

WNMD2172
Dual N-Channel, 20V, 7.0A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

V_{DS} (V)	$R_{ds(on)}$ (Ω)
20	0.015@ $V_{GS}=4.5V$
	0.0155@ $V_{GS}=4.0V$
	0.017@ $V_{GS}=3.1V$
	0.018@ $V_{GS}=2.5V$
	0.021@ $V_{GS}=1.8V$
ESD Protected	

Descriptions

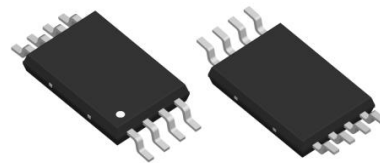
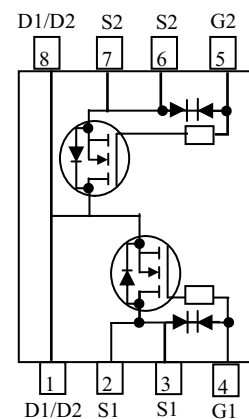
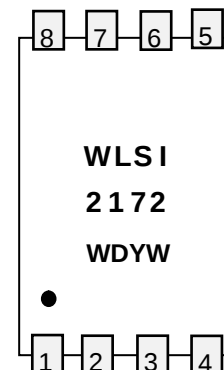
The WNMD2172 is Dual N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNMD2172 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package TSSOP-8L

Applications

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


TSSOP-8L

Pin configuration (Top view)


WLSI = Willsemi
 2172 = Device Code
 WD = Special Code
 Y = Year
 W = Week

Marking
Order information

Device	Package	Shipping
WNMD2172-8/TR	TSSOP-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	7.0	5.9	A
	T _A =70°C		5.6	4.7	
Maximum Power Dissipation ^a	T _A =25°C	P _D	1.4	1.0	W
	T _A =70°C		0.9	0.6	
Continuous Drain Current ^b	T _A =25°C	I _D	6.2	5.6	A
	T _A =70°C		5.0	4.5	
Maximum Power Dissipation ^b	T _A =25°C	P _D	1.1	0.9	W
	T _A =70°C		0.7	0.5	
Pulsed Drain Current ^c		I _{DM}	30		A
Operating Junction Temperature		T _J	-55~+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	$t \leq 10 \text{ s}$	$R_{\theta JA}$	66	87	$^{\circ}\text{C/W}$
	Steady State		90	120	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10 \text{ s}$	$R_{\theta JA}$	84	108	
	Steady State		110	135	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	54	71	

