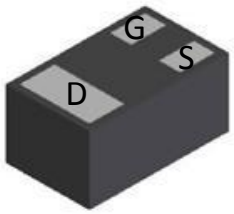
WNM2046C

Single N-Channel, 20V, 0.6A, Power MOSFET

Http://www.willsemi.com

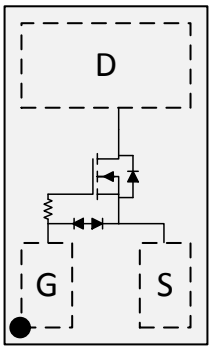
V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
20	0.42 @ V_{GS} =4.5V
	0.58 @ V_{GS}=2.5V
	0.84 @ V_{GS}=1.8V



DFN1006-3L

Descriptions

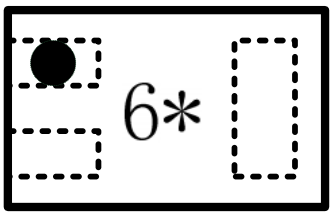
The WPM2046C is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2046C is Pb-free.



Pin configuration (Top view)

Features

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



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

Marking

Applications

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

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}	±10		
Continuous Drain Current [a d]	T_A=25°C	I_D	0.6	0.55	A
	T_A=70°C		0.48	0.44	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	0.32	0.27	W
	T_A=70°C		0.21	0.18	
Continuous Drain Current [b d]	T_A=25°C	I_D	0.57	0.52	A
	T_A=70°C		0.45	0.42	
Maximum Power Dissipation [b d]	T_A=25°C	P_D	0.29	0.25	W
	T_A=70°C		0.18	0.16	
Pulsed Drain Current [c]		I_{DM}	1.4		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 ≤ 10 s	$R_{\theta JA}$	350	390	°C/W
	Steady State		395	455	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	397	435	
	Steady State		445	505	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	240	280	

a. Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.

b. Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.

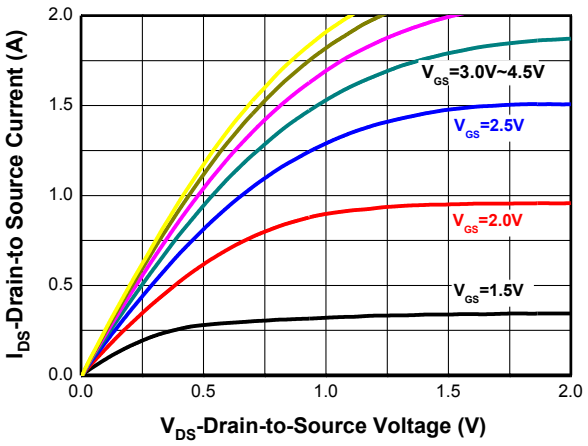
c. Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%.

d. Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C.

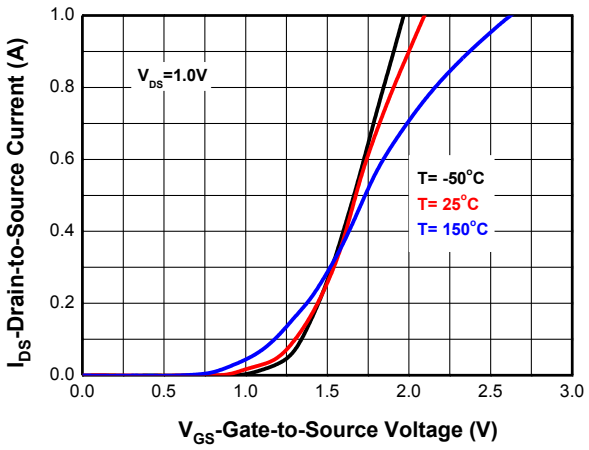
Electronics Characteristics (Ta=25°C, unless otherwise noted)

