

WPMD2011

Dual P-Channel -20V, -4.4A, 52mΩ Power MOSFET

[Http://www.willsemi.com](http://www.willsemi.com)

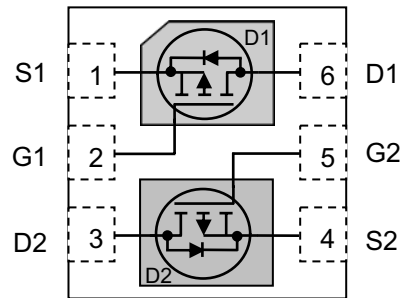
$V_{(BR)DSS}$	$R_{ds(on)}$ (Ω)
-20	0.052 @ -4.5V
	0.064 @ -2.5V
	0.080 @ -1.8V
	0.090 @ -1.5V



DFN2x2-6L

Description

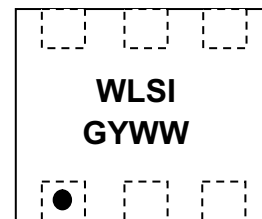
The WPMD2011 is P-Channel enhancement dual MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion and power switch applications. Standard Product WPMD2011 is Pb-free.



Pin Configuration (Top View)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for highest DC current
- Extremely low threshold voltage
- Bidirectional current flow with common source configuration
- DFN2x2 package provides exposed drain pad for excellent thermal conduction



WLSI = Company Code
G = Device Code
Y = Year (last digit)
WW = Week

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power switch
- High side load switch
- Battery management and charging circuit

