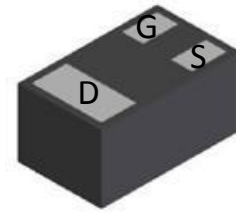
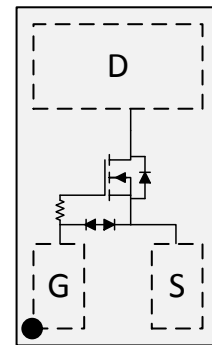


**WNM2046C**
**Single N-Channel, 20V, 0.6A, Power MOSFET**
[Http://www.willsemi.com](http://www.willsemi.com)

$V_{DS}$ (V)	Typical $R_{DS(on)}$ ( $\Omega$ )
20	0.42 @ $V_{GS}=4.5V$
	0.58 @ $V_{GS}=2.5V$
	0.84 @ $V_{GS}=1.8V$


**DFN1006-3L**

**Descriptions**

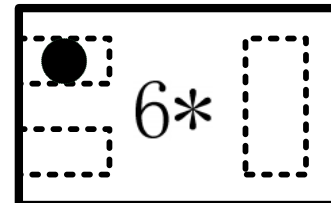
The WPM2046C is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2046C is Pb-free.

**Features**

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

**Applications**

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

**Pin configuration (Top view)**


6 = Device Code

\* = Month(A~z)

**Marking**
**Order information**

Device	Package	Shipping
WNM2046C-3/TR	DFN1006-3L	10K/Tape&Reel

**Absolute Maximum ratings**

Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	20		V	
Gate-Source Voltage	$V_{GS}$	$\pm 10$			
Continuous Drain Current <sup>a d</sup>	$I_D$	$T_A=25^\circ\text{C}$	0.6	0.55	A
		$T_A=70^\circ\text{C}$	0.48	0.44	
Maximum Power Dissipation <sup>a d</sup>	$P_D$	$T_A=25^\circ\text{C}$	0.32	0.27	W
		$T_A=70^\circ\text{C}$	0.21	0.18	
Continuous Drain Current <sup>b d</sup>	$I_D$	$T_A=25^\circ\text{C}$	0.57	0.52	A
		$T_A=70^\circ\text{C}$	0.45	0.42	
Maximum Power Dissipation <sup>b d</sup>	$P_D$	$T_A=25^\circ\text{C}$	0.29	0.25	W
		$T_A=70^\circ\text{C}$	0.18	0.16	
Pulsed Drain Current <sup>c</sup>	$I_{DM}$	1.4		A	
Operating Junction Temperature	$T_J$	-55 to 150		$^\circ\text{C}$	
Lead Temperature	$T_L$	260		$^\circ\text{C}$	
Storage Temperature Range	$T_{stg}$	-55 to 150		$^\circ\text{C}$	