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} = 16V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±10V			±5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.45	0.70	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 0.35A		420	600	mΩ
		V_{GS} = 3.1V, I_D = 0.20A		500	700	
		V_{GS} = 2.5V, I_D = 0.20A		580	800	
		V_{GS} = 1.8V, I_D = 0.20A		840	1300	
		V_{GS} = 1.5V, I_D = 0.04A		1100	1600	
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 0.35A		0.85		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0MHz, V_{DS} = 10 V		30		pF
Output Capacitance	C_{OSS}			7		
Reverse Transfer Capacitance	C_{RSS}			5		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 0.54 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		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 0.54A, R_G = 6Ω		7.2		ns
Rise Time	tr			9.5		
Turn-Off Delay Time	td(OFF)			19.6		
Fall Time	tf			4.6		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 0.3A		0.85	1.5	V

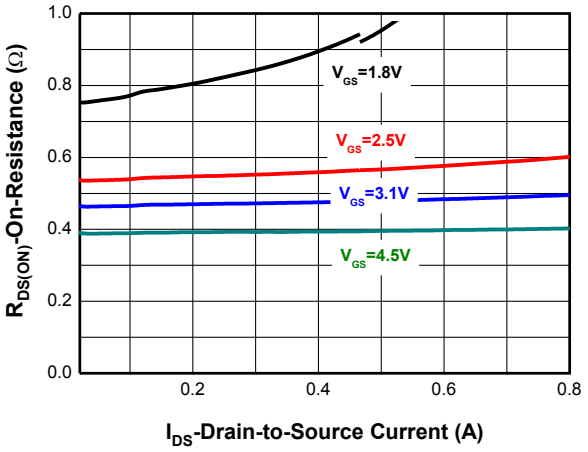
Typical Characteristics (Ta=25°C, unless otherwise noted)