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

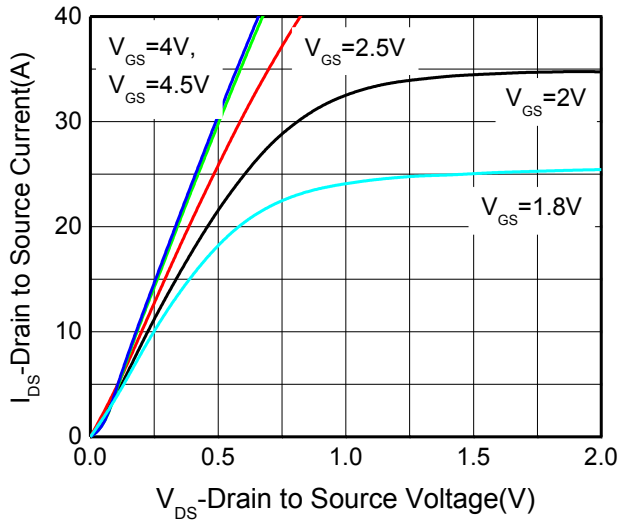
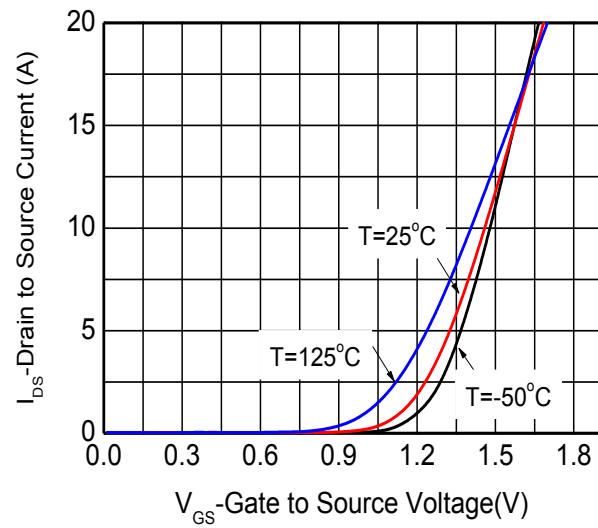
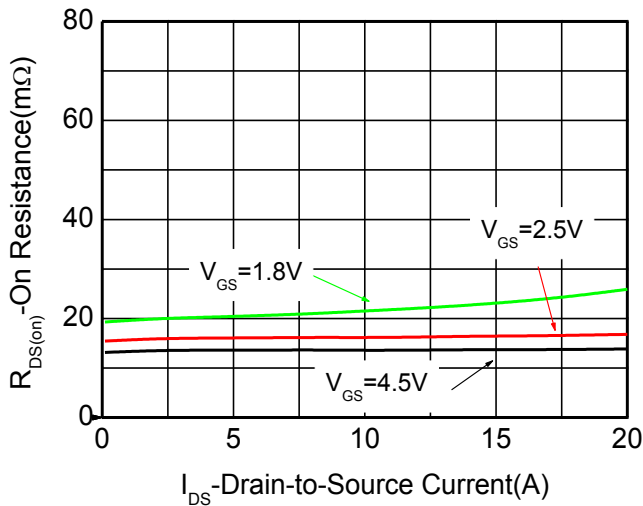
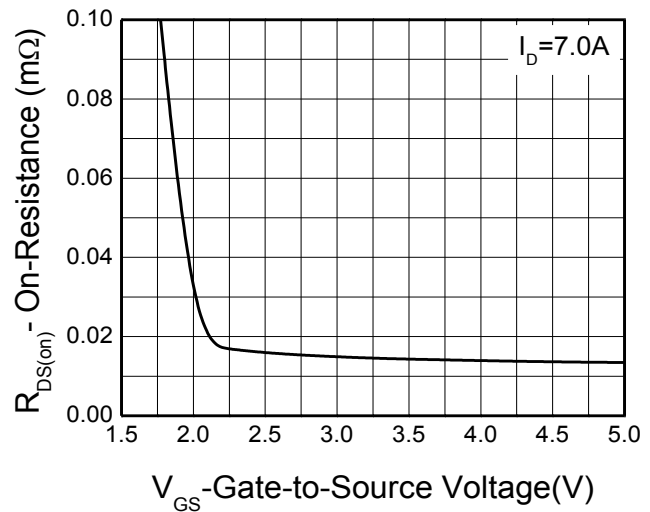
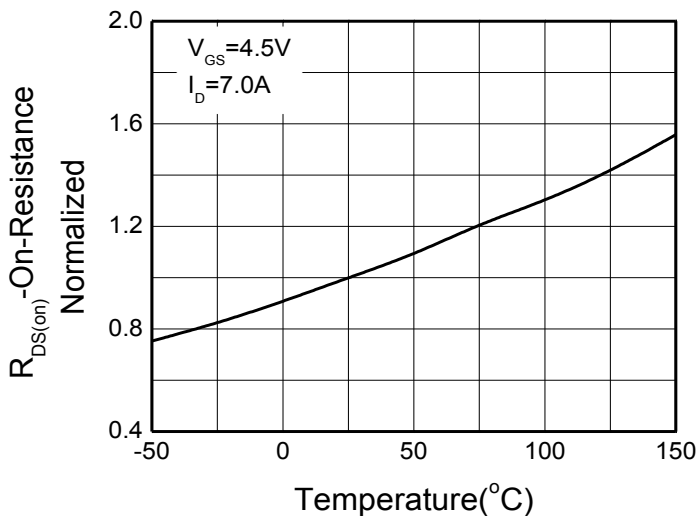
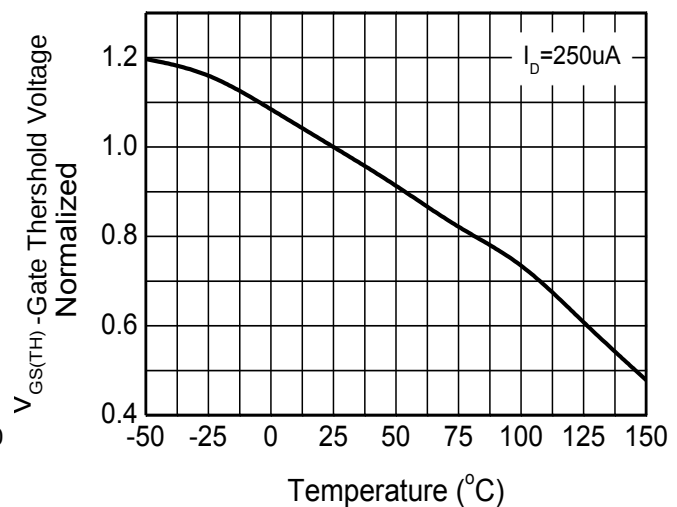
b Surface mounted on FR-4 board using minimum pad size, 1oz copper;.

