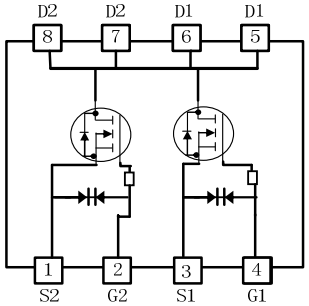
WNMD2180

Dual N-Channel, 20V, 11A, Power MOSFET

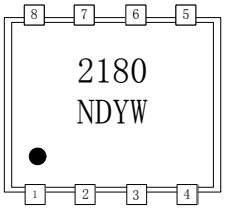
Http://www.sh-willsemi.com

V_{DS} (V)	Typical Rds(on) (mΩ)
20	8.5@ V_{GS}=4.5V
	8.9@ V_{GS}=3.8V
	9.6@ V_{GS}=3.1V
	11@ V_{GS}=2.5V
ESD Protected	

PDFN3×3-8L



Pin configuration (Top view)



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

Marking

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

Applications

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

Order information

Device	Package	Shipping
WNMD2180-8/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]	T_A=25°C	I_D	11.0	8.2	A
	T_A=70°C		8.8	6.6	
Maximum Power Dissipation [a]	T_A=25°C	P_D	1.7	0.9	W
	T_A=70°C		1.1	0.6	
Continuous Drain Current [b]	T_A=25°C	I_D	10.8	7.7	A
	T_A=70°C		8.6	6.1	
Maximum Power Dissipation [b]	T_A=25°C	P_D	1.6	0.8	W
	T_A=70°C		1.0	0.5	
Pulsed Drain Current [c]		I_{DM}	50		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

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	61	72	°C/W
	Steady State		102	128	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 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

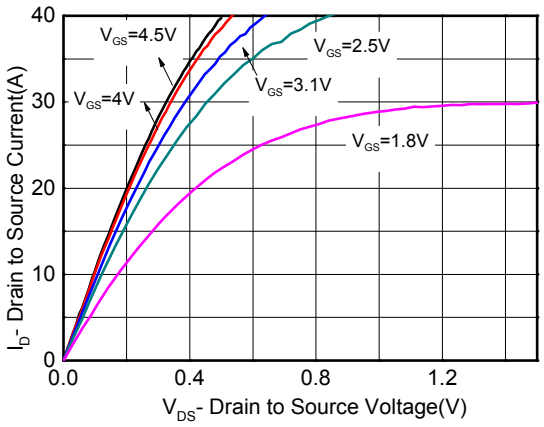
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

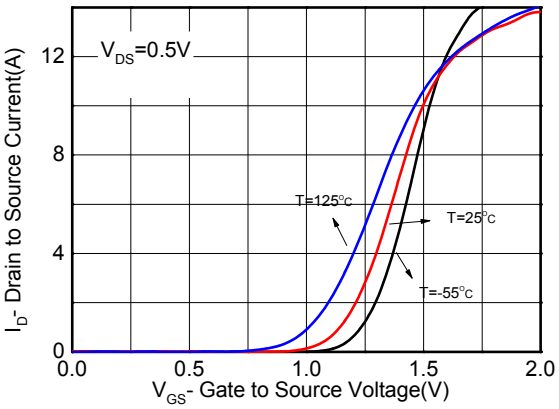
Electronics Characteristics (Ta=25°C, unless otherwise noted)

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} =16 V, 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	0.4	0.7	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 7.0A	6.5	8.5	11.5	mΩ
		V_{GS} = 3.8V, I_D = 6.5A	6.7	8.9	12.5	
		V_{GS} = 3.1V, I_D = 6.5A	7.5	9.6	15	
		V_{GS} = 2.5V, I_D = 5.5A	8	11	19	
Forward Transconductance	g_{FS}	V_{DS} = 5.0 V, I_D = 7.0A		17		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1. 0MHz, V_{DS} = 10 V		1188		pF
Output Capacitance	C_{OSS}			310		
Reverse Transfer Capacitance	C_{RSS}			142		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 7.0 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	td(ON)	V_{GS} = 4.5 V, V_{DS} = 6 V, I_D=4.8A, R_G=6 Ω		29		ns
Rise Time	tr			35		
Turn-Off Delay Time	td(OFF)			260		
Fall Time	tf			125		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1.0A		0.75	1.5	V