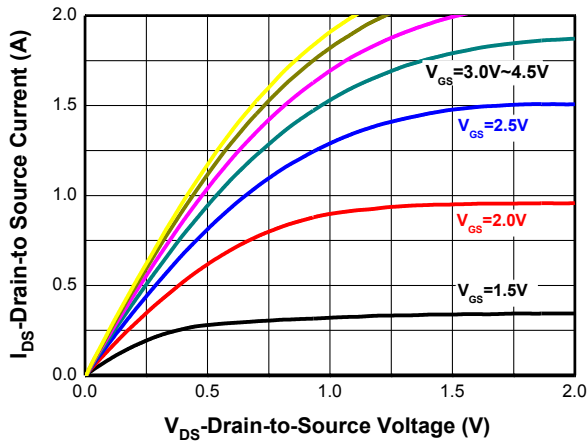
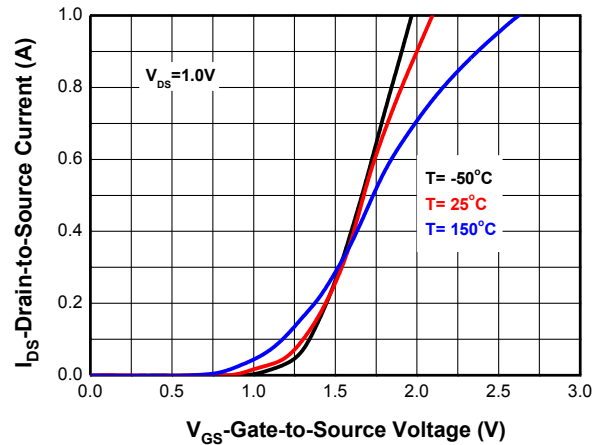
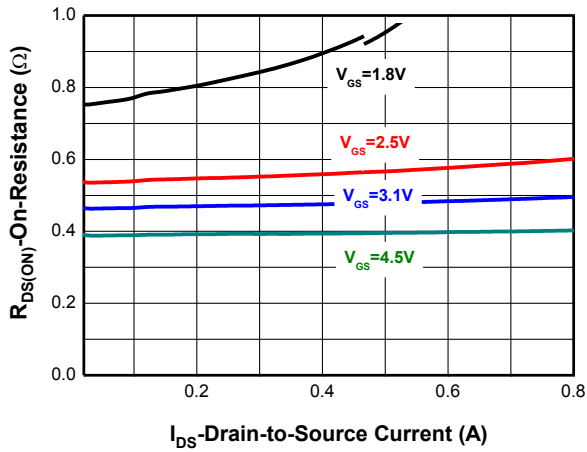
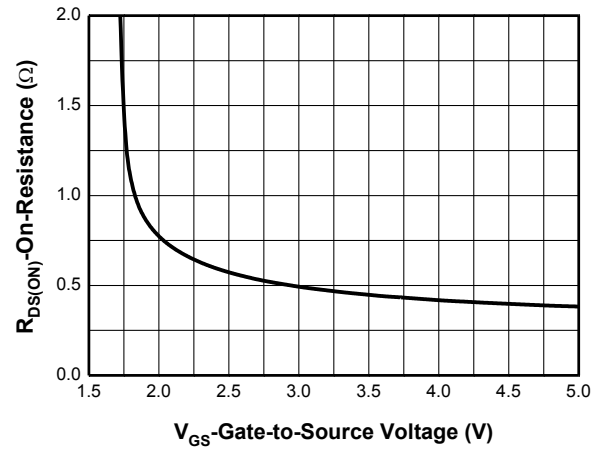
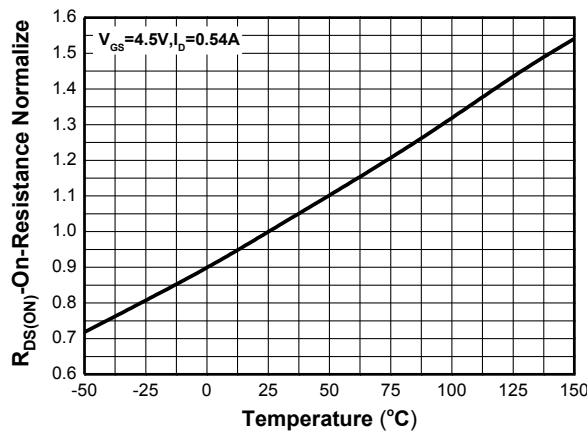
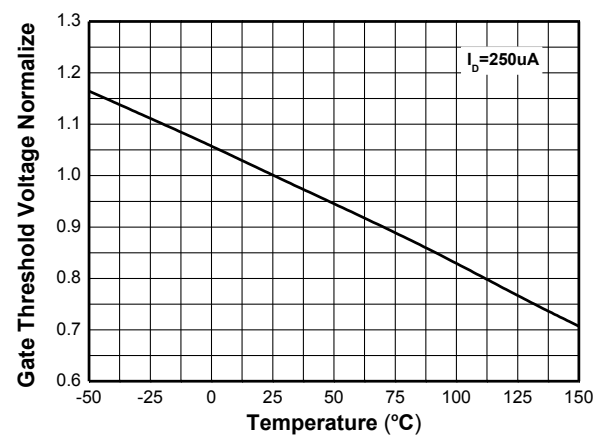
**Thermal resistance ratings**