Order Information

Device	Package	Shipping
WPMD2011-6/TR	DFN2x2-6L	3000/Tape&Reel

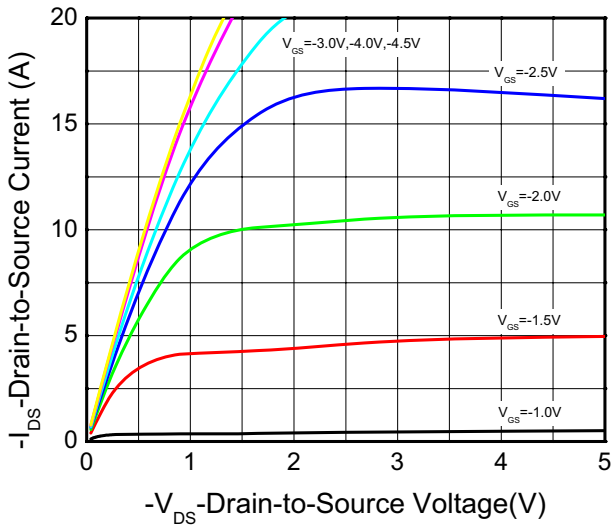
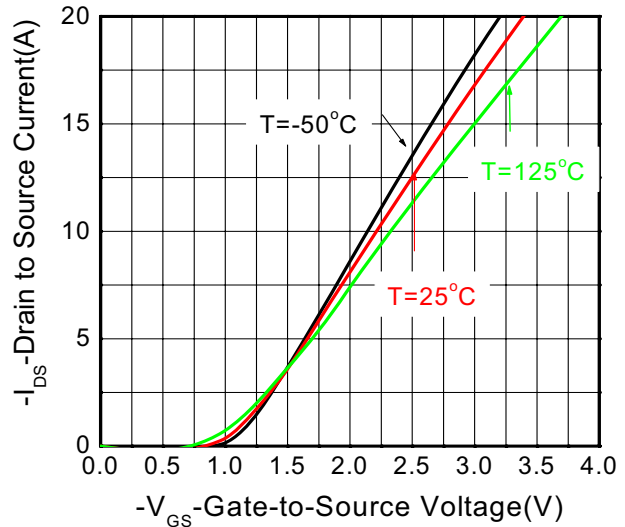
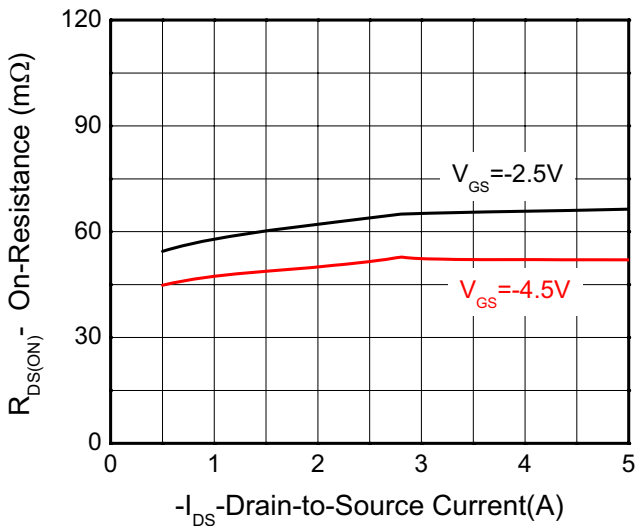
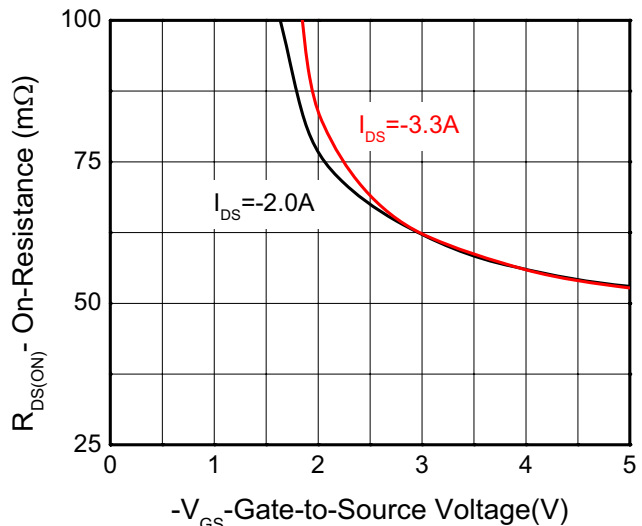
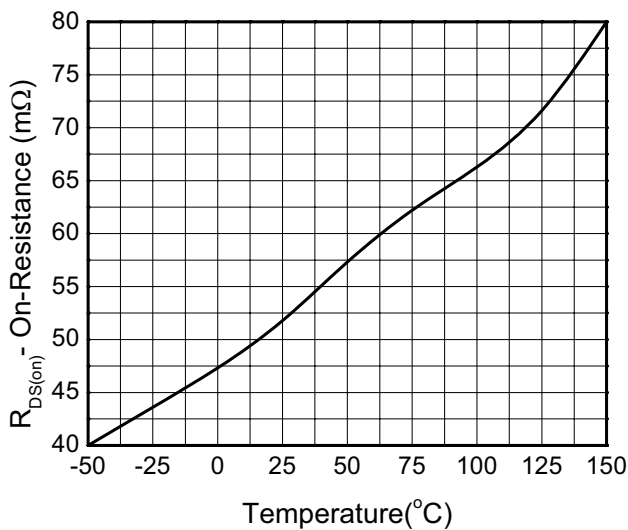
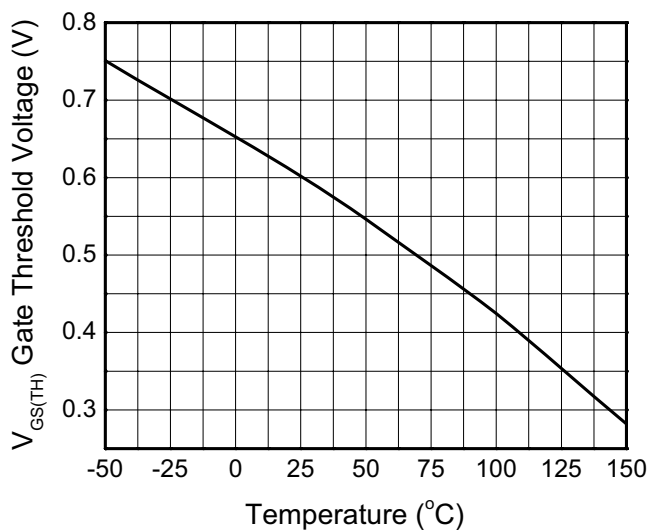
ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C, unless otherwise noted)					
Parameter		Symbol	10S	Steady State	Unit
Drain-Source Voltage		V_{DS}	-20		V
Gate-Source Voltage		V_{GS}	±12		
Continuous Drain Current ($T_J = 150\text{ °C}$) ^a	$T_A=25\text{ °C}$	I_D	-4.4	-3.7	A
	$T_A=70\text{ °C}$		-3.5	-3.0	
Maximum Power Dissipation ^a	$T_A=25\text{ °C}$	P_D	2.0	1.4	W
	$T_A=70\text{ °C}$		1.3	0.9	
Continuous Drain Current ($T_J = 150\text{ °C}$) ^b	$T_A=25\text{ °C}$	I_D	-3.2	-2.6	A
	$T_A=70\text{ °C}$		-2.5	-2.1	
Maximum Power Dissipation ^b	$T_A=25\text{ °C}$	P_D	1.0	0.7	W
	$T_A=70\text{ °C}$		0.6	0.4	
Pulsed Drain Current ^c		I_{DM}	-15		A
Operating Junction Temperature		T_J	150		°C
Storage Temperature		T_{stg}	-55 to 150		°C