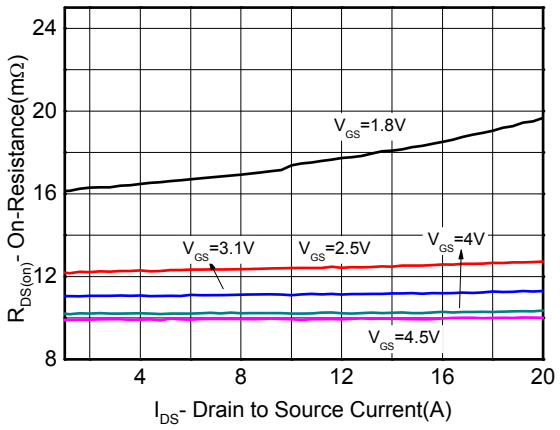
Typical Characteristics (Ta=25°C, unless otherwise noted)



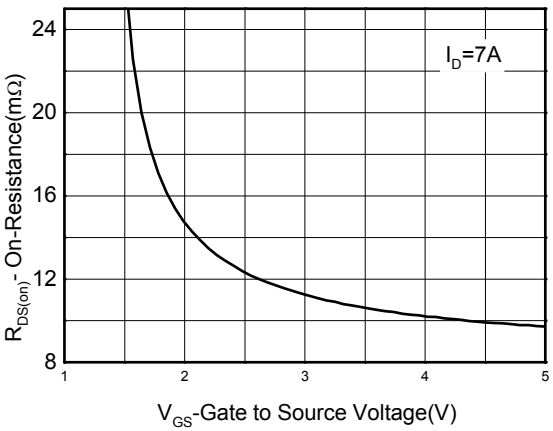
Output characteristics



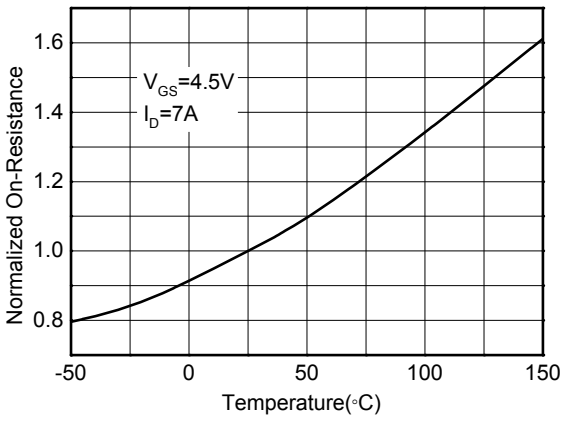
Transfer characteristics



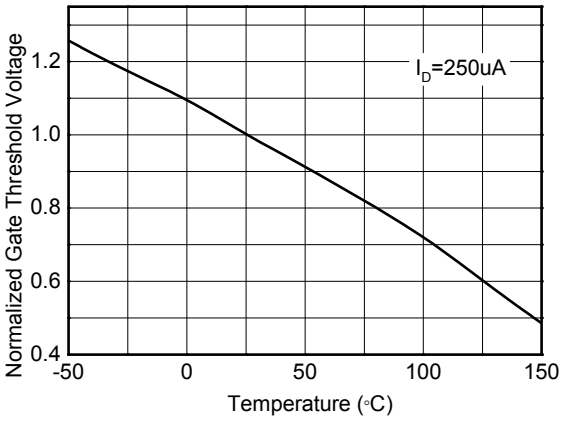
On-Resistance vs. Drain current



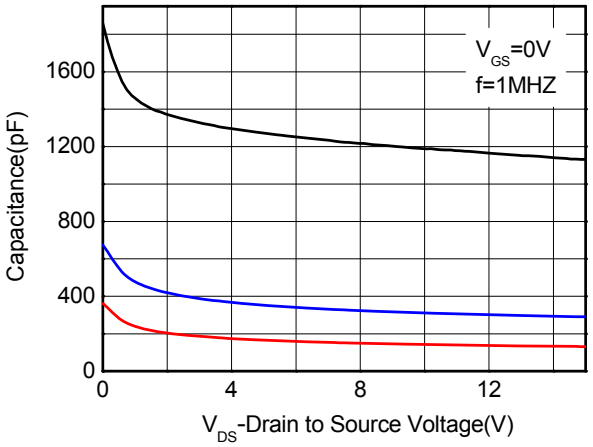
On-Resistance vs. Gate-to-Source voltage



