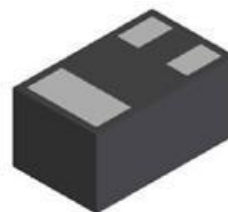


**Single N-Channel, 20V, 0.55A, Power MOSFET**

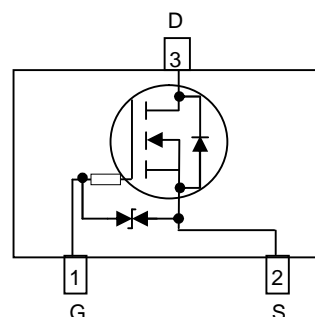
V <sub>DS</sub> (V)	Typical R <sub>ds(on)</sub> ( )
20	0.220@ V <sub>GS</sub> =4.5V
	0.260@ V <sub>GS</sub> =2.5V
	0.315@ V <sub>GS</sub> =1.8V



**DFN1006-3L**

**Descriptions**

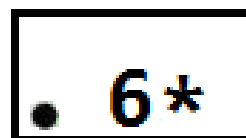
The WNM2046 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<sub>DS (ON)</sub> with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2046 is Pb-free.



**Pin configuration (Top view)**

**Features**

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



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

**Marking**

**Applications**

- Small Signal Switching
- Small Moto Driver

**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 <sup>a d</sup>	$T_A=25^{\circ}C$	$I_D$	0.84	0.78	A
	$T_A=70^{\circ}C$		0.67	0.62	
Maximum Power Dissipation <sup>a d</sup>	$T_A=25^{\circ}C$	$P_D$	0.32	0.27	W
	$T_A=70^{\circ}C$		0.20	0.17	
Continuous Drain Current <sup>b d</sup>	$T_A=25^{\circ}C$	$I_D$	0.79	0.74	A
	$T_A=70^{\circ}C$		0.63	0.59	
Maximum Power Dissipation <sup>b d</sup>	$T_A=25^{\circ}C$	$P_D$	0.28	0.24	W
	$T_A=70^{\circ}C$		0.18	0.15	
Pulsed Drain Current <sup>c</sup>		$I_{DM}$	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 <sup>a</sup>	t 10 s	$R_{JA}$	350	390	°C/W
	Steady State		395	455	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	t 10 s	$R_{JA}$	397	435	
	Steady State		445	505	
Junction-to-Case Thermal Resistance		$R_{JC}$	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<380µs, Single pulse

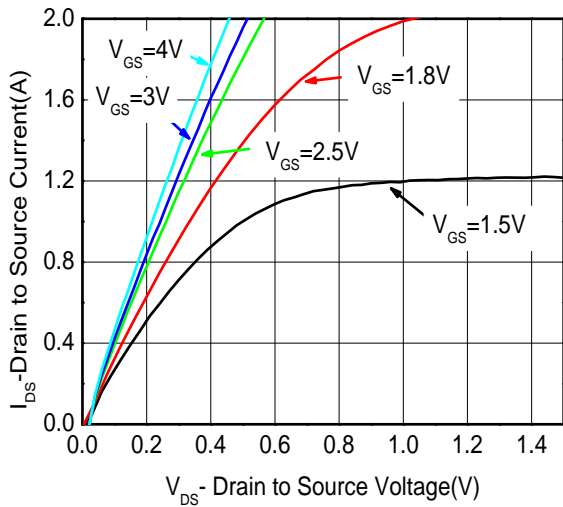
d Maximum junction temperature  $T_J=150^{\circ}C$ .