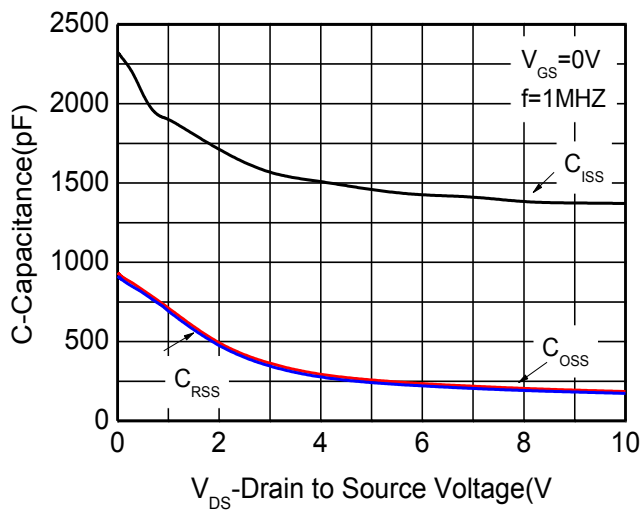
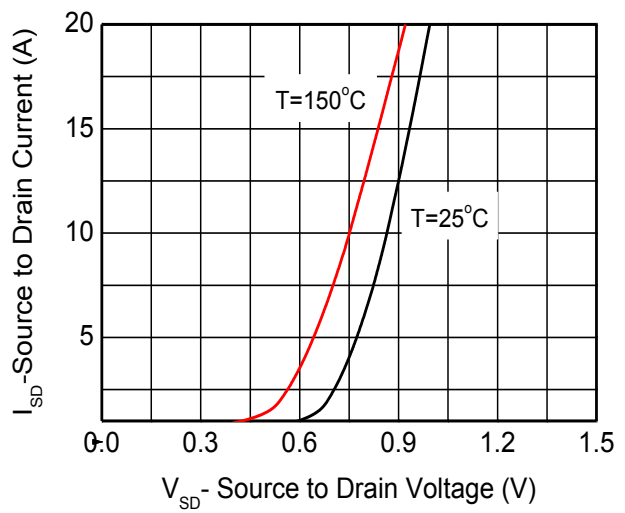
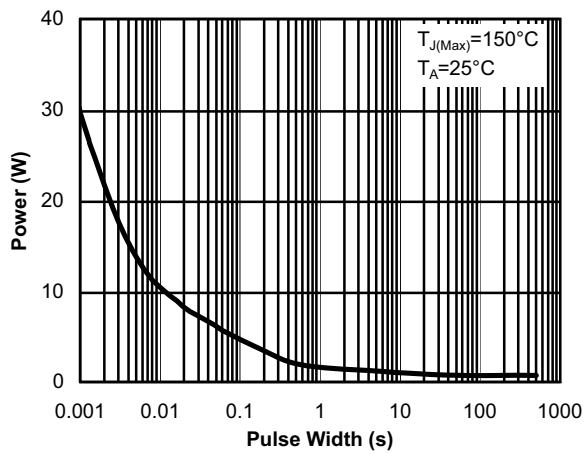
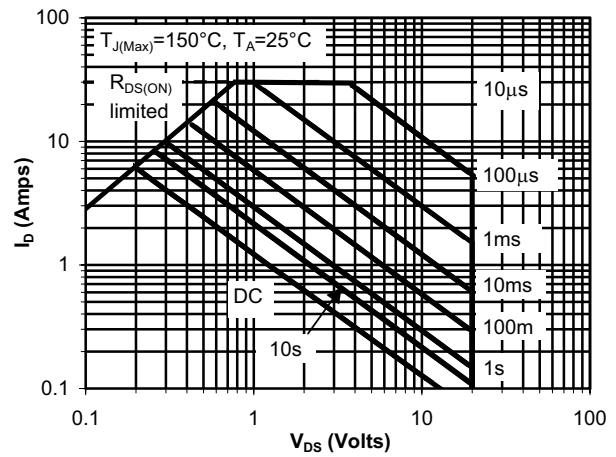
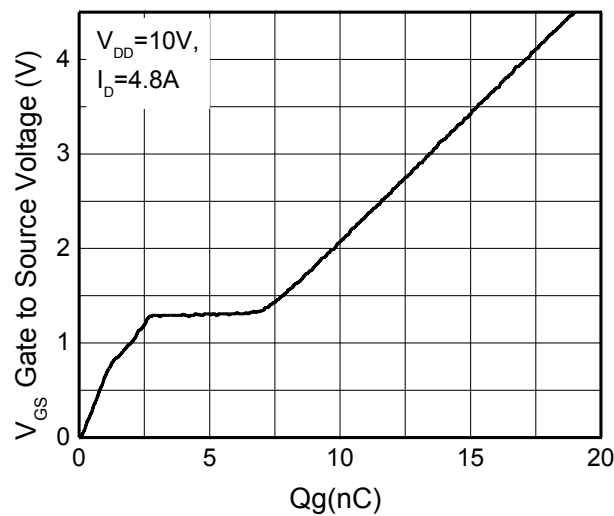
c Pulse width $<380\mu\text{s}$, Duty Cycle $<2\%$;