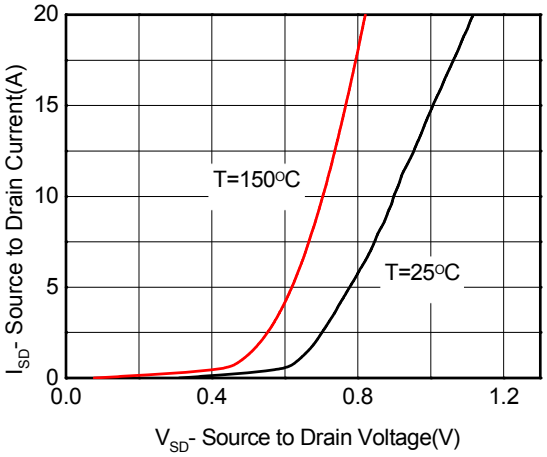
On-Resistance vs. Junction temperature



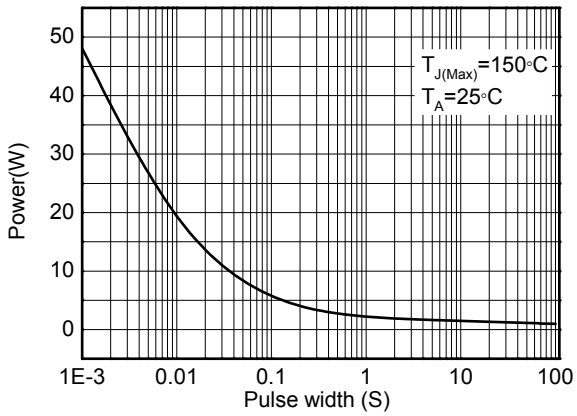
Threshold voltage vs. Temperature



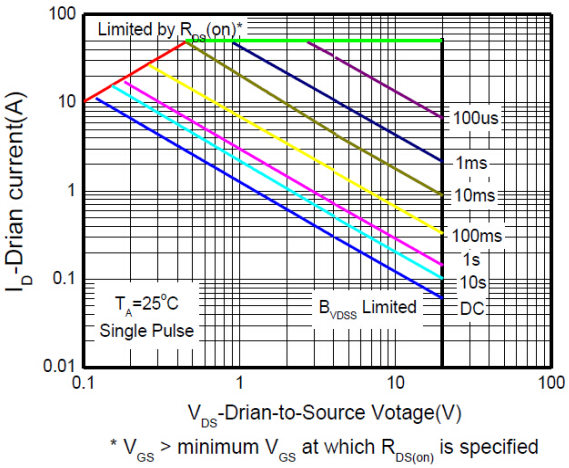
Capacitance



