

## WNM3053

### Single N-Channel, 30V, 14.5A, Power MOSFET

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

V <sub>DS</sub> (V)	Typical R <sub>DS(on)</sub> (mΩ)
30	6.5 @ V <sub>GS</sub> = 10V
	9.0 @ V <sub>GS</sub> = 4.5V



### Descriptions

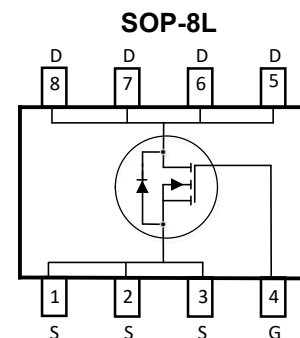
The WNM3053 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<sub>DS(ON)</sub> with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM3053 is Pb-free.

### Features

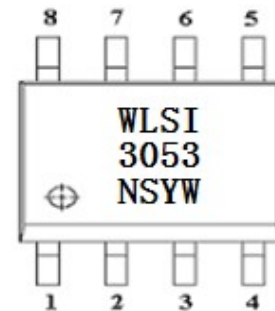
- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOP-8L

### Applications

- DC/DC converters
- Power supply converters circuit
- Load/Power Switching for portable device



Pin configuration (Top view)



3053 = Device Code  
 NS = Special Code  
 Y = Year  
 W = Week(A~z)

### Marking

### Order information

Device	Package	Shipping
WNM3053-3/TR	SOP-8L	4000/Tape&Reel

**Absolute Maximum ratings**

Parameter	Symbol	Maximum	Unit	
Drain-Source Voltage	$V_{DS}$	30	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	14.5	A
		$T_A=70^\circ\text{C}$	11.5	
Pulsed Drain Current <sup>c</sup>	$I_{DM}$	60		
Maximum Power Dissipation <sup>b</sup>	$P_D$	$T_A=25^\circ\text{C}$	3.1	W
		$T_A=70^\circ\text{C}$	2.0	
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ\text{C}$	
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ\text{C}$	