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

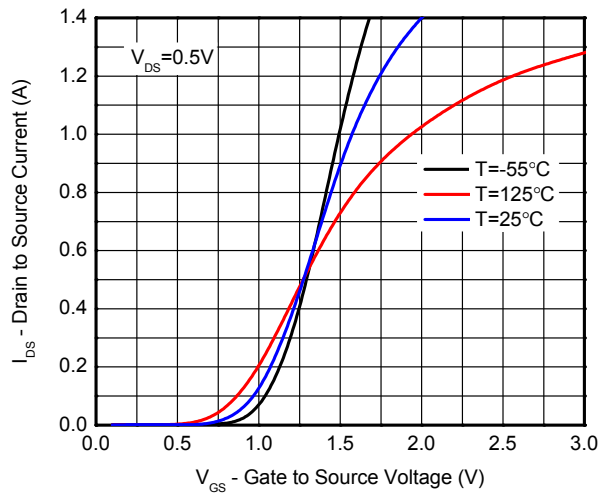
**Electronics Characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250uA	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0V			1	uA
Gate-to-source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±5V			±5	uA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250uA	0.45	0.58	0.85	V
Drain-to-source On-resistance <sup>e</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.55A		220	800	m
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 0.45A		260	1000	
		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 0.35A		315	1500	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 0.55A		2.0		S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, f = 1.0 MHz, V <sub>DS</sub> = 10 V		50.6		pF
Output Capacitance	C <sub>OSS</sub>			13.2		
Reverse Transfer Capacitance	C <sub>RSS</sub>			8.3		
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.55A		0.87		nC
Threshold Gate Charge	Q <sub>G(TH)</sub>			0.06		
Gate-to-Source Charge	Q <sub>GS</sub>			0.15		
Gate-to-Drain Charge	Q <sub>GD</sub>			0.27		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	td(ON)	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.55A, R <sub>G</sub> = 6		34		ns
Rise Time	tr			97.6		
Turn-Off Delay Time	td(OFF)			606		
Fall Time	tf			318		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 0.35A	0.5	0.7	1.1	V

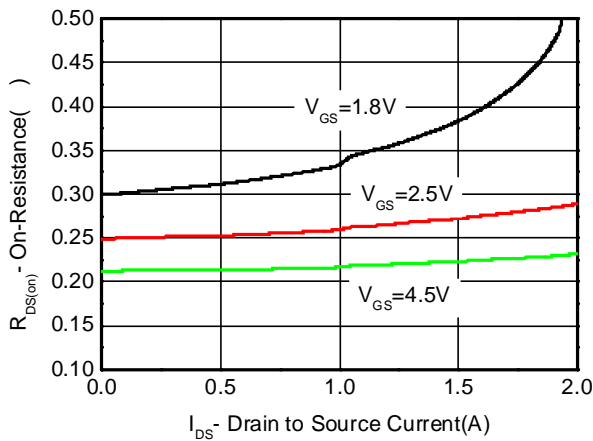
Typical Characteristics (Ta=25°C, unless otherwise noted)