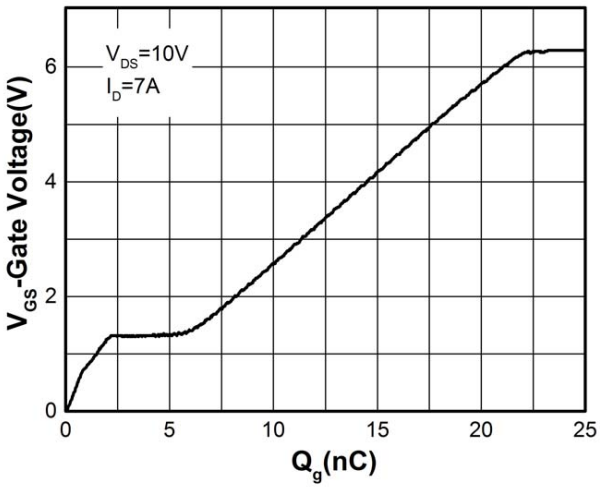
Body diode forward voltage



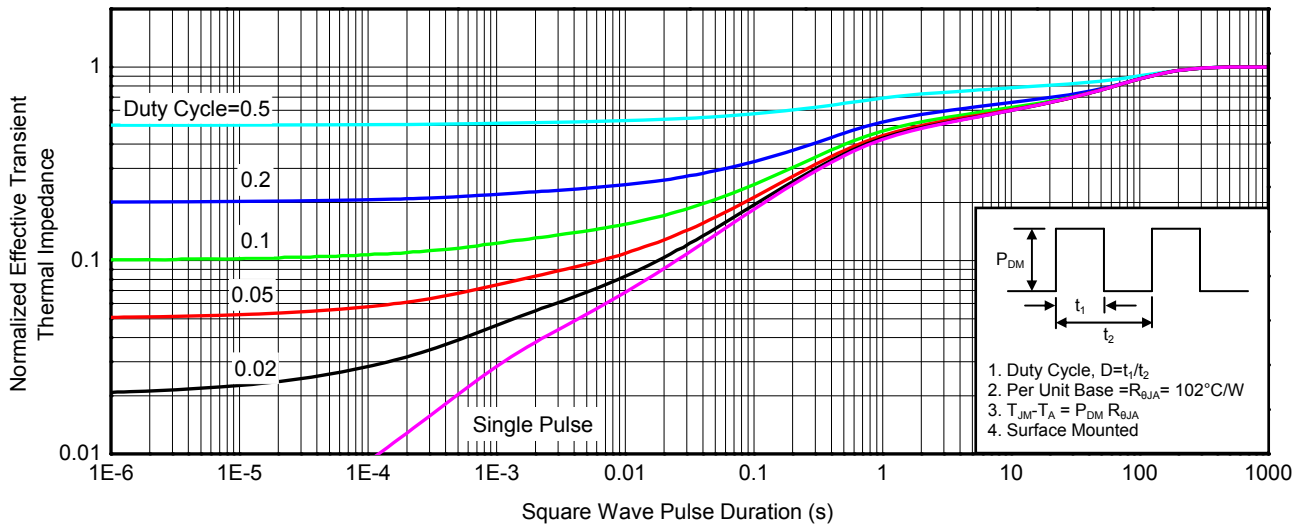
Single pulse power



Safe operating power



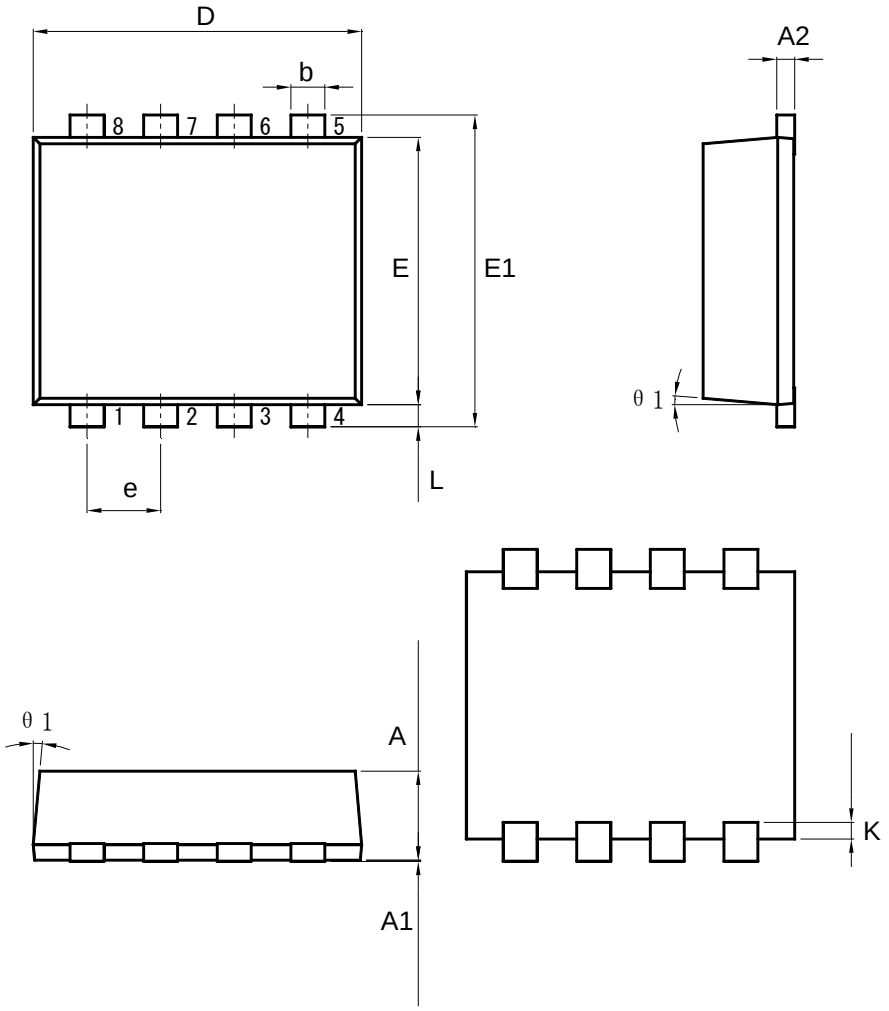
Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions

