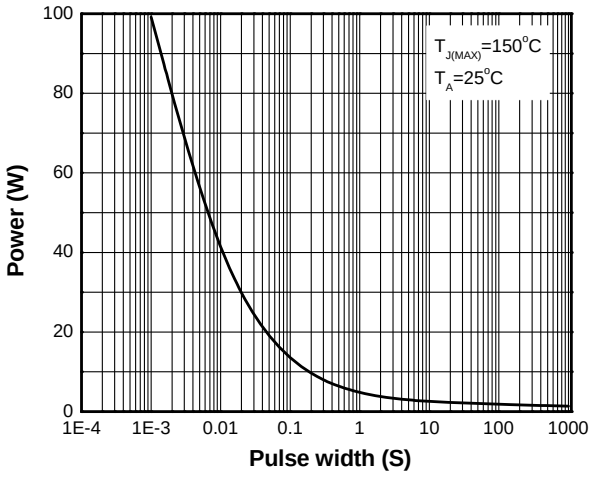
Threshold voltage vs. Temperature



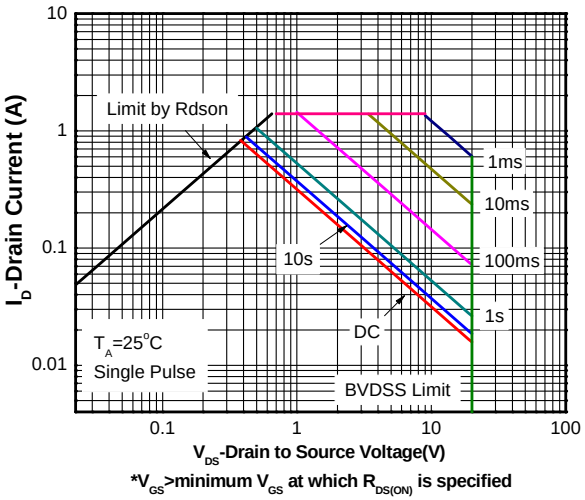
Capacitance



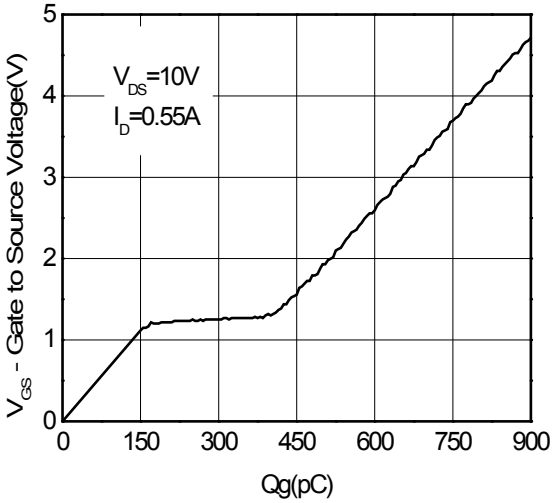
Body diode forward voltage



Single pulse power

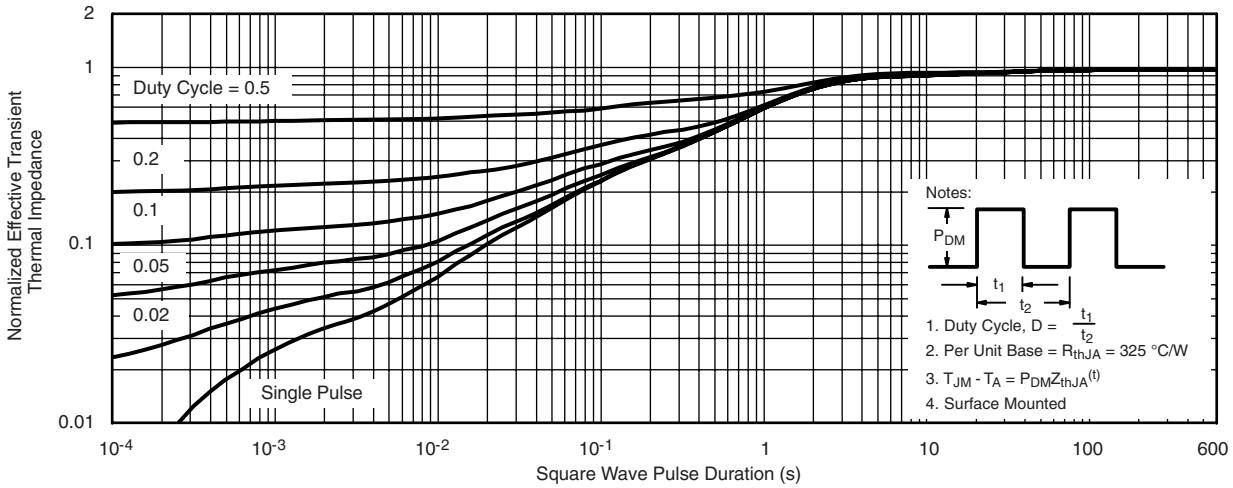


Safe operating power



Gate Charge Characteristics

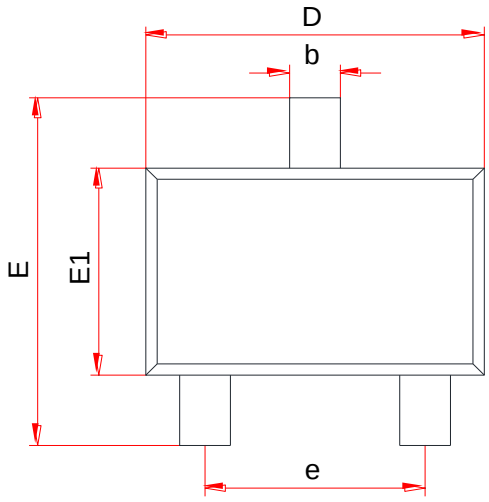
Transient thermal response (Junction-to-Ambient)



