WNM2016A

Single N-Channel, 20V, 4.7A, Power MOSFET

Http://www.sh-willsemi.com

V_{DS} (V)	Typical $R_{DS(on)}$ (mΩ)
20	33@ V_{GS}=4.5V
	39@ V_{GS}=3.1V
	44@ V_{GS}=2.5V
	66@ V_{GS}=1.8V

SOT-23

Description

The WNM2016A is 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 WNM2016A is Pb-free and Halogen-free.
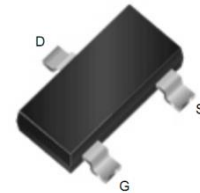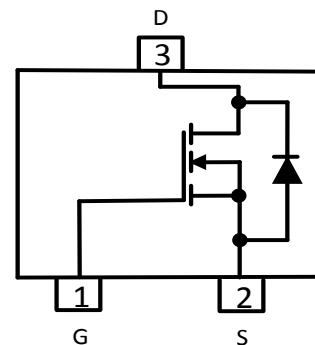
Pin configuration (Top view)

Features

● Trench Technology

● Supper high density cell design

● Excellent ON resistance

● Extremely Low Threshold Voltage

● Small package SOT-23
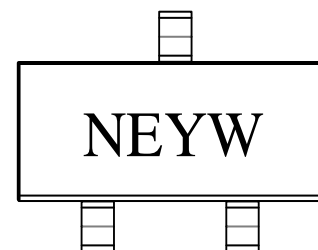
NE = Device Code

Y = Year

W = Week(A~Z)

Marking

Order information

Applications

● DC/DC converters

● Power supply converters circuit

● Load/Power Switching for portable device

Device	Package	Shipping
WNM2016A-3/TR	SOT-23	3000/Tape&Reel

Absolute Maximum ratings

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current	T_A=25°C	I_D	4.7	A
	T_A=70°C		3.7	
Pulsed Drain Current [c]		I_{DM}	24	
Maximum Power Dissipation [b]	T_A=25°C	P_D	1.4	W
	T_A=70°C		0.9	
Operating Junction Temperature		T_J	-55 to 150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

Thermal resistance ratings

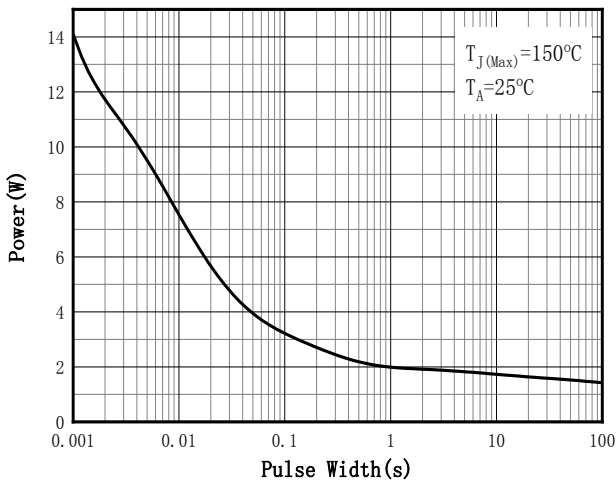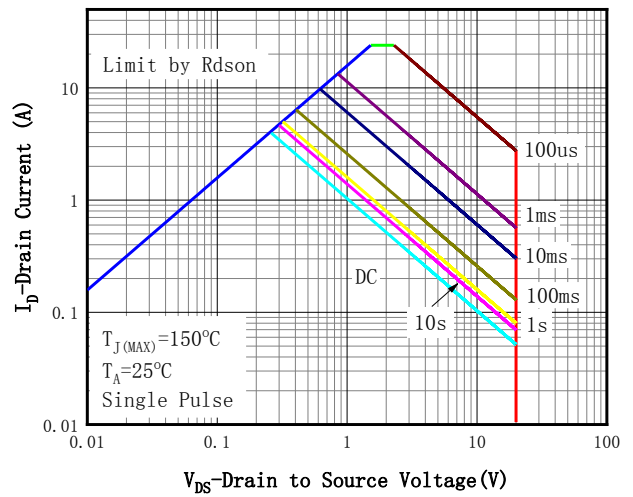| Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	72	90	°C/W
	Steady State		98	122	
Junction-to-Lead Thermal Resistance	Steady State	$R_{\theta JL}$	42	54	

Note:

a. The value of $R_{\theta JA}$ is measured with the device mounted on 1-inch^2 (6.45cm^2) with 2oz.(0.071mm thick) Copper pad on a 1.5*1.5 inch^2, 0.06-inch thick FR4 PCB, in a still air environment with T_A =25°C. The value in any given application is determined by the user's specific board design

b. The power dissipation P_D is based on Junction-to-Ambient thermal resistance $R_{\theta JA}$ t⩽10s value and the $T_{J(MAX)}$=150°C.

c. Repetitive rating, ~10us pulse width, duty cycle ~1%, keep initial T_J =25°C, the maximum allowed junction temperature of 150°C.