**Thermal resistance ratings**

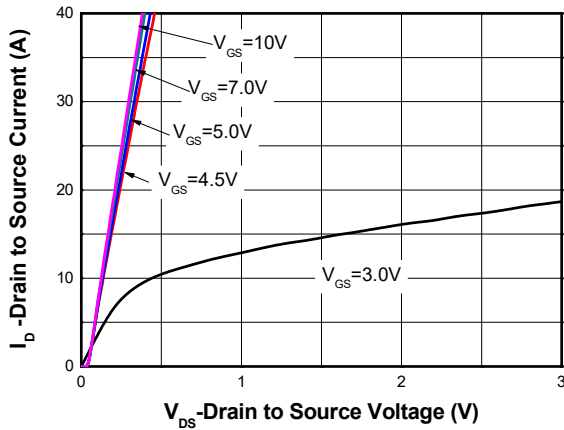
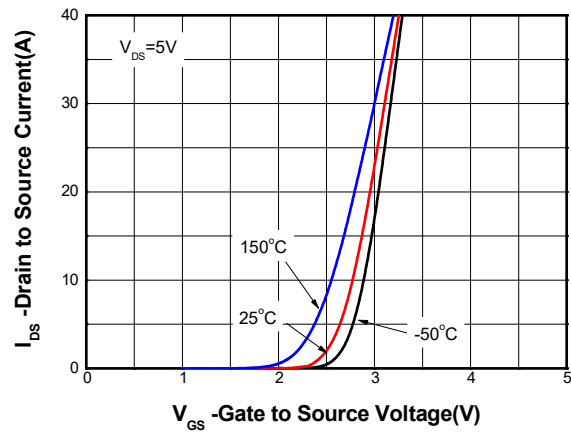
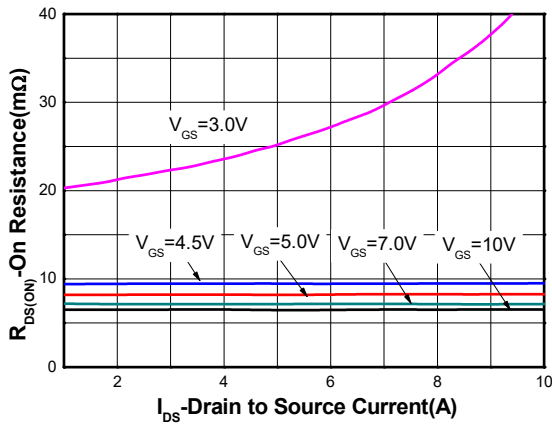
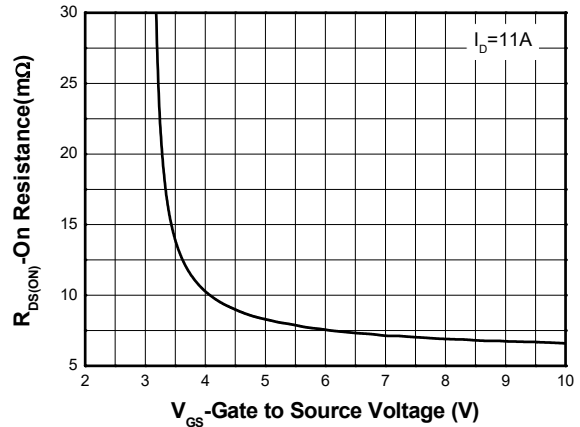
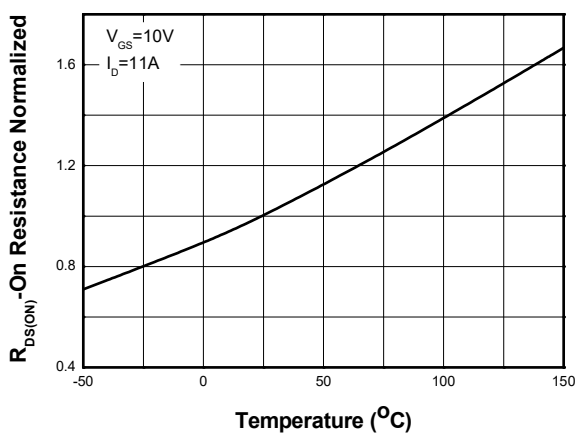
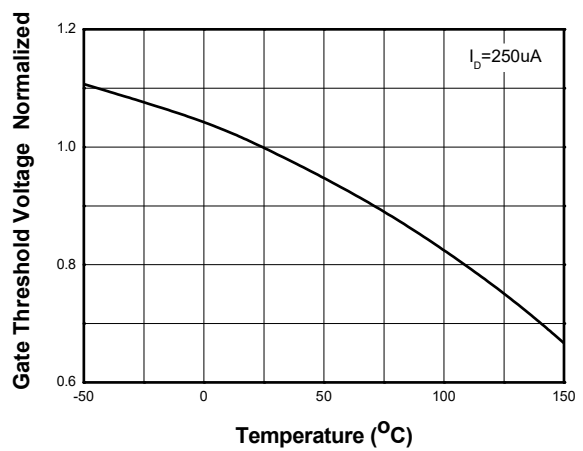
Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$t \leq 10\text{ s}$	$R_{\theta JA}$	32	42	$^\circ\text{C/W}$
	Steady State		63	78	
Junction-to-Lead Thermal Resistance	Steady State	$R_{\theta JL}$	18	23	