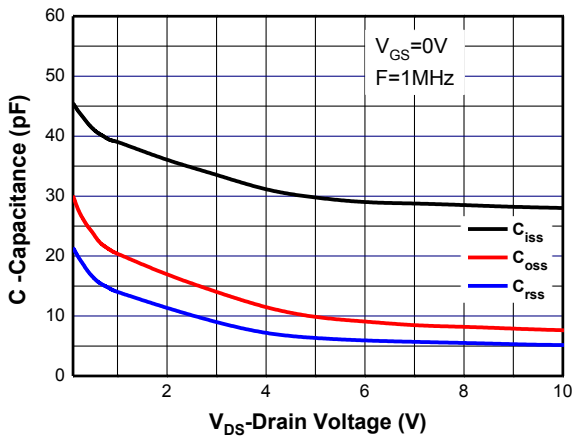
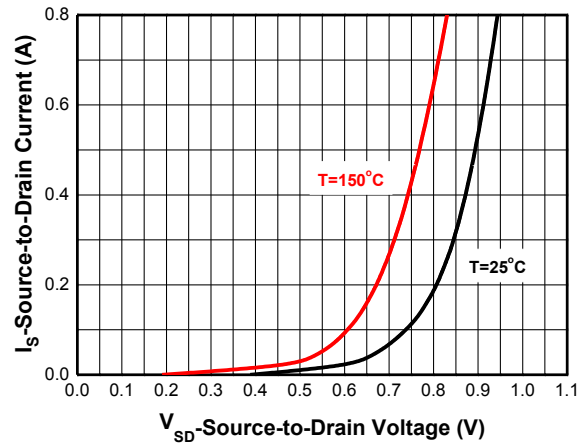
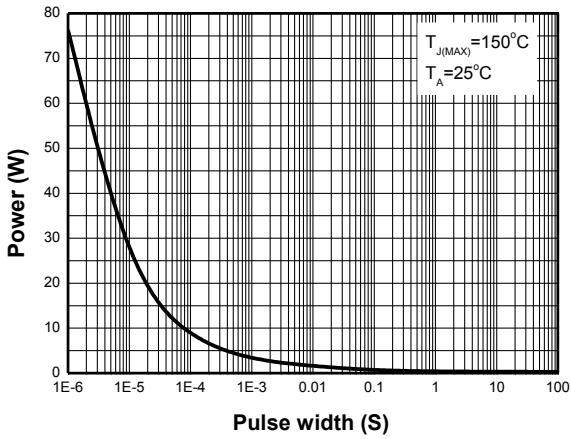
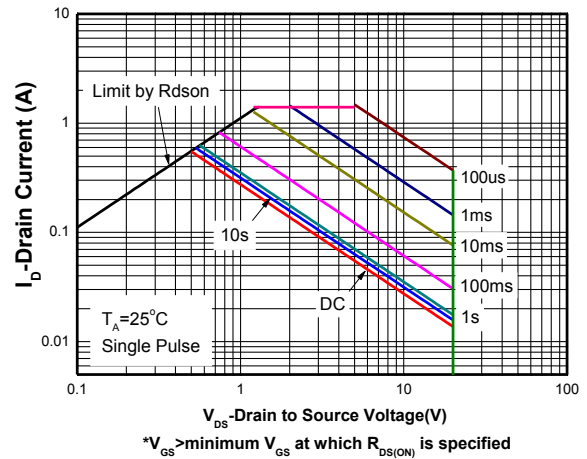
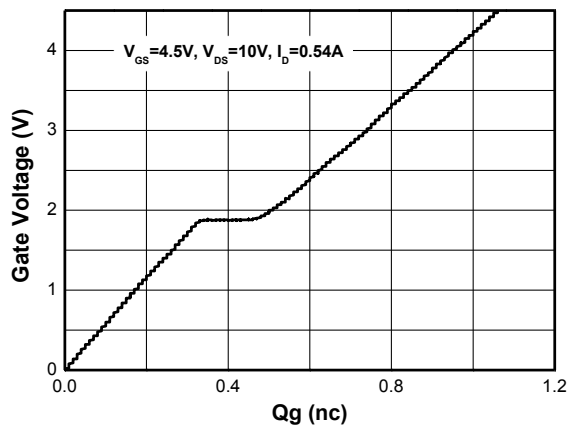
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$R_{\theta JA}$	$t \leq 10 \text{ s}$	350	390	$^\circ\text{C/W}$
		Steady State	395	455	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$R_{\theta JA}$	$t \leq 10 \text{ s}$	397	435	
		Steady State	445	505	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	240	280		

