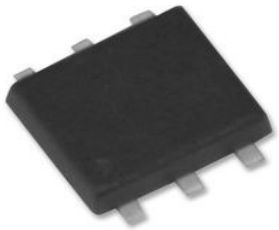
WNMD2090

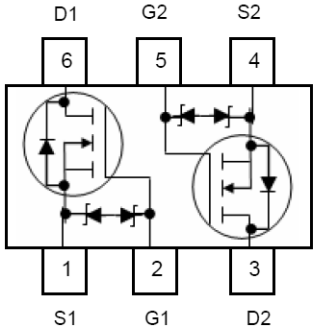
Dual N-Channel, 20V, 0.62A, Power MOSFET

Http//:www.sh- willsemi.com

V_{DS} (V)	Rds(on) (Ω)
20	0.420@ V_{GS}=4.5V
	0.580@ V_{GS}=2.5V
	0.800@ V_{GS}=1.8V
ESD Protected	



PDFN2X2-6L



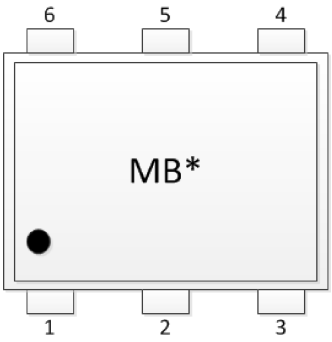
Pin configuration (Top view)

Descriptions

The WNMD2090 is Dual 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 WNMD2090 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package PDFN2X2-6L



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

Marking

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

Device	Package	Shipping
WNMD2090-6/TR	PDFN2X2-6L	3000 /Reel&Tape

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	0.62	0.57	A
	T_A=70°C		0.50	0.45	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	0.35	0.29	W
	T_A=70°C		0.22	0.19	
Continuous Drain Current [b d]	T_A=25°C	I_D	0.53	0.49	A
	T_A=70°C		0.43	0.39	
Maximum Power Dissipation [b d]	T_A=25°C	P_D	0.26	0.22	W
	T_A=70°C		0.16	0.14	
Pulsed Drain Current [c]		I_{DM}	1.0		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	$R_{\theta JA}$	310	360	°C/W
	Steady State		366	432	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	415	486	
	Steady State		498	575	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	265	305	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR-4 board using minimum pad size, 1oz copper

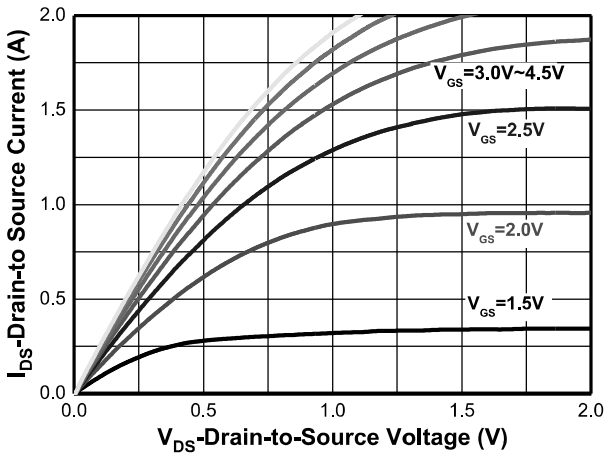
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

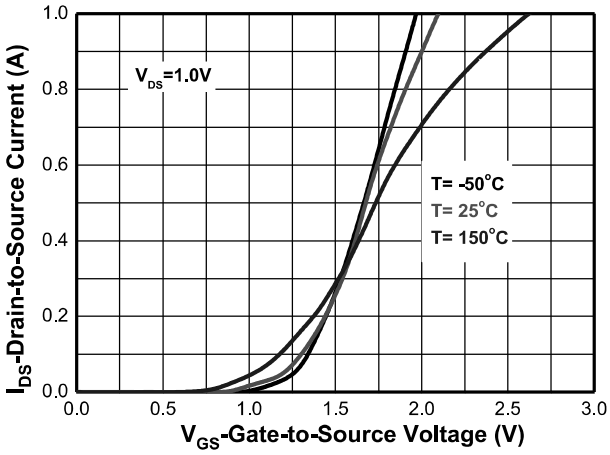
Electronics Characteristics (Ta=25°C, unless otherwise noted)

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
Forward Transconductance[e]	g_{FS}	V_{DS} = 10V, I_D = 0.35A		0.85		S
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 0.50A		380	600	mΩ
		V_{GS} = 3.1V, I_D = 0.30A		460	700	
		V_{GS} = 2.5V, I_D = 0.30A		530	800	
		V_{GS} = 1.8V, I_D = 0.10A		700	1300	
		V_{GS} = 1.5V, I_D = 0.04A		900	1600	
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1MHz, V_{DS} = 10 V		30		pF
Output Capacitance	C_{OSS}			12.8		
Reverse Transfer Capacitance	C_{RSS}			6		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 0.54A		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_{DD} = 10 V, I_D=0.54 A, R_G=6 Ω		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