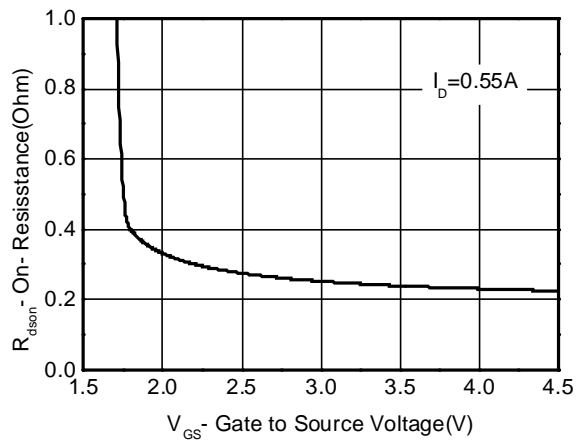
Output characteristics



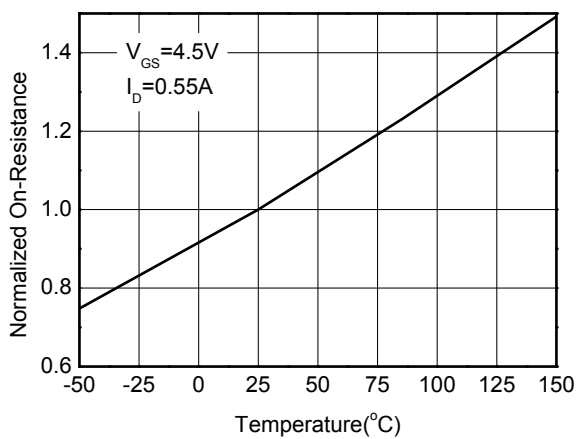
Transfer characteristics



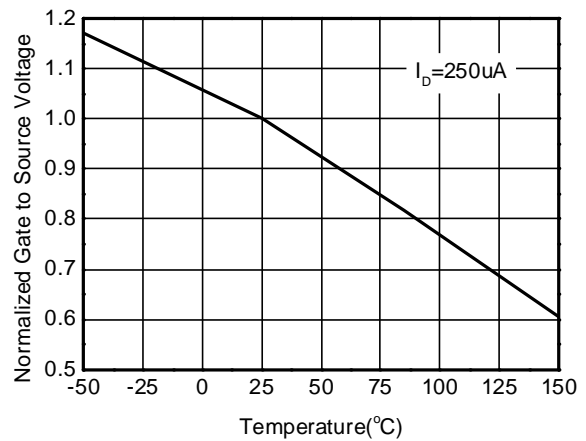
On-Resistance vs. Drain current



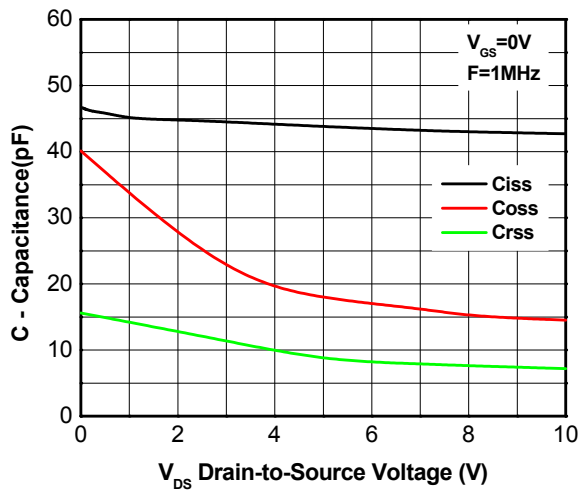
On-Resistance vs. Gate-to-Source voltage