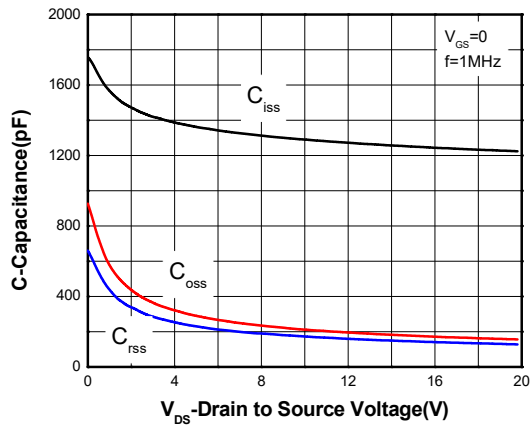
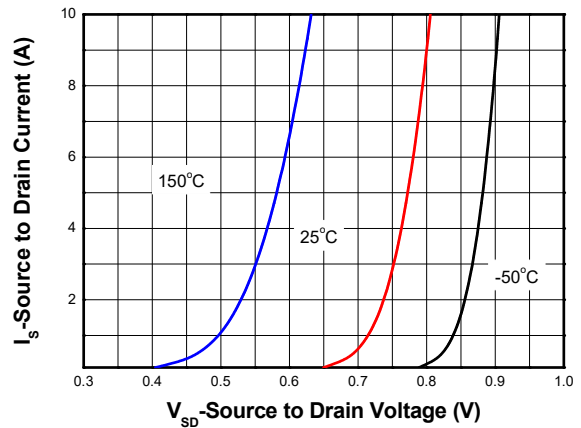
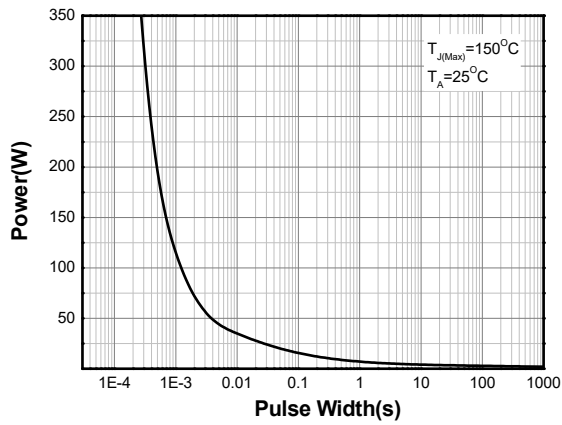
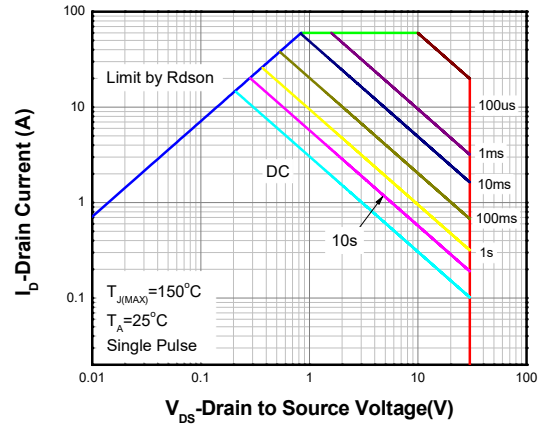
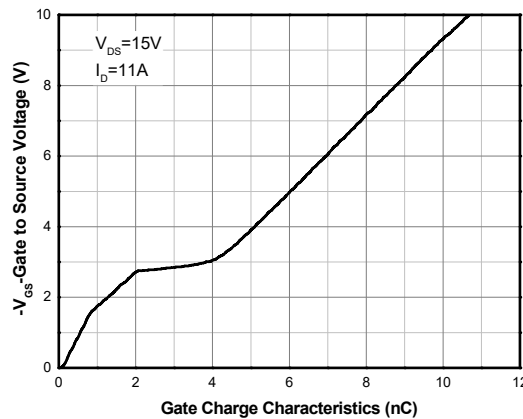
**Note:**

