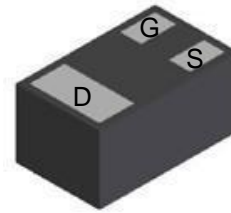


WNM2046
Single N-Channel, 20V, 0.71A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
20	0.220 @ $V_{GS}=4.5V$
	0.260 @ $V_{GS}=2.5V$
	0.315 @ $V_{GS}=1.8V$


DFN1006-3L
Descriptions

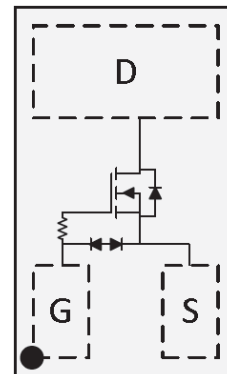
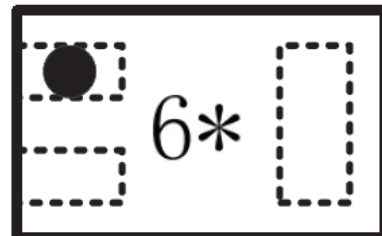
The WNM2046 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2046 is Pb-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package DFN1006-3L

Applications

- Small Signal Switching
- Small Moto Driver


Pin configuration (Top view)


6 = Device Code
 * = Month (A~Z)

Marking
Order information

Device	Package	Shipping
WNM2046-3/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}	± 5		
Continuous Drain Current ^{a d}	$T_A=25^\circ\text{C}$	I_D	0.71	0.66	A
	$T_A=70^\circ\text{C}$		0.57	0.52	
Maximum Power Dissipation ^{a d}	$T_A=25^\circ\text{C}$	P_D	0.32	0.27	W
	$T_A=70^\circ\text{C}$		0.20	0.17	
Continuous Drain Current ^{b d}	$T_A=25^\circ\text{C}$	I_D	0.67	0.62	A
	$T_A=70^\circ\text{C}$		0.54	0.50	
Maximum Power Dissipation ^{b d}	$T_A=25^\circ\text{C}$	P_D	0.28	0.24	W
	$T_A=70^\circ\text{C}$		0.18	0.15	
Pulsed Drain Current ^c		I_{DM}	1.4		A
Operating Junction Temperature		T_J	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 ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	350	390	$^\circ\text{C/W}$
	Steady State		395	455	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10 \text{ s}$	$R_{\theta JA}$	397	435	
	Steady State		445	505	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	240	280	