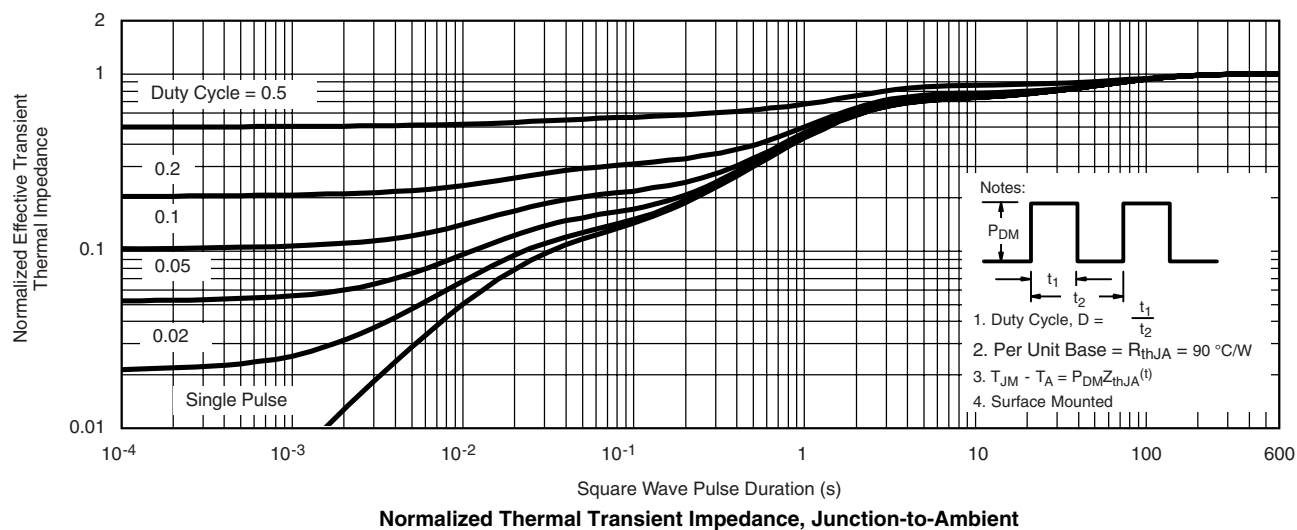
d Maximum junction temperature $T_J=150^{\circ}\text{C}$;

