

WNMD2180
Dual N-Channel, 20V, 11A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

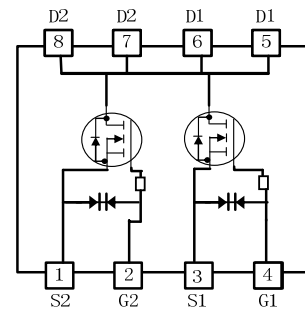
V_{DS} (V)	$R_{ds(on)}$ (m Ω)
20	9.5@ $V_{GS}=4.5V$
	10.5@ $V_{GS}=3.1V$
	12.0@ $V_{GS}=2.5V$



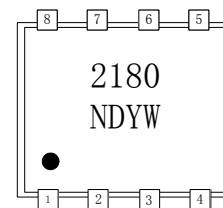
PDFN3×3-8L

Descriptions

The WNMD2180 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 WNMD2180 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 PDFN3×3-8L

Pin configuration (Top view)


2180 = Device Code
 ND = Special Code
 Y = Year
 W = Week

Applications

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

Marking
Order information

Device	Package	Shipping
WNMD2180-6/TR	PDFN3×3-8L	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	I_D	$T_A=25^\circ\text{C}$	11.0	8.2	A
		$T_A=70^\circ\text{C}$	8.8	6.6	
Maximum Power Dissipation ^a	P_D	$T_A=25^\circ\text{C}$	1.7	0.9	W
		$T_A=70^\circ\text{C}$	1.1	0.6	
Continuous Drain Current ^b	I_D	$T_A=25^\circ\text{C}$	10.8	7.7	A
		$T_A=70^\circ\text{C}$	8.6	6.1	
Maximum Power Dissipation ^b	P_D	$T_A=25^\circ\text{C}$	1.6	0.8	W
		$T_A=70^\circ\text{C}$	1.0	0.5	
Pulsed Drain Current ^c	I_{DM}	50		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

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	61	72	$^\circ\text{C/W}$
	Steady State		102	128	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10 \text{ s}$	$R_{\theta JA}$	65	75	
	Steady State		120	148	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	54	63	