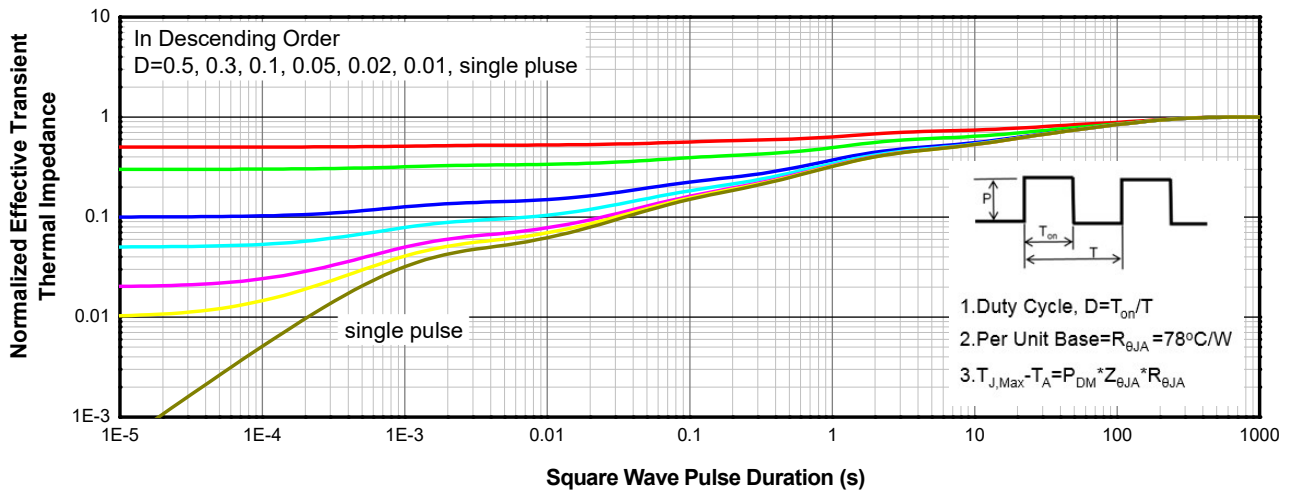
- The value of  $R_{\theta JA}$  is measured with the device mounted on 1-inch<sup>2</sup> (6.45cm<sup>2</sup>) with 2oz.(0.071mm thick) Copper pad on a 1.5\*1.5 inch<sup>2</sup>, 0.06-inch thick FR4 PCB, in a still air environment with  $T_A = 25^\circ\text{C}$ . The value in any given application is determined by the user's specific board design
- The power dissipation  $P_D$  is based on Junction-to-Ambient thermal resistance  $R_{\theta JA}$   $t \leq 10\text{s}$  value and the  $T_{J(\text{MAX})}=150^\circ\text{C}$ .
- Repetitive rating, ~10us pulse width, duty cycle ~1%, keep initial  $T_J = 25^\circ\text{C}$ , the maximum allowed junction temperature of 150 $^\circ\text{C}$ .
- The static characteristics are obtained using ~380us pulses, duty cycle ~1%.

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

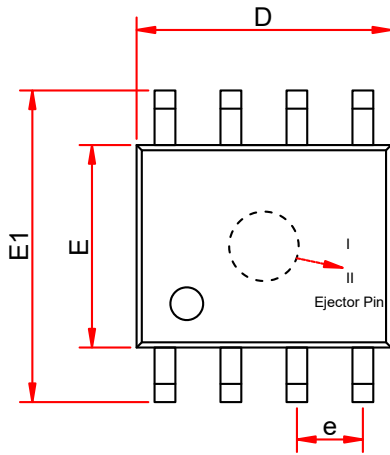
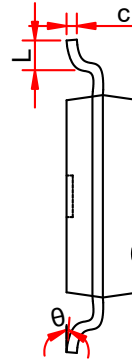
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	1.3	1.8	2.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 14\text{ A}$		6.5	8.5	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		9.0	12.5	
Forward Transconductance	$g_{FS}$	$V_{DS} = 5\text{ V}, I_D = 11\text{ A}$		17	25	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, F = 1.0\text{ MHz}, V_{DS} = 15\text{ V}$		1250		Pf
Output Capacitance	$C_{OSS}$			180		
Reverse Transfer Capacitance	$C_{RSS}$			144		
Gate resistance	$R_g$	$F = 1\text{ MHz}$		1.8		$\Omega$
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 11\text{ A}$		26.5		nC
Threshold Gate Charge	$Q_{G(TH)}$			2.1		
Gate-to-Source Charge	$Q_{GS}$			4.3		
Gate-to-Drain Charge	$Q_{GD}$			4.83		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 11\text{ A}, R_G = 6\Omega$		6.4		ns
Rise Time	$t_r$			17.6		
Turn-Off Delay Time	$t_d(OFF)$			32.4		
Fall Time	$t_f$			14		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 1\text{ A}$		0.7	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 11\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		10.0		ns
Reverse Recovery Charge	$Q_{rr}$			3.1		nC