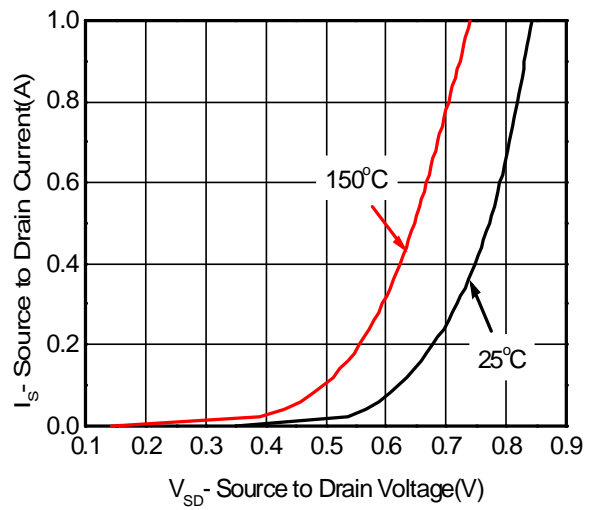
On-Resistance vs. Junction temperature



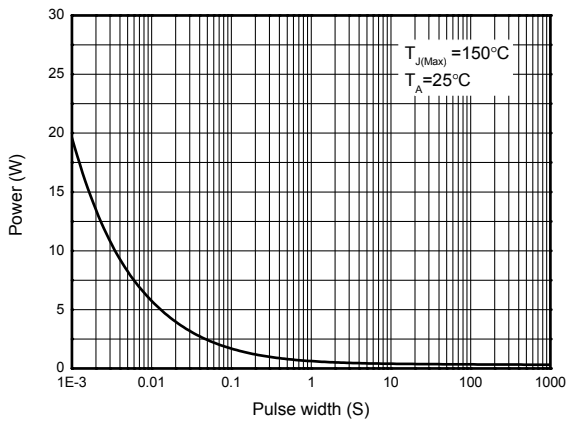
Threshold voltage vs. Temperature



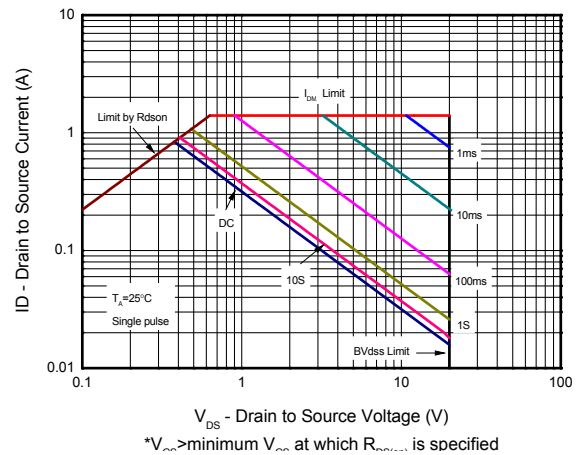
Capacitance



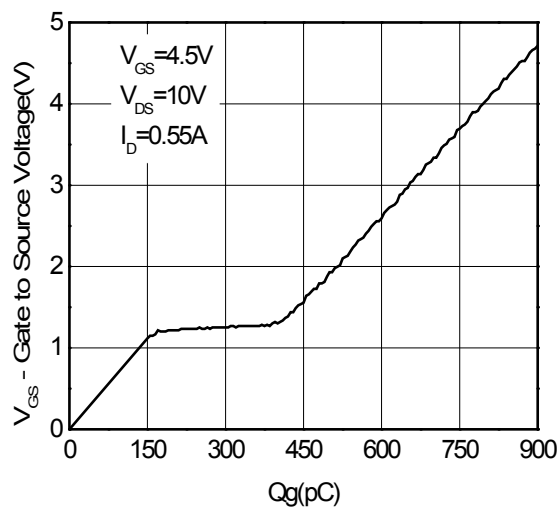
Body diode forward voltage

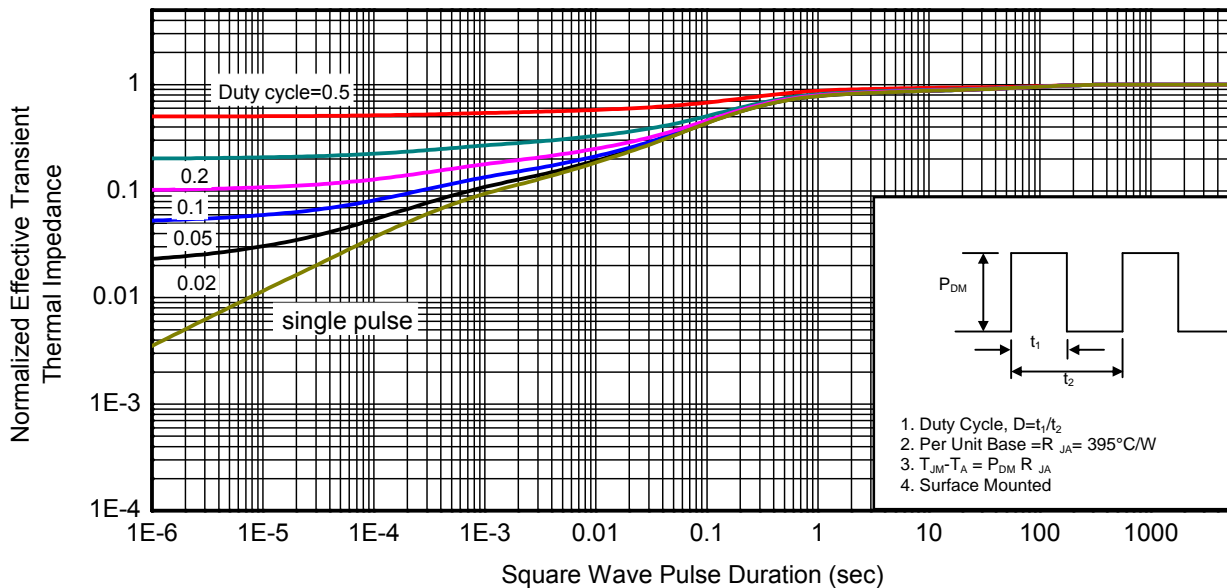


Single pulse power



Safe operating power

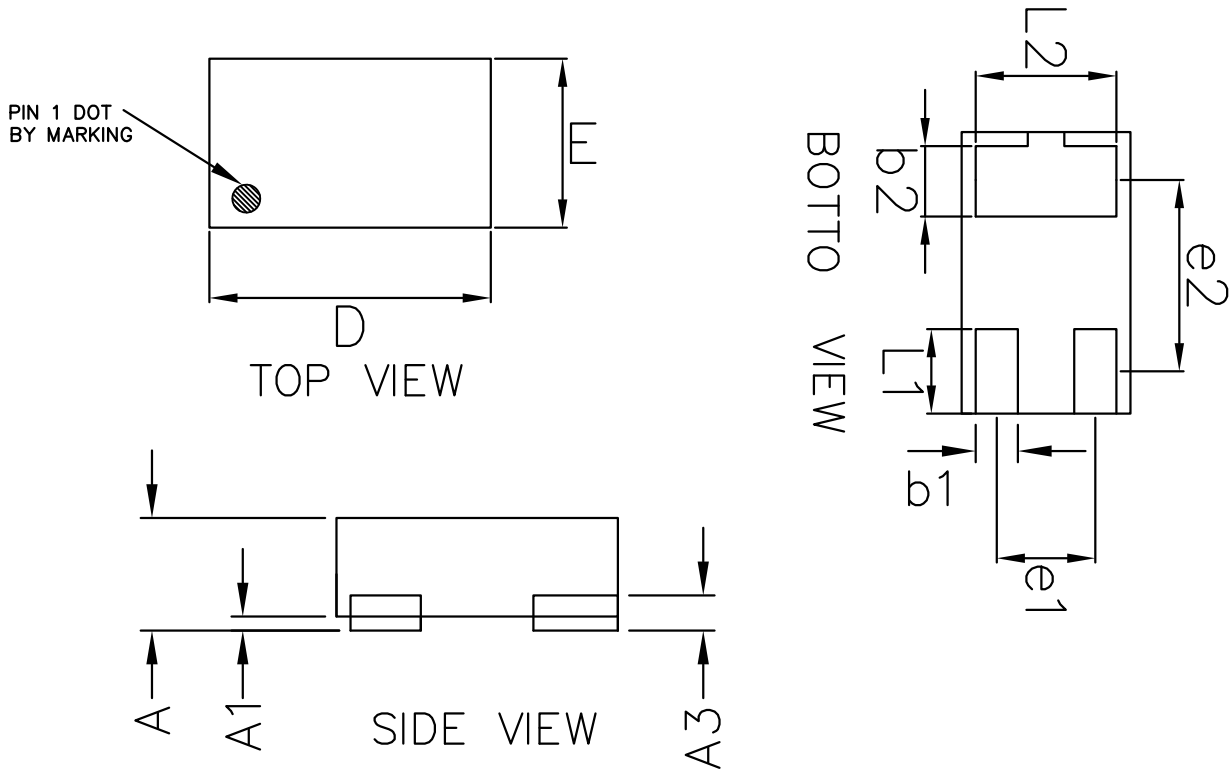




Transient thermal response (Junction-to-Ambient)

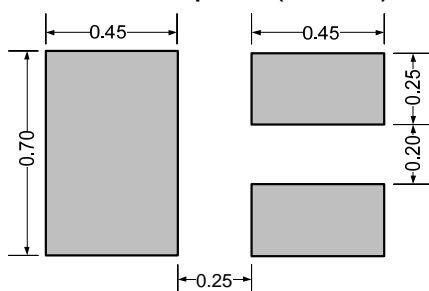
Package outline dimensions

DFN1006-3L



COMMON DIMENSIONS(MM)			
PKG.	X1: EXTREME THIN		
REF.	MIN.	NOM.	MAX
A	>0.40	—	0.50
A1	0.00	—	0.05
A3	0.125 REF.		
D	0.95	1.00	1.05
E	0.55	0.60	0.65
b1	0.10	0.15	0.20
b2	0.20	0.25	0.30
L1	0.20	0.30	0.40
L2	0.40	0.50	0.60
e1	0.35 BSC		
e2	0.675 BSC		

Recommend land pattern (Unit: mm)



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