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

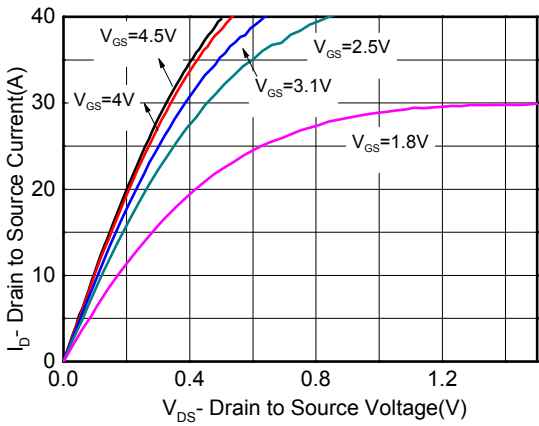
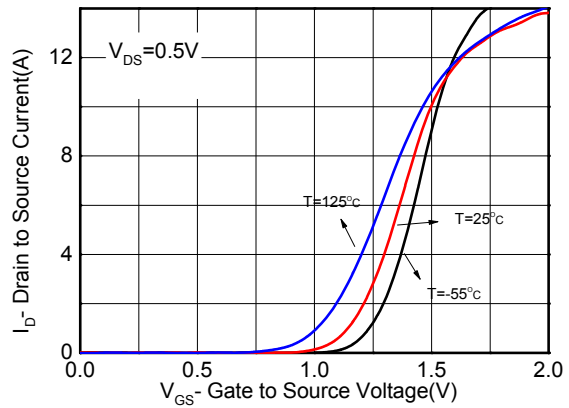
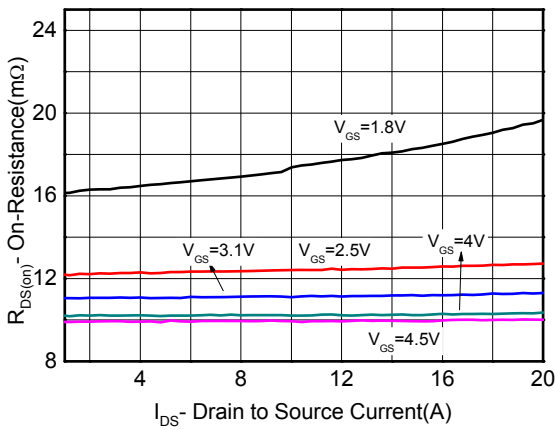
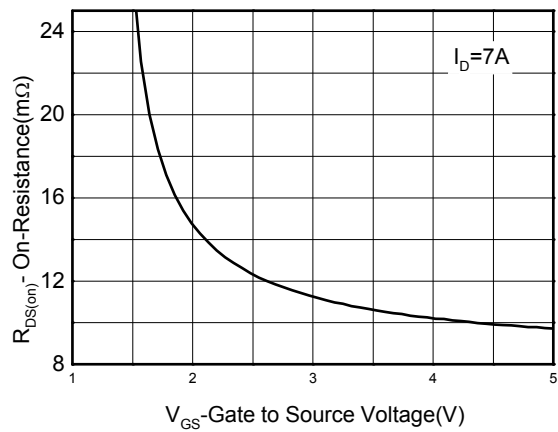
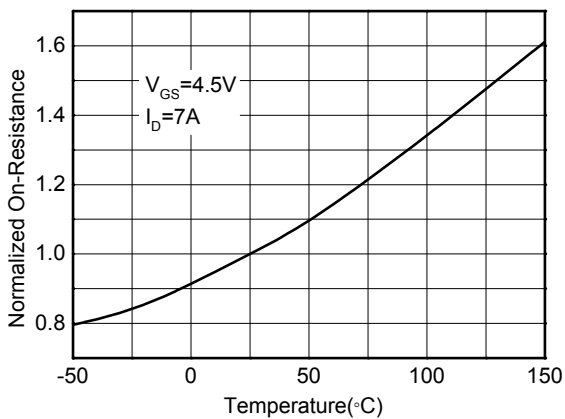
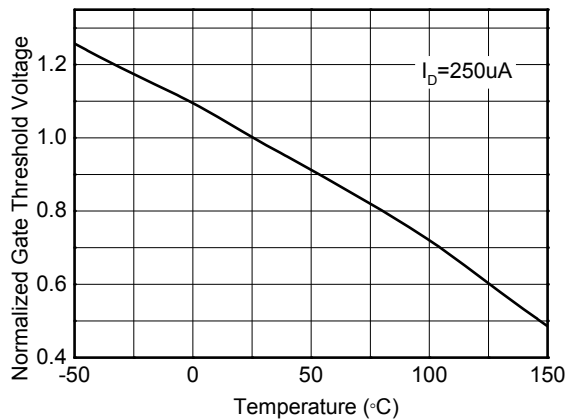
b Surface mounted on FR4 board using minimum pad size, 1oz copper

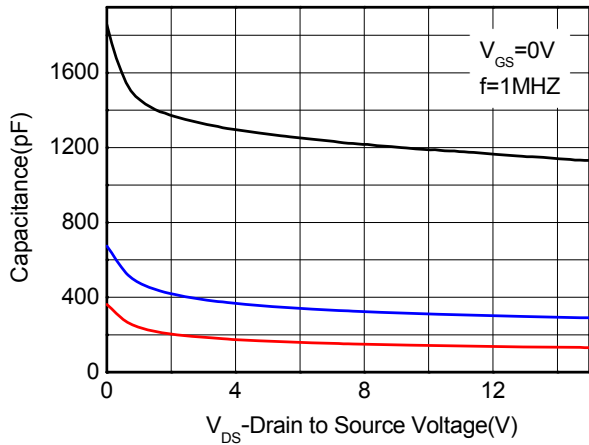
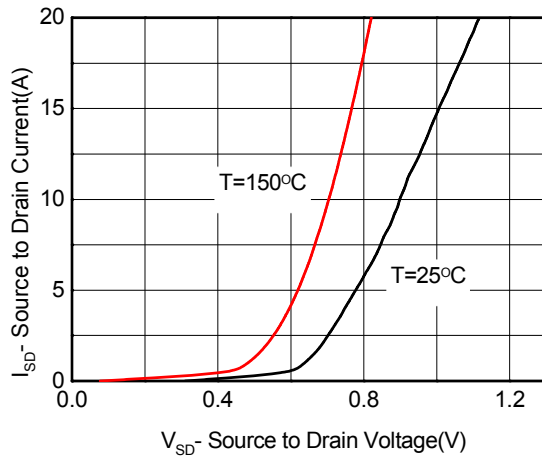
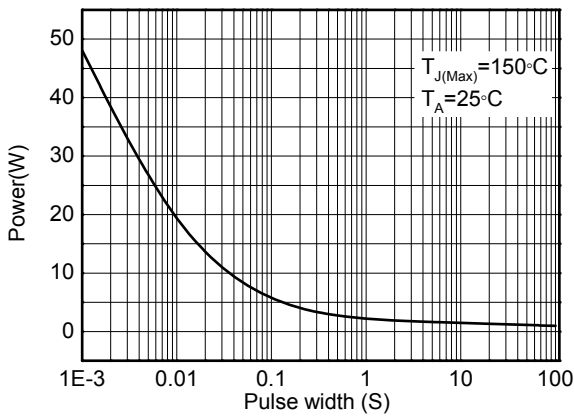
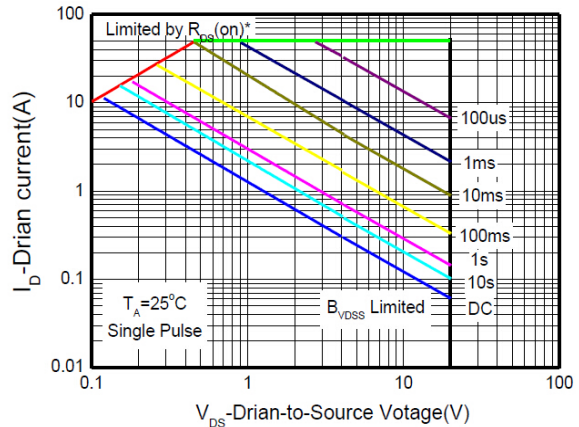
c Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature $T_J=150^\circ\text{C}$.