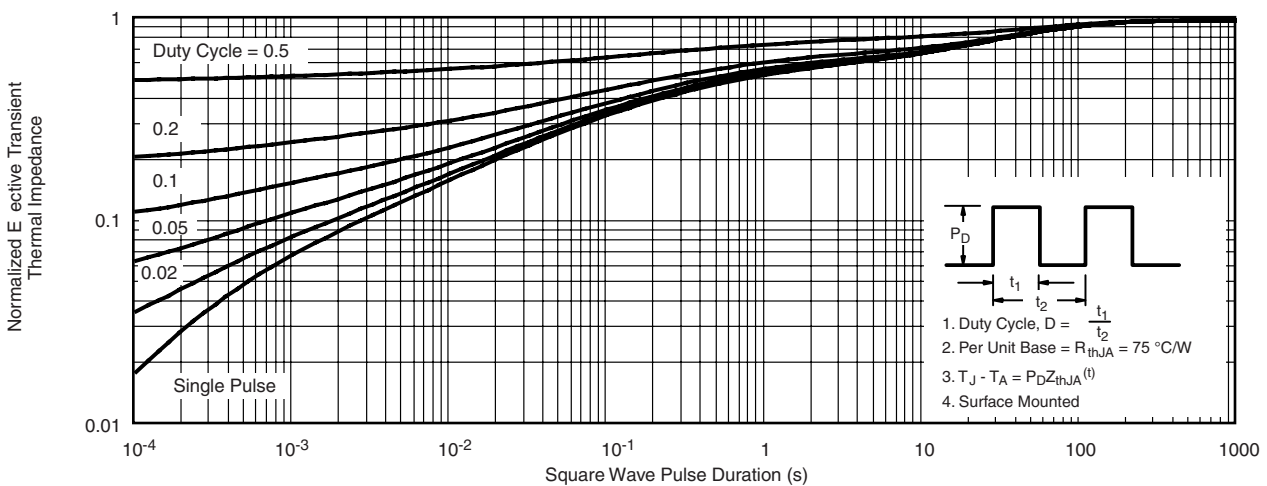
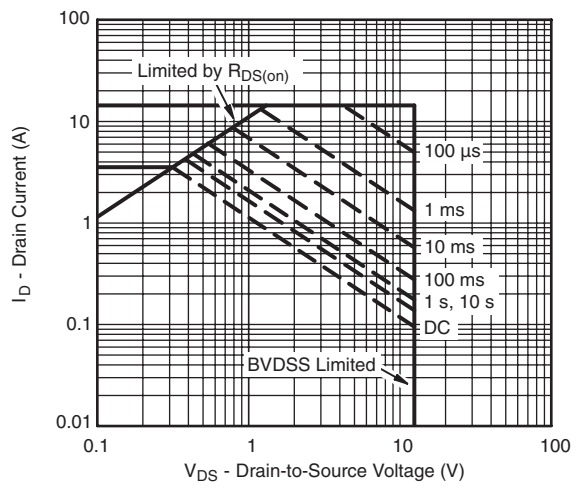
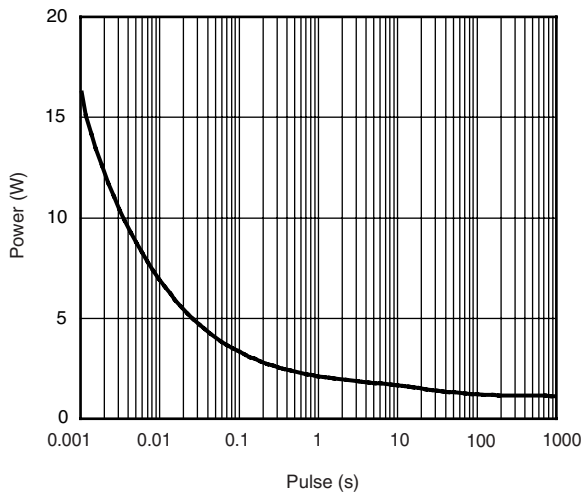
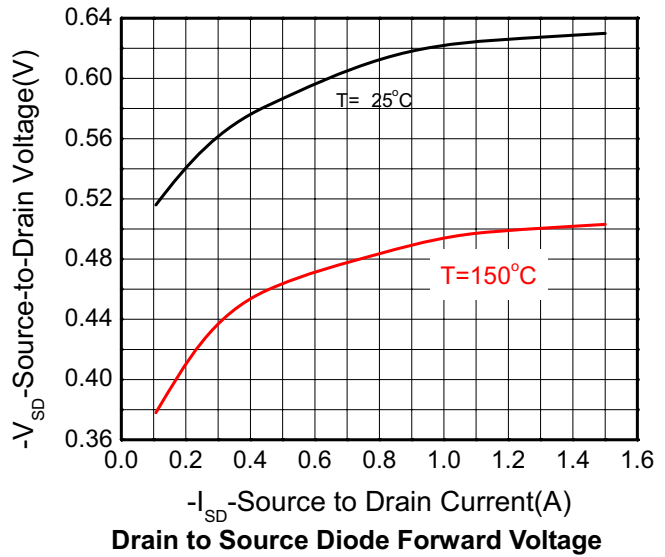
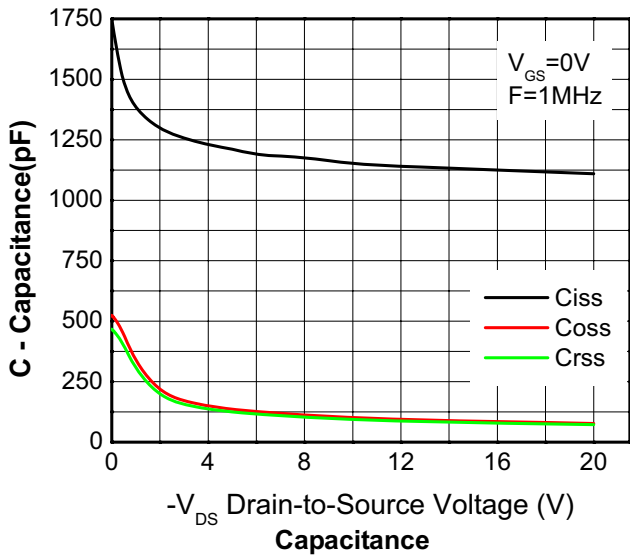
THERMAL RESISTANCE RATINGS					
Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10\text{ s}$	$R_{\theta JA}$	45	60	°C/W
	Steady State		62	85	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10\text{ s}$	$R_{\theta JA}$	80	115	
	Steady State		120	170	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	32	40	
Dual operation					
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10\text{ s}$	$R_{\theta JA}$	40	55	°C/W
	Steady State		58	80	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10\text{ s}$	$R_{\theta JA}$	75	110	
	Steady State		115	160	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	30	36	