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

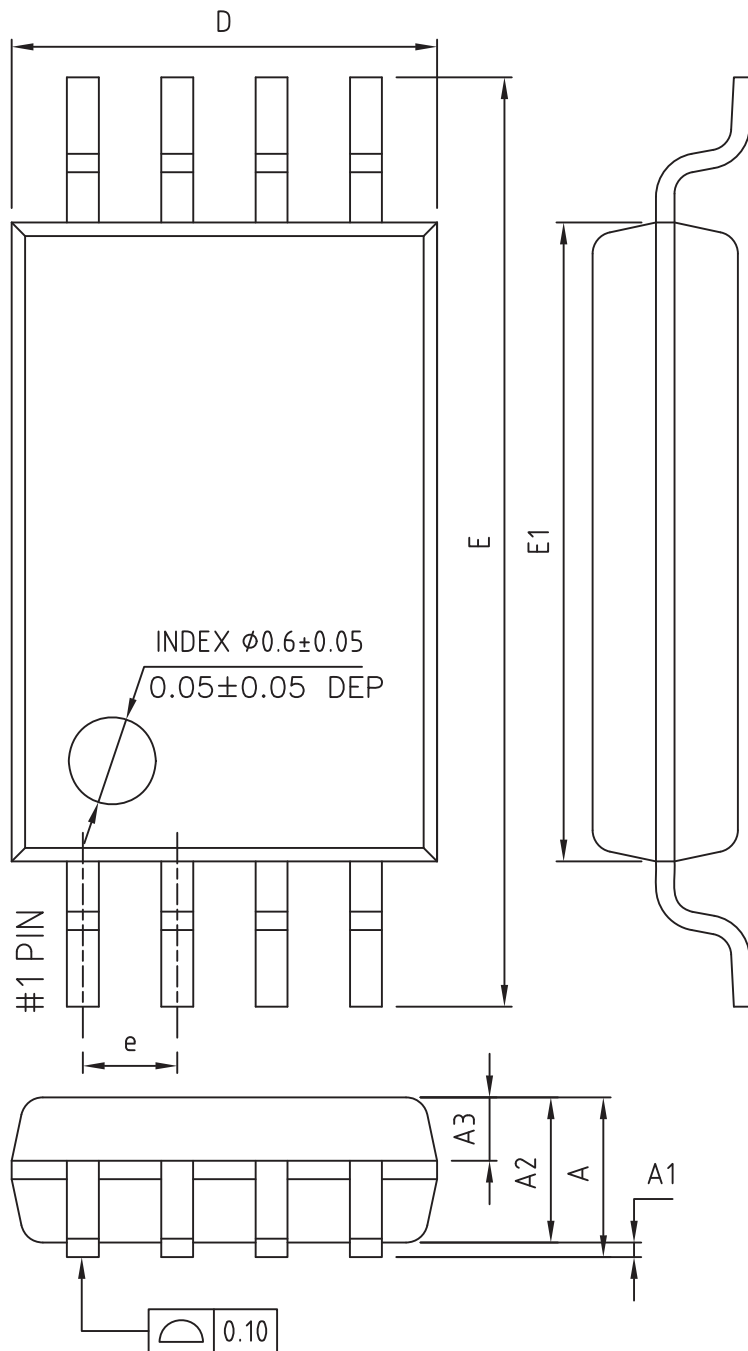
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250uA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =16 V, V _{GS} = 0V			1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10V			±10	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	11	15	20	mΩ
		V _{GS} = 4.0V, I _D = 7.0A	11.5	15.5	22	
		V _{GS} = 3.1V, I _D = 6.5A	12	17	23	
		V _{GS} = 2.5V, I _D = 6.5A	12.5	18	25	
		V _{GS} = 1.8V, I _D = 5.0A	15	21	30	
Forward Transconductance	g _{FS}	V _{DS} = 5.0 V, I _D = 7.0A		18		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 10 V		1371		pF
Output Capacitance	C _{OSS}			185		
Reverse Transfer Capacitance	C _{RSS}			172		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DD} = 10 V, I _D = 4.8 A		18.9		nC
Threshold Gate Charge	Q _{G(TH)}			1.3		
Gate-to-Source Charge	Q _{GS}			2.8		
Gate-to-Drain Charge	Q _{GD}			6.4		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V _{GS} = 4.5 V, V _{DD} = 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		0.65	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(Note.e)

Gate Charge Characteristics



Package outline dimensions(ALL DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS)

TSSOP-8L


COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.90	1.00	1.05
A3	0.34	0.44	0.54
b	0.20	—	0.28
b1	0.20	0.22	0.24
c	0.10	—	0.19
c1	0.10	0.13	0.15
D	2.83	2.93	3.03
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00REF		
L2	0.25BSC		
R	0.09	—	—
R1	0.09	—	—
S	0.20	—	—
$\theta 1$	0°	—	8°
$\theta 2$	10°	12°	14°
$\theta 3$	10°	12°	14°