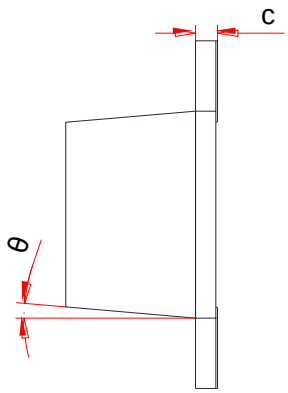
Transient thermal response (Junction-to-Ambient)

Package outline dimensions

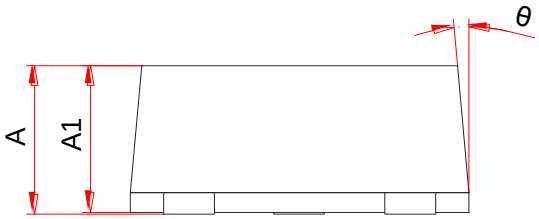
SOT-323



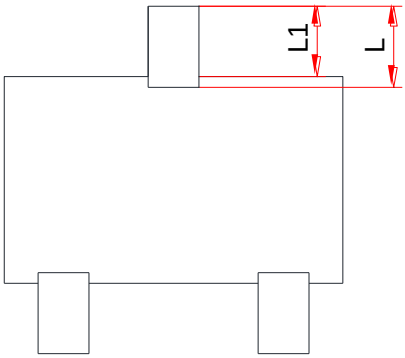
Top View



Side View



Side View

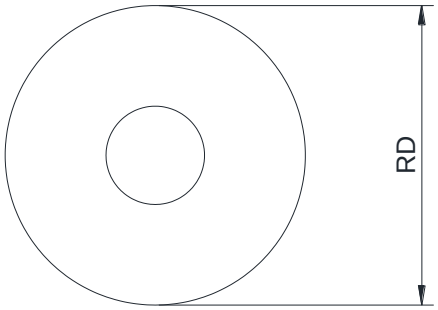


Bottom View

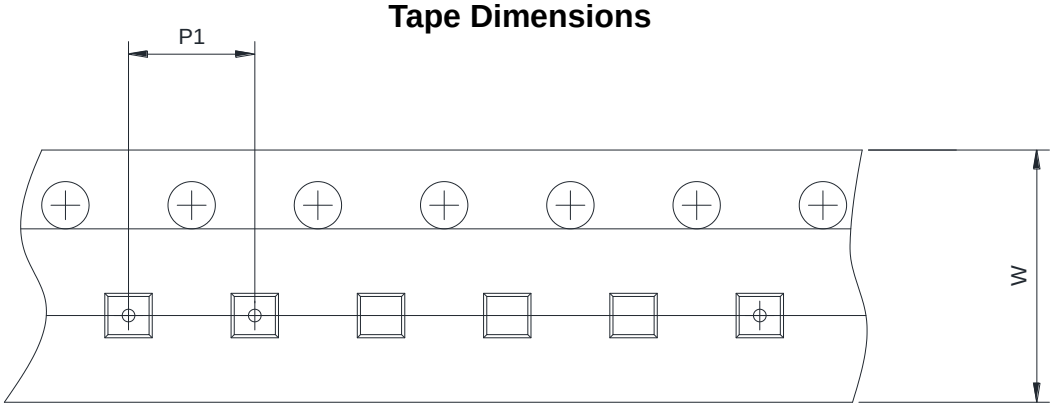
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.800	0.900	1.000
A1		0.890 Ref.	
b	0.280	0.300	0.350
e	1.200	1.300	1.400
c	0.110	0.130	0.180
D	1.800	2.000	2.200
E	2.000	2.100	2.200
E1	1.150	1.250	1.350
L		0.490 Ref.	
L1	0.375	0.425	0.475
θ		5° Ref.	

TAPE AND REEL INFORMATION

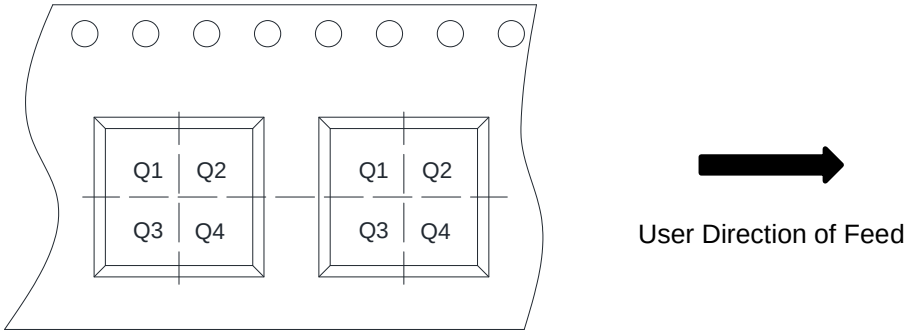
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



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