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

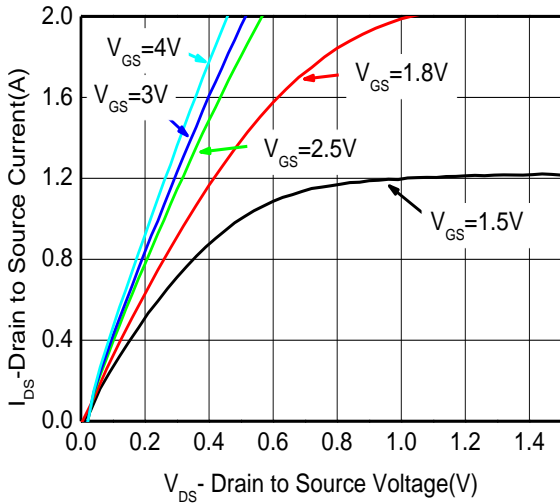
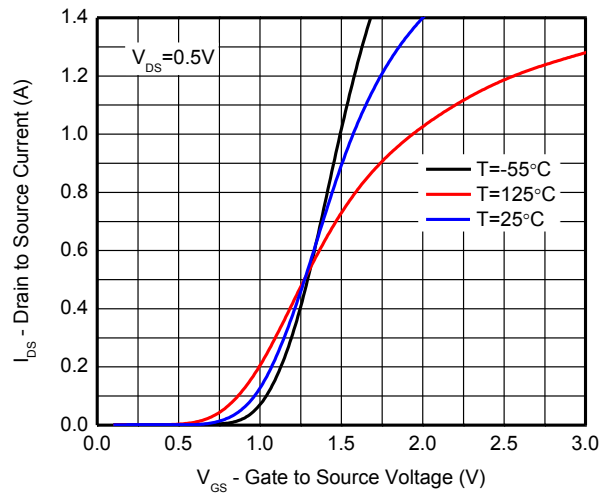
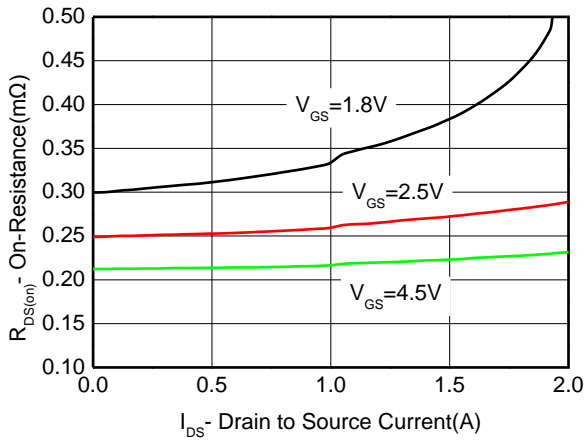
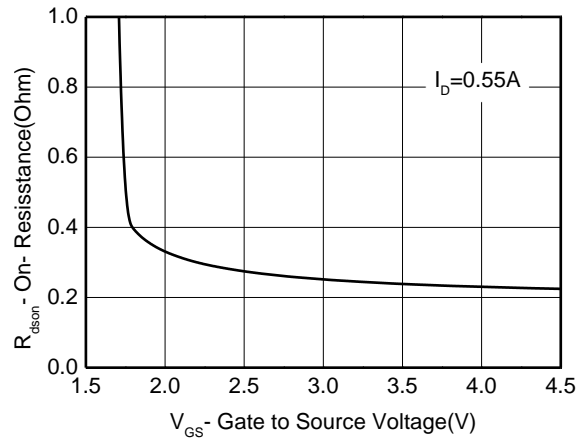
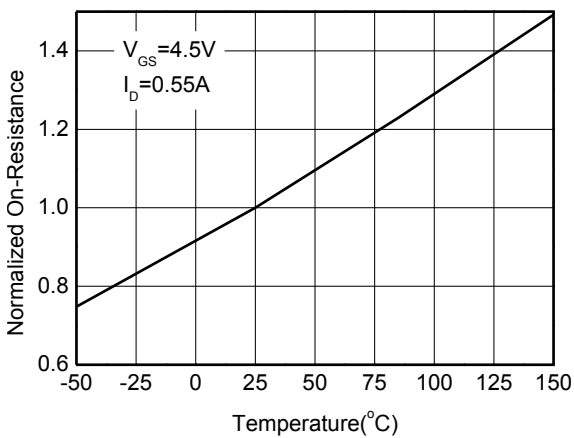
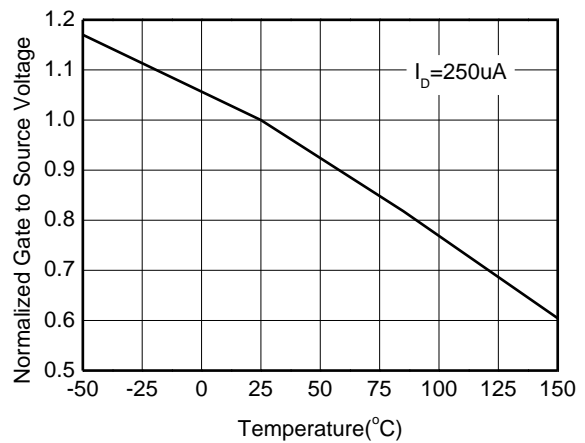
c Pulse width < 380 μs , Single pulse