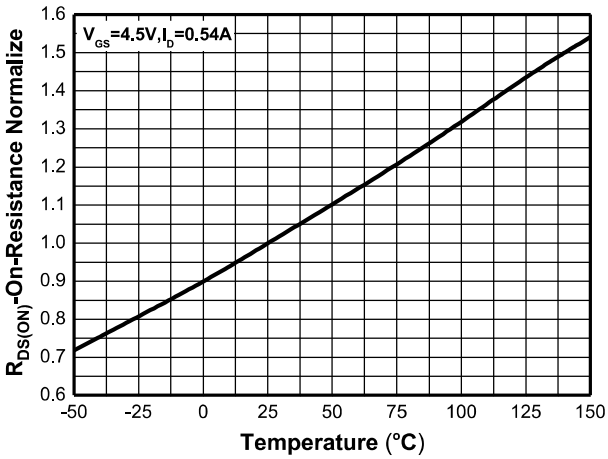
Typical Characteristics (Ta=25°C, unless otherwise noted)



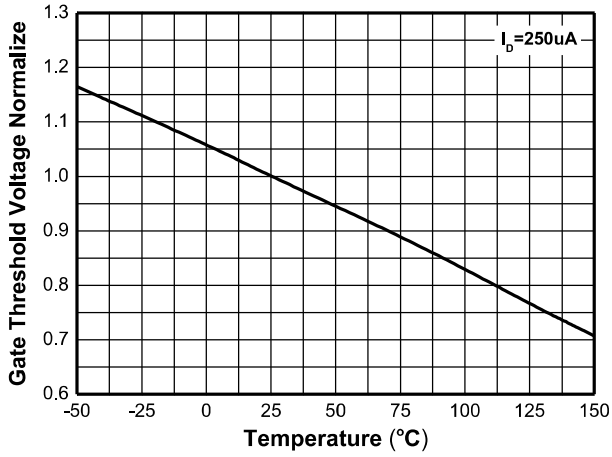
Output characteristics



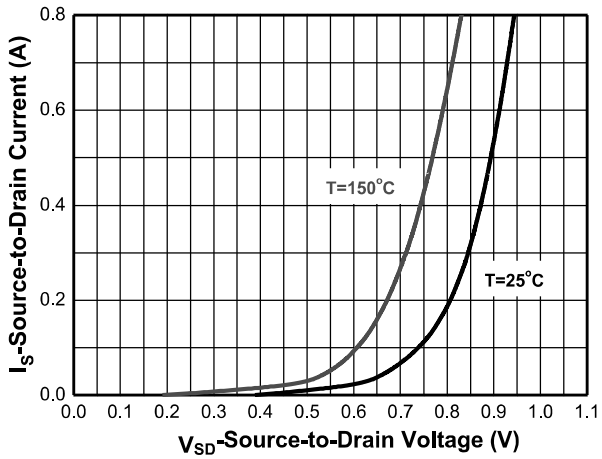
Transfer characteristics



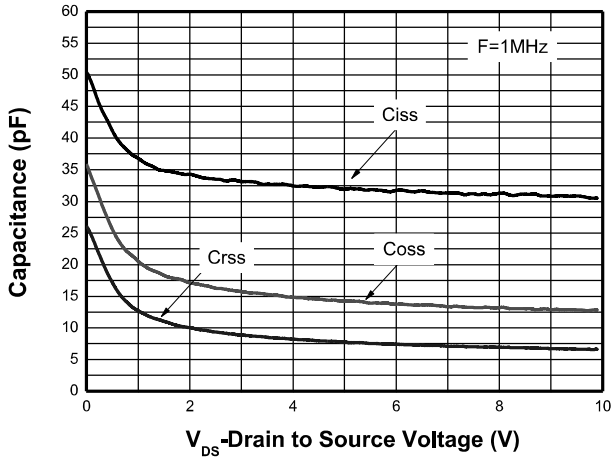
On-Resistance vs. Junction temperature



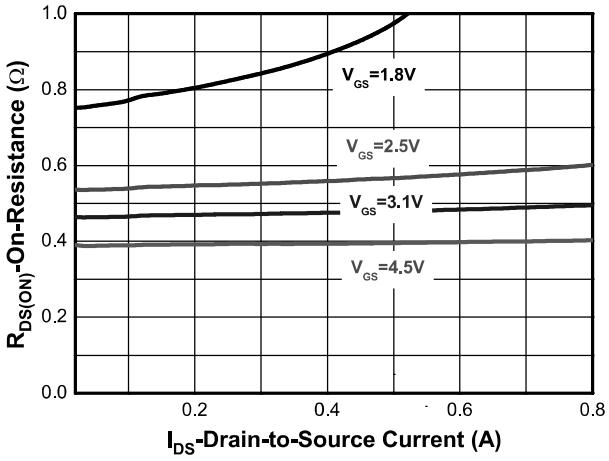