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

**Output Characteristics <sup>d</sup>**

**Transfer Characteristics <sup>d</sup>**

**On-Resistance vs. Drain Current <sup>d</sup>**

**On-Resistance vs. Gate to Source Voltage <sup>d</sup>**

**On-Resistance vs. Junction Temperature <sup>d</sup>**

**Threshold Voltage vs. Temperature**


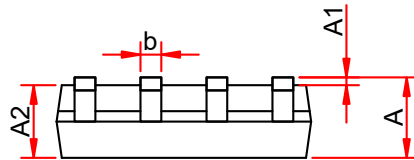

**Capacitance**

**Body Diode Forward Voltage<sup>d</sup>**

**Single Pulse power**

**Safe Operating Power**

**Gate Charge Characteristics**



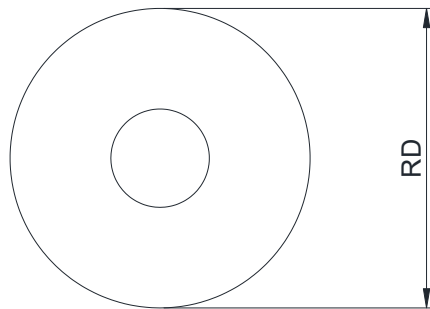
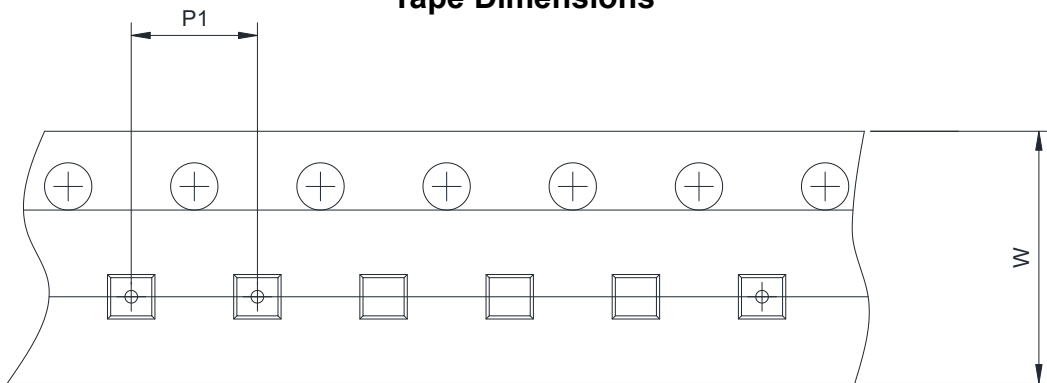
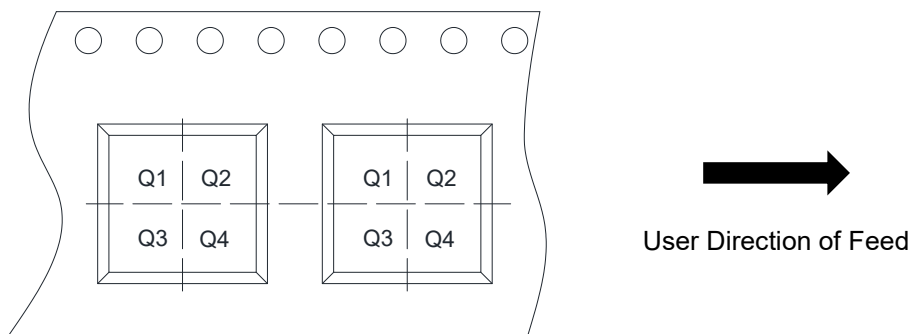
**Transient thermal response (Junction-to-Ambient)**

**PACKAGE OUTLINE DIMENSIONS**
**SOP-8L**

**TOP VIEW**

**SIDE VIEW**

I) NA

 II) 

**SIDE VIEW**

Symbol	Dimensions In Millimeters (mm)		
	Min.	Typ.	Max.
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
A2	1.25	1.40	1.65
b	0.33	-	0.51
c	0.15	-	0.26
D	4.70	4.90	5.10
E	3.70	3.90	4.10
E1	5.80	6.00	6.20
e	1.27BSC		
L	0.40	-	1.27
$\theta$	0°	-	8°

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


RD	Reel Dimension	<input type="checkbox"/> 7inch	<input checked="" type="checkbox"/> 13inch		
W	Overall width of the carrier tape	<input type="checkbox"/> 8mm	<input checked="" type="checkbox"/> 12mm		
P1	Pitch between successive cavity centers	<input type="checkbox"/> 2mm	<input type="checkbox"/> 4mm	<input checked="" type="checkbox"/> 8mm	
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input type="checkbox"/> Q2	<input type="checkbox"/> Q3	<input type="checkbox"/> Q4