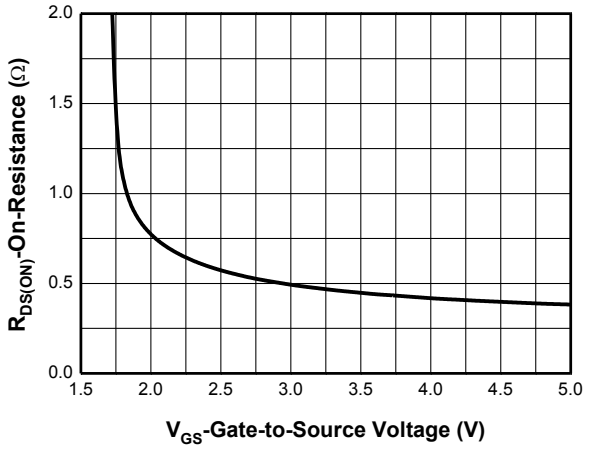
Output characteristics



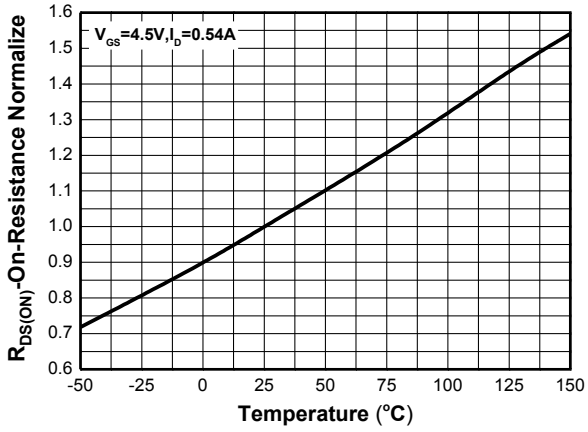
Transfer characteristics



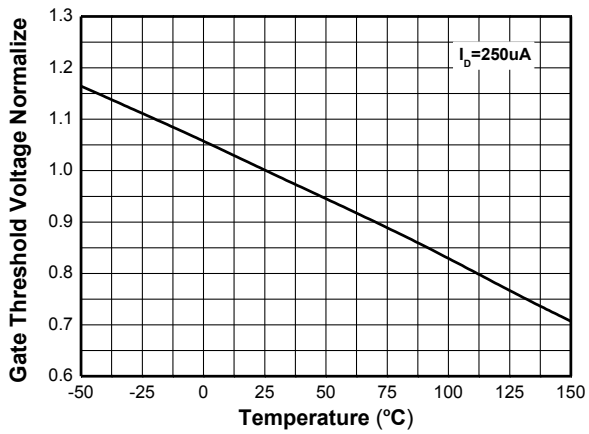
On-Resistance vs. Drain current



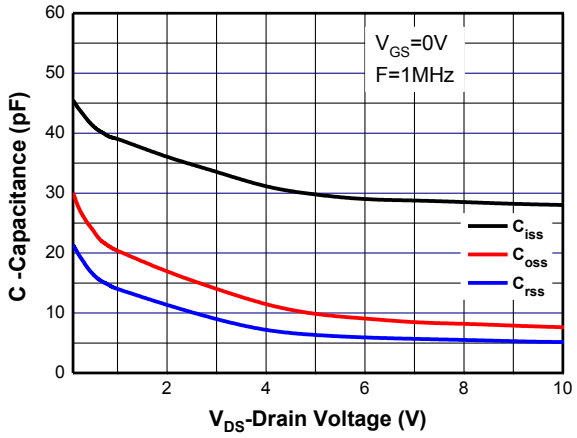
On-Resistance vs. Gate-to-source voltage