Threshold voltage vs. Temperature



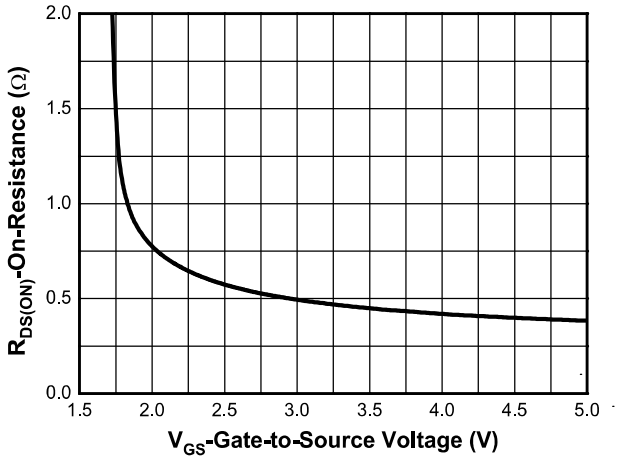
Body diode forward voltage



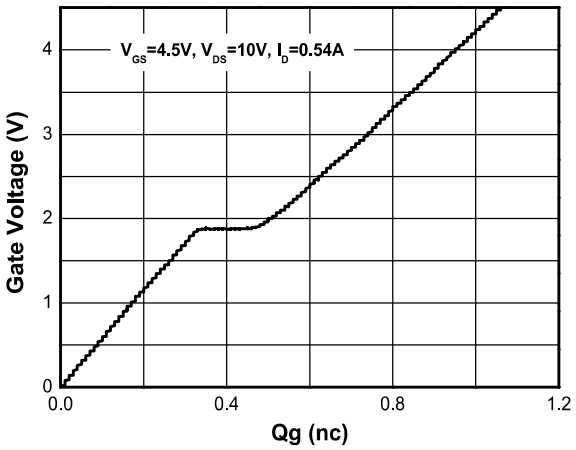
Capacitance



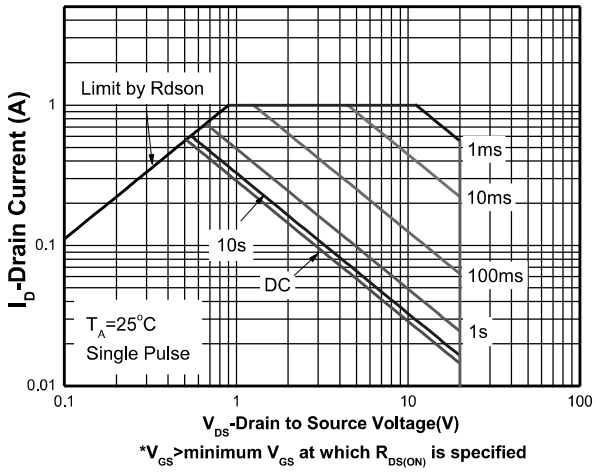
On-Resistance vs. Drain current



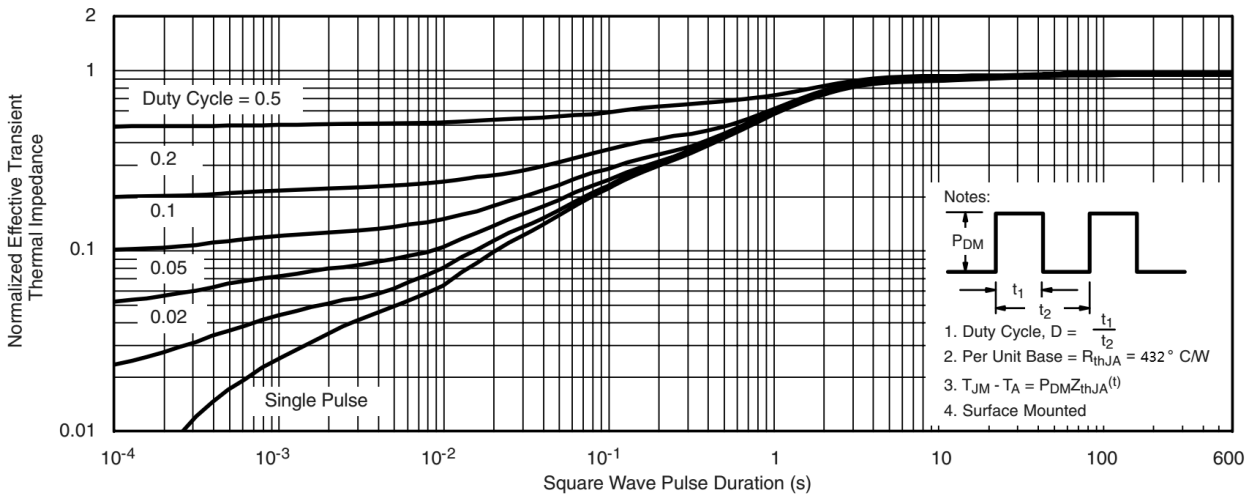
On-Resistance vs. Gate-to-Source voltage