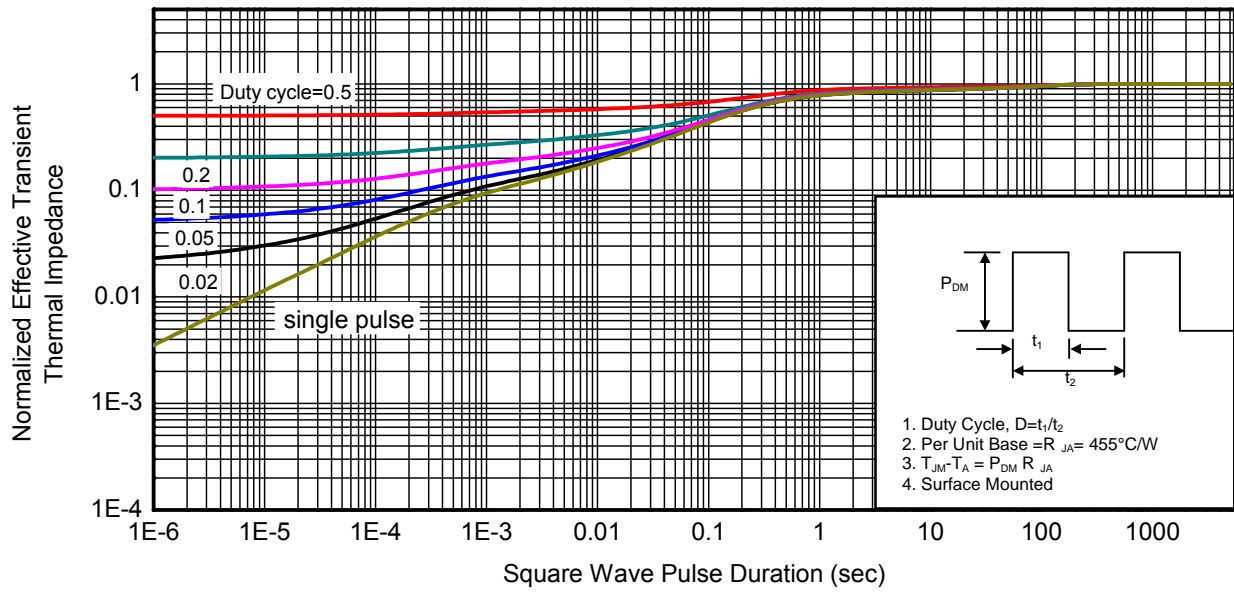
- Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.
- Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.
- Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu\text{s}$ , Duty Cycle=1%.
- Repetitive rating, pulse width limited by junction temperature  $T_J(\text{MAX})=150^\circ\text{C}$ .

**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	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			$\pm 5$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.45	0.70	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 0.35\text{ A}$		420	600	m $\Omega$
		$V_{GS} = 3.1\text{ V}, I_D = 0.20\text{ A}$		500	700	
		$V_{GS} = 2.5\text{ V}, I_D = 0.20\text{ A}$		580	800	
		$V_{GS} = 1.8\text{ V}, I_D = 0.20\text{ A}$		840	1300	
		$V_{GS} = 1.5\text{ V}, I_D = 0.04\text{ A}$		1100	1600	
Forward Transconductance	$g_{FS}$	$V_{DS} = 10\text{ V}, I_D = 0.35\text{ A}$		0.85		S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 10\text{ V}$		30		pF
Output Capacitance	$C_{OSS}$			7		
Reverse Transfer Capacitance	$C_{RSS}$			5		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 0.54\text{ A}$		1.07		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.12		
Gate-to-Source Charge	$Q_{GS}$			0.32		
Gate-to-Drain Charge	$Q_{GD}$			0.14		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 0.54\text{ A}, R_G = 6\Omega$		7.2		ns
Rise Time	$t_r$			9.5		
Turn-Off Delay Time	$t_d(OFF)$			19.6		
Fall Time	$t_f$			4.6		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 0.3\text{ A}$		0.85	1.5	V