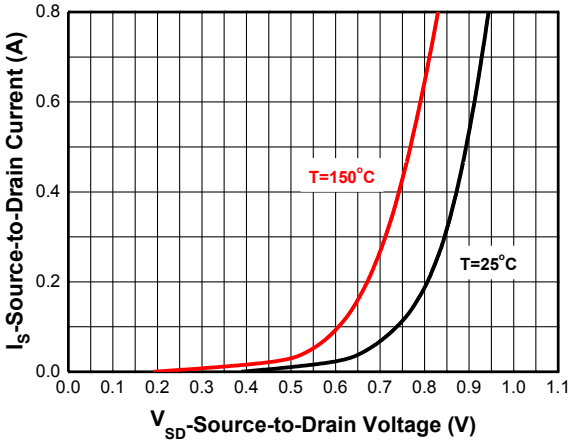
On-Resistance vs. Junction temperature



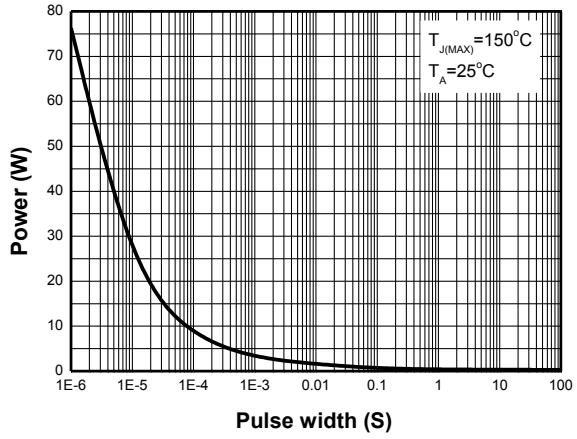
Threshold voltage vs. Temperature



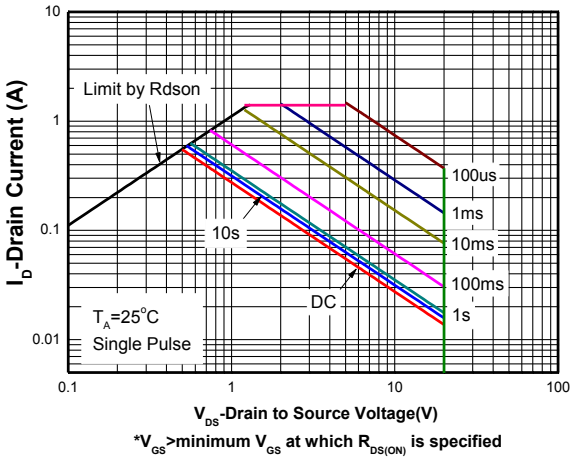
Capacitance



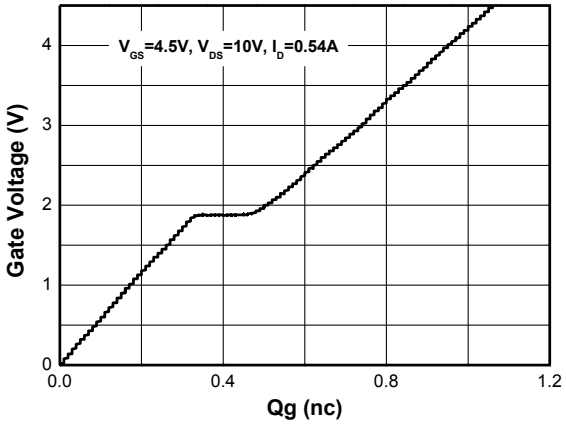
Body diode forward voltage



Single pulse power