Total Gate Charge



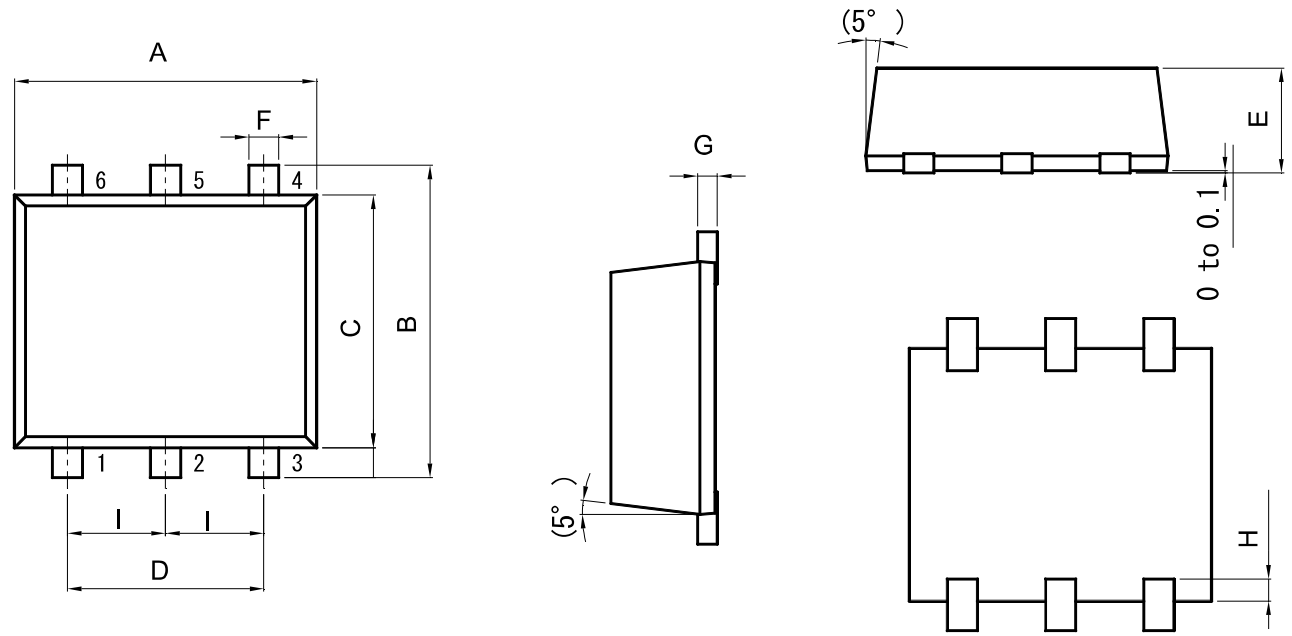
Safe operating power



Transient thermal response (Junction-to-Ambient)

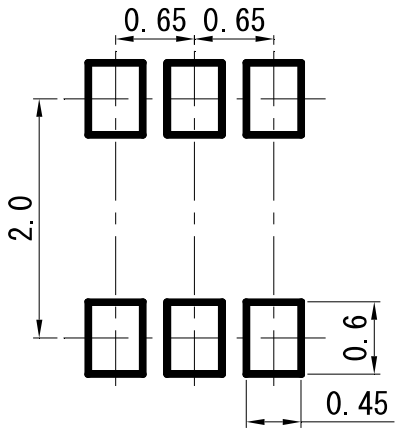
Package outline dimensions

PDFN2X2-6L



Symbol	Dimension in Millimeters	
	Min.	Max.
A	1.9	2.1
B	2.0	2.2
C	1.6	1.8
D	1.2	1.4
E	0.6	0.8
F	0.18	0.25
G	0.1	0.18
H	0.15	
I	0.65	

■Land Pattern (Reference) (Unit : mm)



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