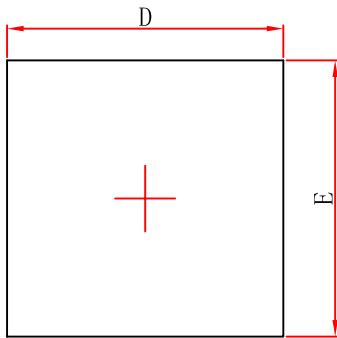
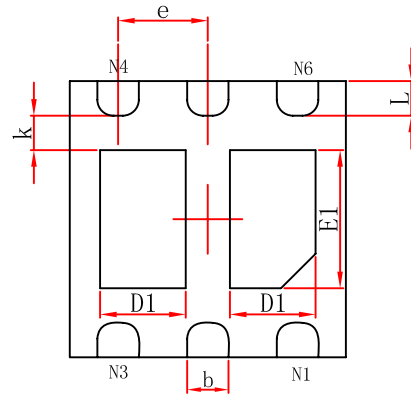
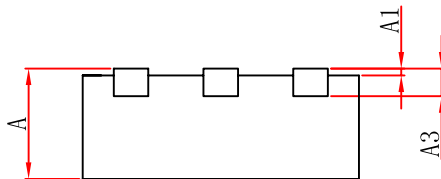
- Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.
- Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.
- Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu s$, Duty Cycle=1%
- Repetitive rating, pulse width limited by junction temperature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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
Gate-source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\text{ }\mu\text{A}$	-0.35	-0.6	-1.0	V
Drain-Source On Resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -4.0\text{ A}$		52	70	m Ω
		$V_{GS} = -2.5\text{ V}, I_D = -3.0\text{ A}$		64	85	
		$V_{GS} = -1.8\text{ V}, I_D = -2.0\text{ A}$		80	100	
		$V_{GS} = -1.5\text{ V}, I_D = -1.0\text{ A}$		90	150	
Forward Transconductance	g_{FS}	$V_{DS} = -5\text{ V}, I_D = -3.6\text{ A}$		10		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz},$ $V_{DS} = -10\text{ V}$		1130		pF
Output Capacitance	C_{OSS}			120		
Reverse Transfer Capacitance	C_{RSS}			115		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V},$ $I_D = -2.7\text{ A}$		11		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.6		
Gate-Source Charge	Q_{GS}			1.3		
Gate-Drain Charge	Q_{GD}			2.7		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$td_{(ON)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -6\text{ V},$ $R_L = 3\text{ }\Omega, R_G = 6\text{ }\Omega$		9.5		ns
Rise Time	tr			5.8		
Turn-Off Delay Time	$td_{(OFF)}$			54		
Fall Time	tf			13		
BODY DIODE CHARACTERISTICS						
Forward Recovery Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = -1.0\text{ A}$		-0.62	-1.5	V

Typical Performance Characteristics

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



Packaging Information
DFN2x2-6L

Top View

Bottom View

Side View

Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.700	0.800
A1	0.000	0.050
A3	0.203REF	
D	1.900	2.100
E	1.900	2.100
E1	0.750	0.850
D1	0.600	0.700
k	0.200MIN	
b	0.250	0.350
e	0.650TYP	
L	0.250	0.350