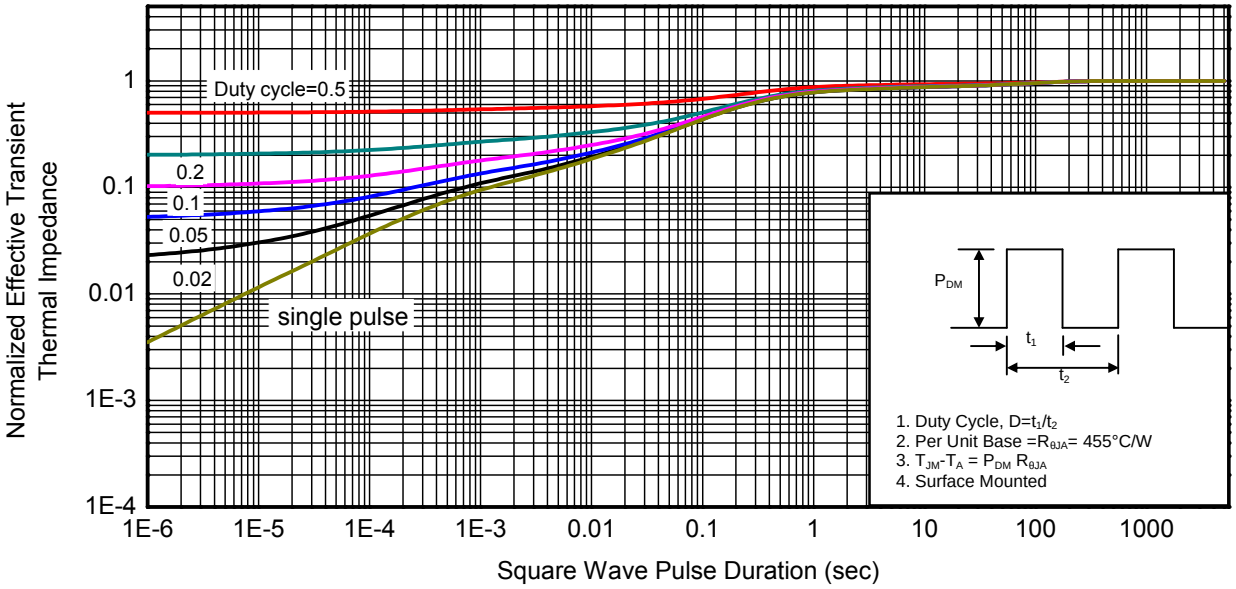


Safe operating power



Gate Charge Characteristics

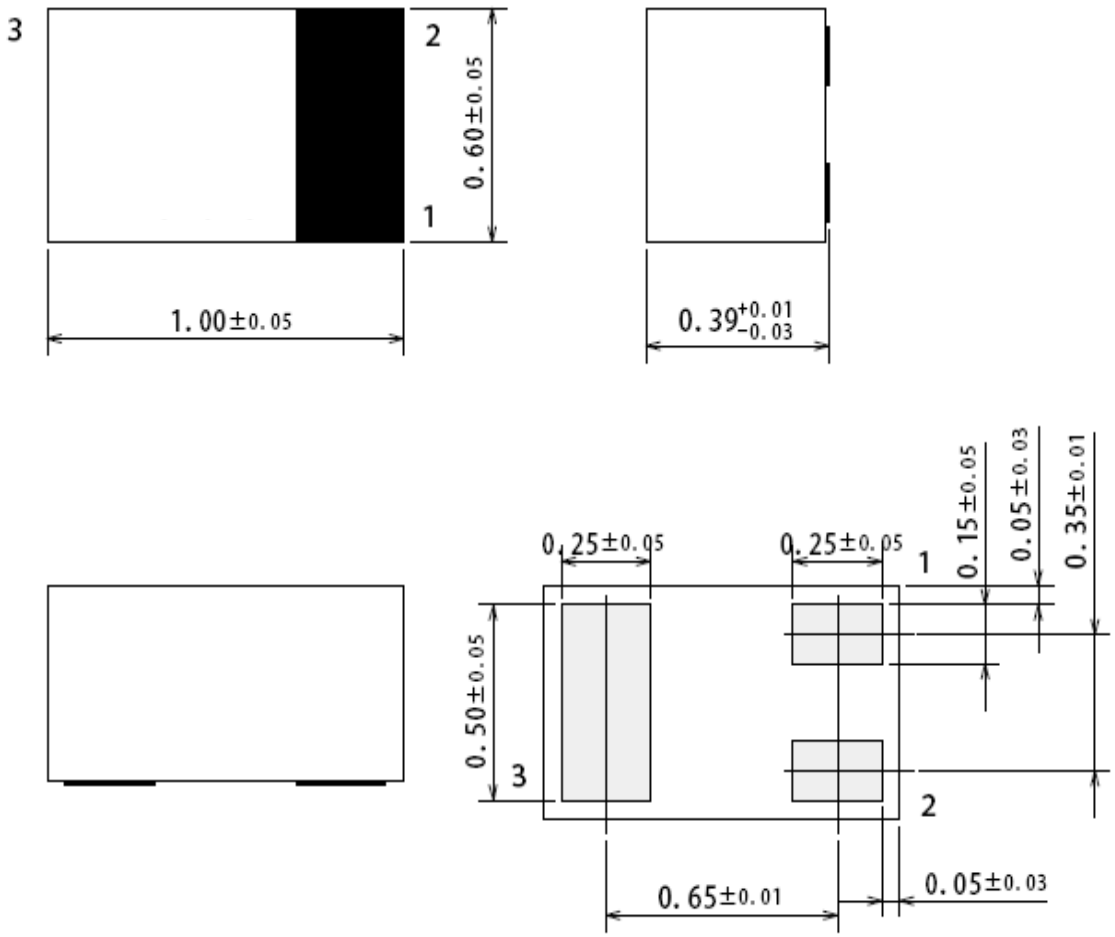
Transient thermal response (Junction-to-Ambient)



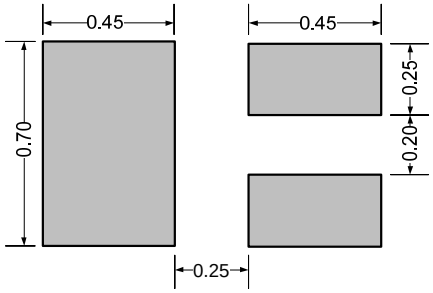
Package outline dimensions

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.