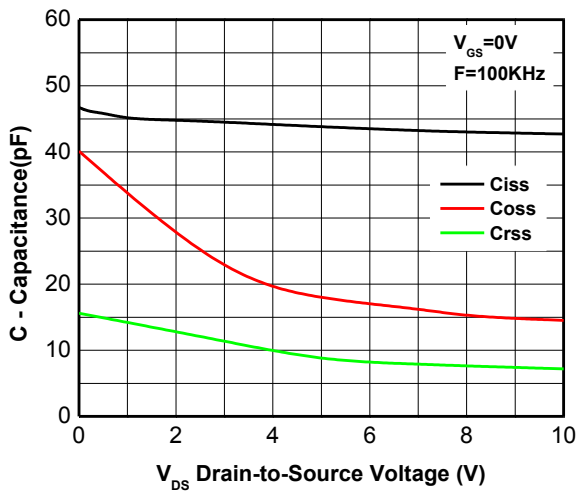
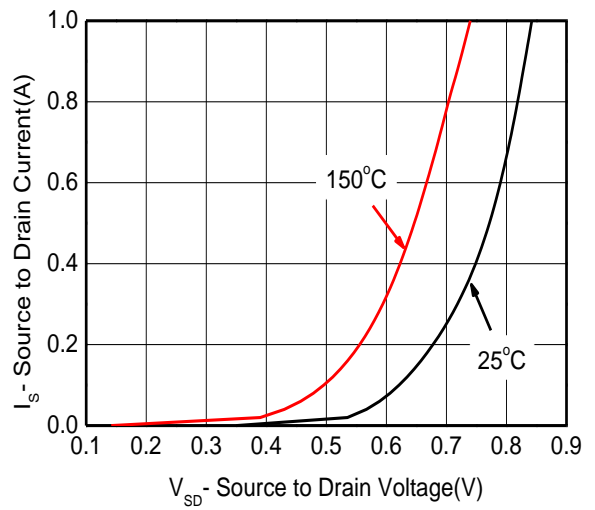
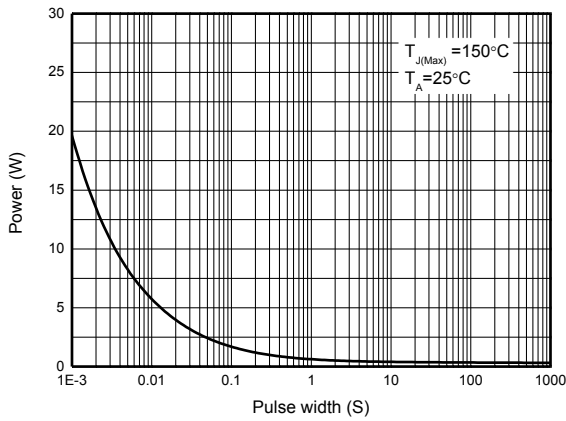
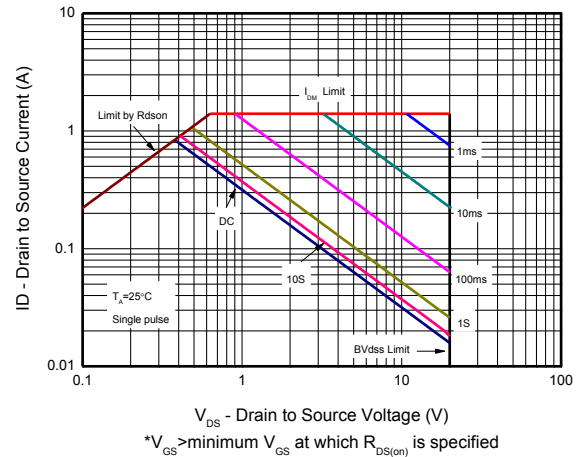
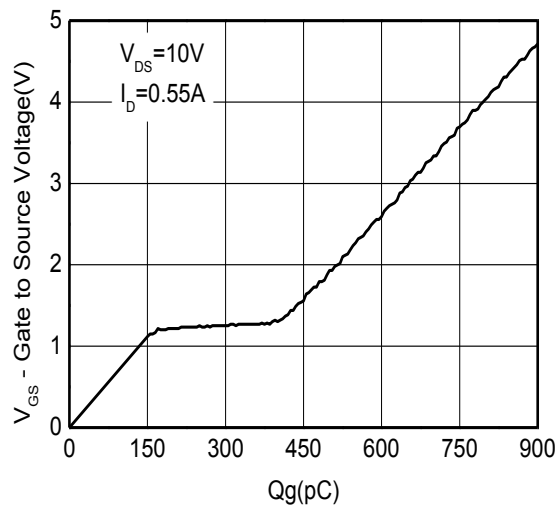
d Maximum junction temperature $T_J=150^\circ \text{C}$.