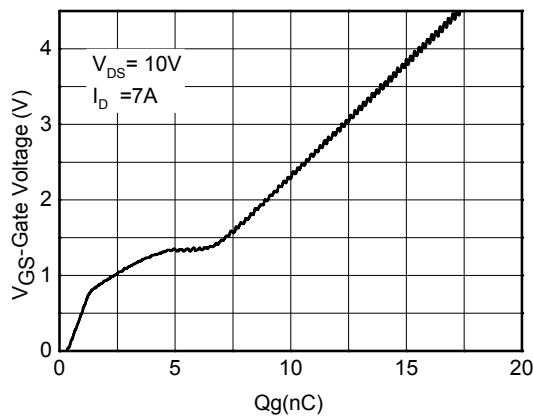
Electronics Characteristics (Ta=25°C, unless otherwise noted)

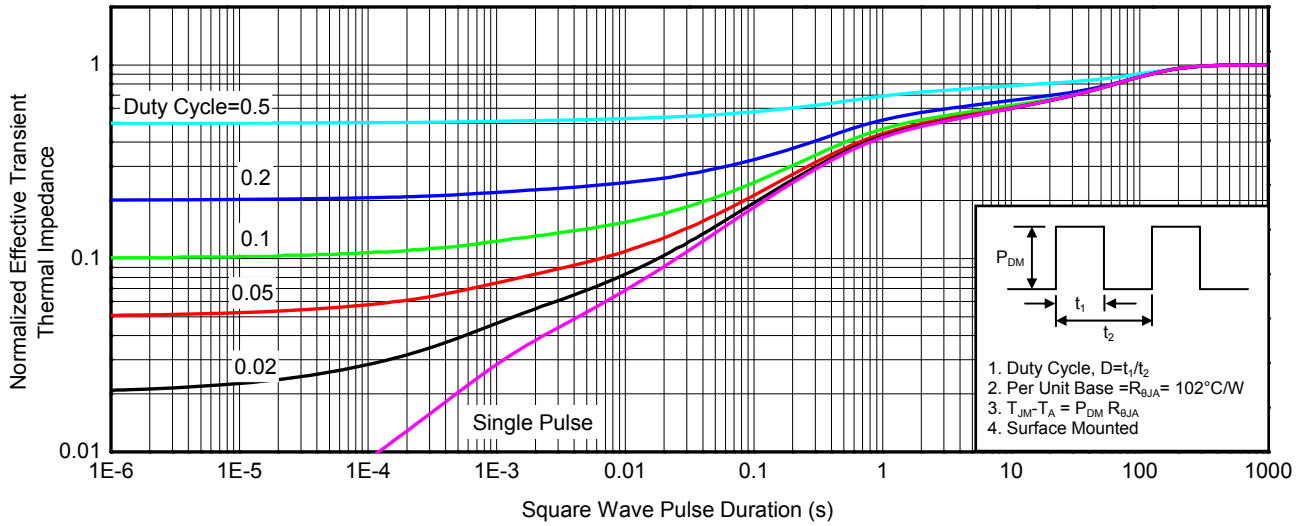
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			± 5	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.4	0.7	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 7.0\text{ A}$		9.5	14	m Ω
		$V_{GS} = 3.1\text{ V}, I_D = 6.5\text{ A}$		10.5	17	
		$V_{GS} = 2.5\text{ V}, I_D = 5.5\text{ A}$		12.0	22	
Forward Transconductance	g_{FS}	$V_{DS} = 5.0\text{ V}, I_D = 7.0\text{ A}$		17		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 10\text{ V}$		1188		pF
Output Capacitance	C_{OSS}			310		
Reverse Transfer Capacitance	C_{RSS}			142		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 7.0\text{ A}$		16.8		nC
Threshold Gate Charge	$Q_{G(TH)}$			1.2		
Gate-to-Source Charge	Q_{GS}			2.0		
Gate-to-Drain Charge	Q_{GD}			5.3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 4.5\text{ V}, V_{DS} = 6\text{ V}, I_D = 4.8\text{ A}, R_G = 6\ \Omega$		29		ns
Rise Time	t_r			35		
Turn-Off Delay Time	$t_d(OFF)$			260		
Fall Time	t_f			125		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 1.0\text{ A}$		0.75	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