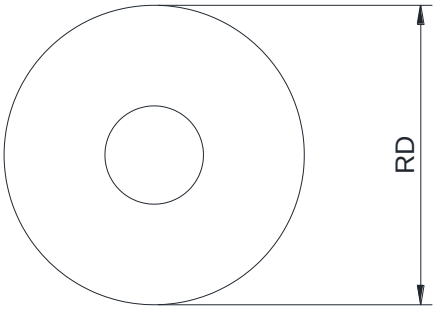
PDFN3*3-8L



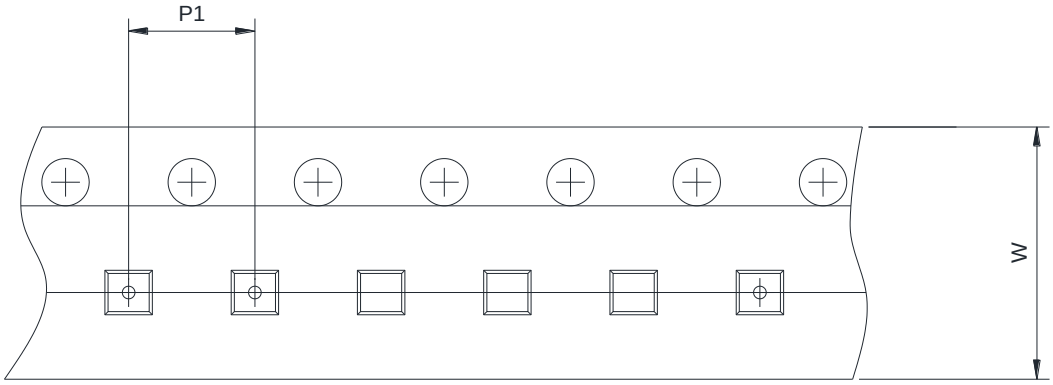
Symbol	Dimensions in Millimeters	
	Min.	Max.
A	0.75	0.85
A1	0.00	0.02
A2	0.11	0.26
b	0.25	0.40
D	2.80	3.00
E	2.30	2.50
E1	2.70	2.90
e	0.65 BSC.	
L	0.20 Ref.	
K	0.15 Ref.	
θ	5 °	

TAPE AND REEL INFORMATION

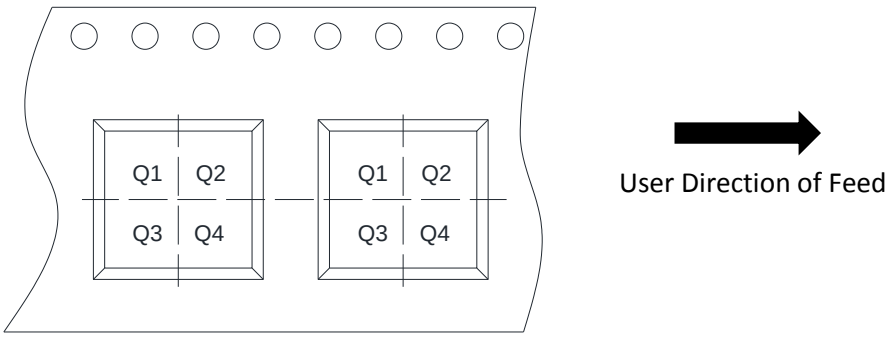
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	■ 7 inch □ 13 inch
P1	Pitch between successive cavity centers	□ 2 mm ■ 4 mm □ 8 mm
W	Overall width of the carrier tape	■ 8 mm □ 12 mm
Pin1	Pin1 Quadrant	□ Q1 ■ Q2 □ Q3 □ Q4