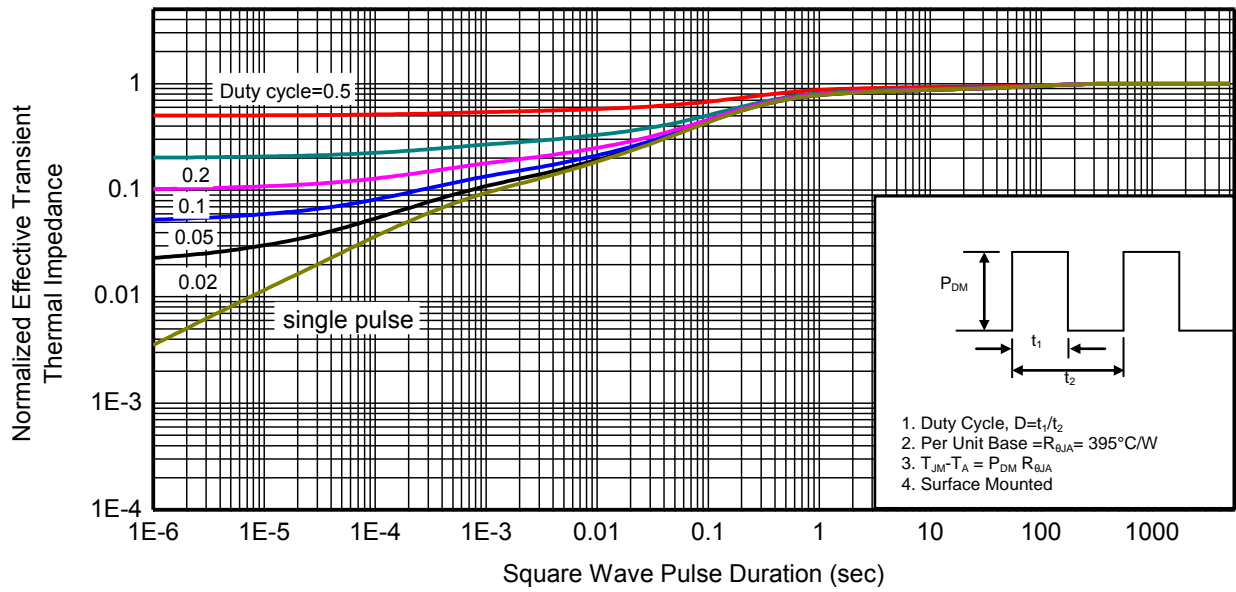
e Pulse test: Pulse width < 380 us duty cycle < 2%.

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

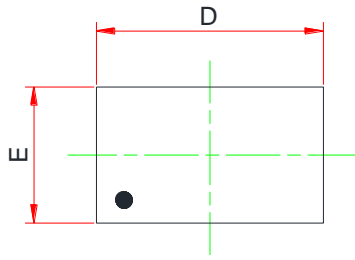
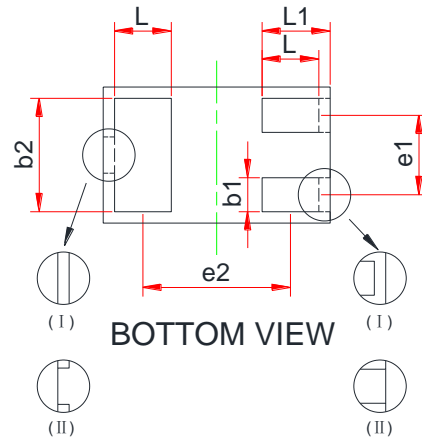
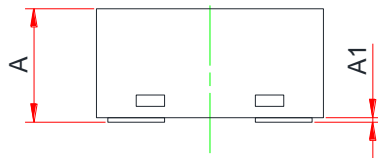
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			± 5	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.45	0.58	0.85	V
Drain-to-source On-resistance ^e	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 0.55\text{ A}$		220	420	m Ω
		$V_{GS} = 2.5\text{ V}, I_D = 0.45\text{ A}$		260	500	
		$V_{GS} = 1.8\text{ V}, I_D = 0.35\text{ A}$		315	600	
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 0.55\text{ A}$		2.0		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 10\text{ V}$		50.6		pF
Output Capacitance	C_{OSS}			13.2		
Reverse Transfer Capacitance	C_{RSS}			8.3		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 0.55\text{ A}$		0.87		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.06		
Gate-to-Source Charge	Q_{GS}			0.15		
Gate-to-Drain Charge	Q_{GD}			0.27		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 0.55\text{ A}, R_G = 6\ \Omega$		34		ns
Rise Time	t_r			97.6		
Turn-Off Delay Time	$t_d(OFF)$			606		
Fall Time	t_f			318		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 0.35\text{ A}$	0.5	0.7	1.1	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