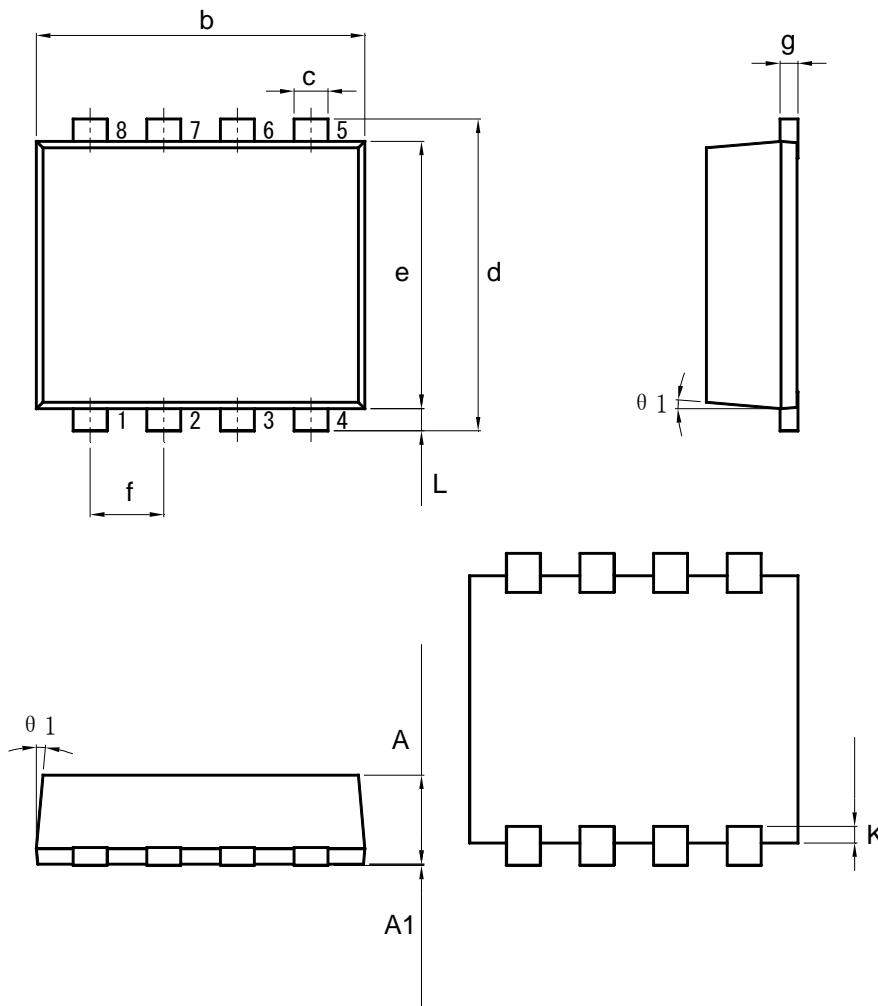

Capacitance

Body diode forward voltage

Single pulse power


* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe operating power

Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions
PDFN3*3-8L


Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.750	0.800	0.850
A1	0.000	—	0.020
b	2.800	2.900	3.000
c	0.250	0.300	0.400
d	2.700	2.800	2.900
e	2.300	2.400	2.500
f	0.650		
g	0.110	0.160	0.260
L	0.200		
K	0.150		
$\theta 1$		5°	