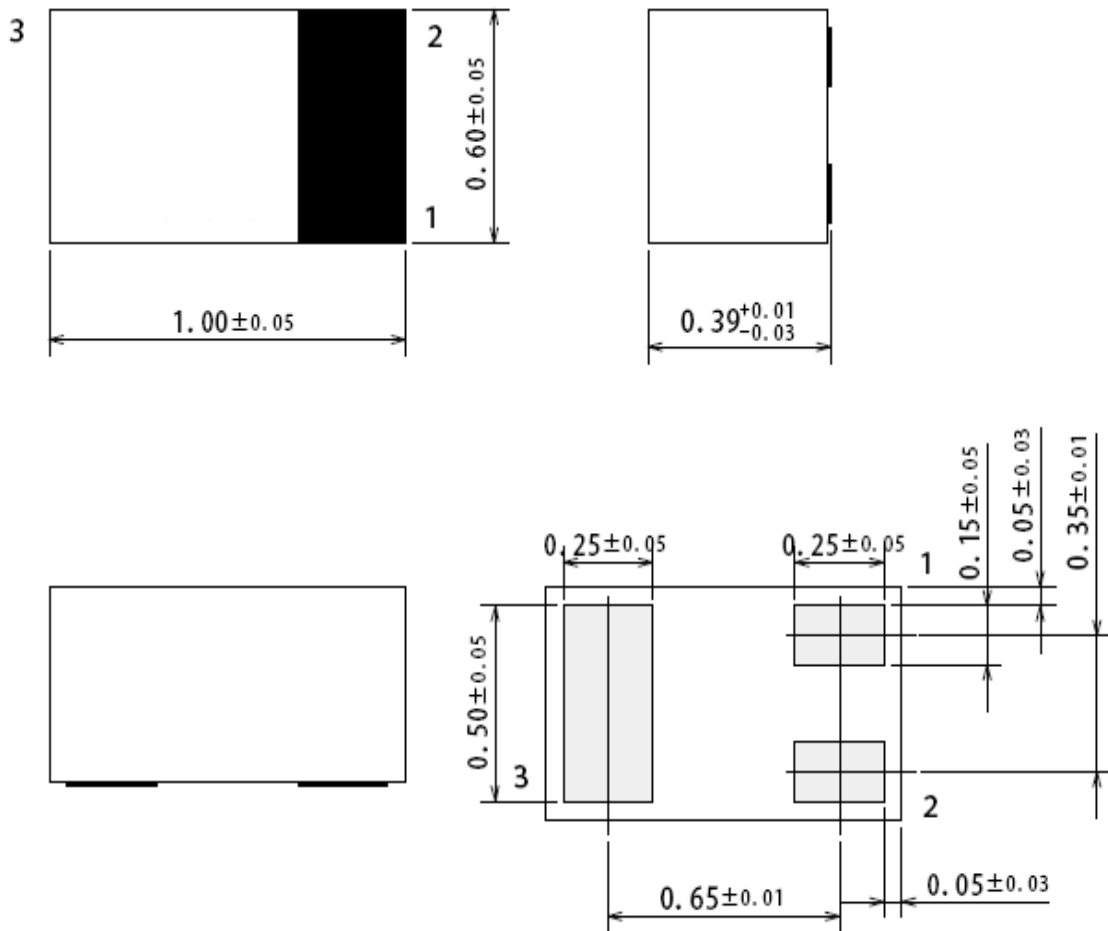
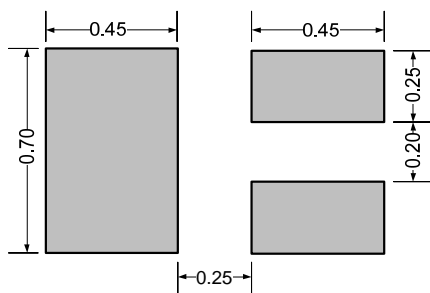
**Typical Characteristics (Ta=25°C, unless otherwise noted)**

**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**
**DFN1006-3L**

Unit:mm


**Recommend land pattern (Unit: mm)**


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