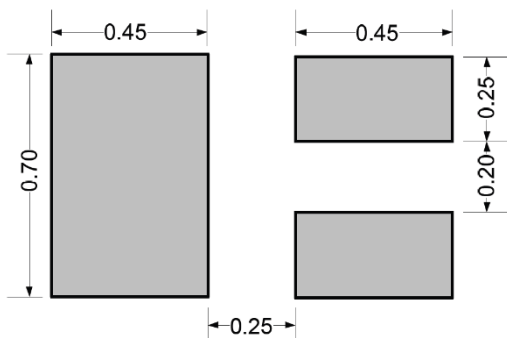


Transient thermal response (Junction-to-Ambient)

PACKAGE OUTLINE DIMENSIONS
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	0.35Ref		
e2	0.65 Ref		

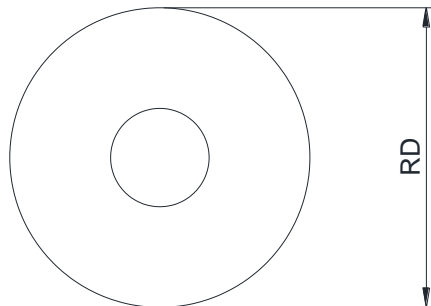
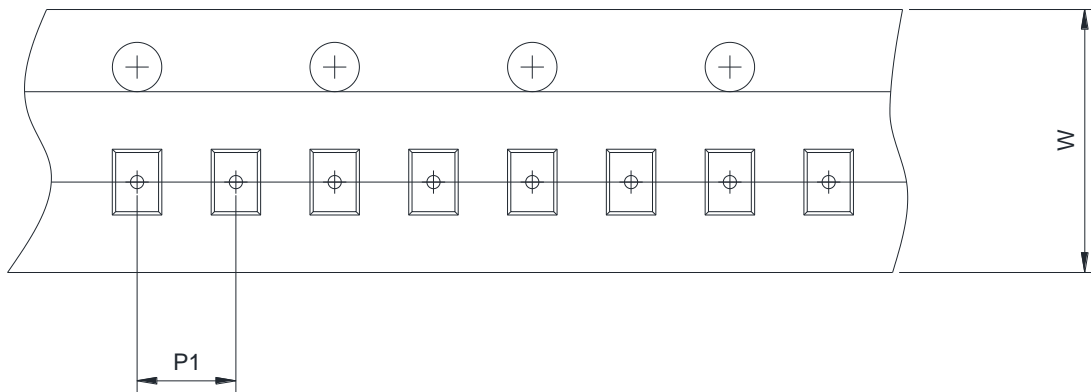
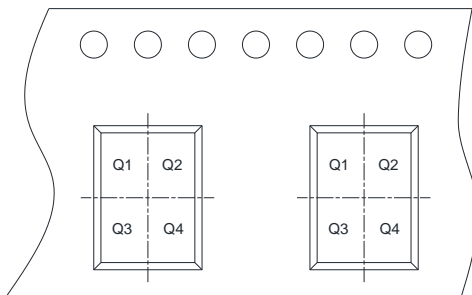
Recommend land pattern (Unit: mm)



Note: This land pattern is for your reference only. Actual pad layouts may vary depending on application.

TAPE AND REEL INFORMATION

Reel Dimensions

Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape



 User Direction of Feed

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

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