d. 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
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} = ±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.45	0.65	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 4.7A		34	42	mΩ
		V_{GS} = 3.1V, I_D = 3.5A		39	52	
		V_{GS} = 2.5V, I_D = 2.5A		44	63	
		V_{GS} = 1.8V, I_D = 2.0A		66	118	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0V, f = 1.0MHz, V_{DS} = 10 V		247		pF
Output Capacitance	C_{OSS}			53		
Reverse Transfer Capacitance	C_{RSS}			36		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 4.7A		4.2		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.3		
Gate-to-Source Charge	Q_{GS}			0.8		
Gate-to-Drain Charge	Q_{GD}			1.0		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} =4.5 V, V_{DS} = 10V, R_L=3.5Ω , R_G=6Ω		5.3		ns
Rise Time	tr			12.6		
Turn-Off Delay Time	td(OFF)			25		
Fall Time	tf			9.9		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1A		0.7	1.2	V

Typical Characteristics (Ta=25°C, unless otherwise noted)
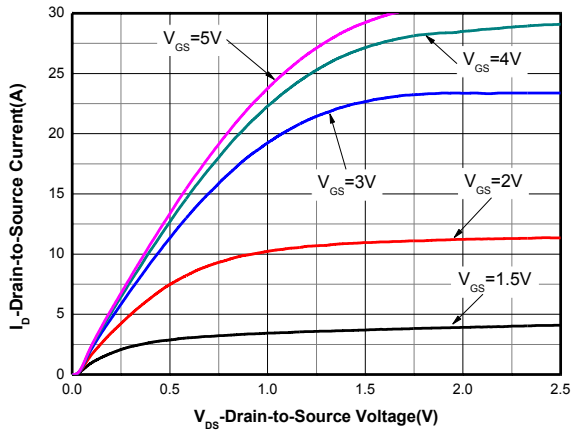
Output Characteristics
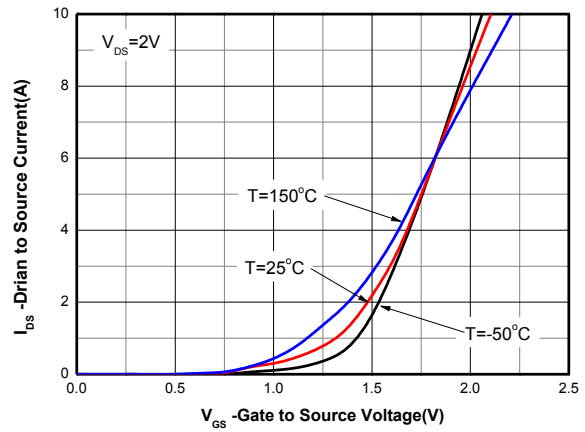
Transfer Characteristics
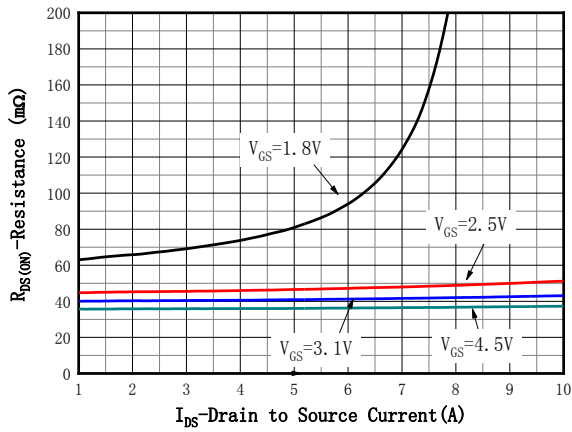
On-Resistance vs. Drain Current
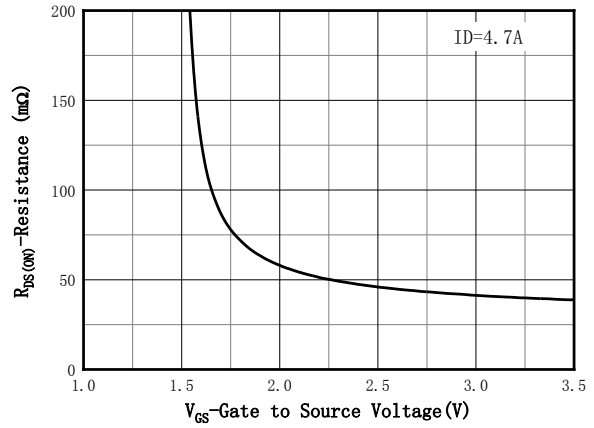
On-Resistance vs. Gate-to-Source Voltage
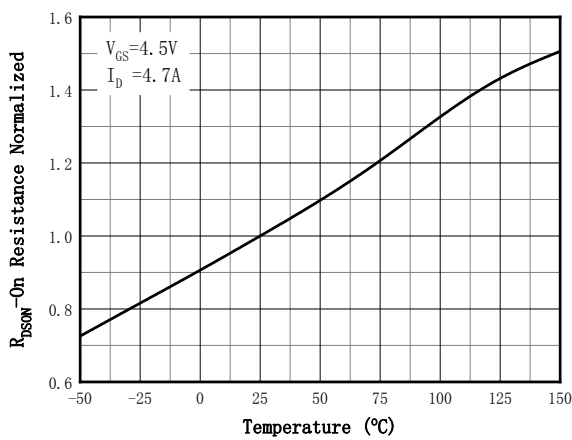
On-Resistance vs. Junction Temperature
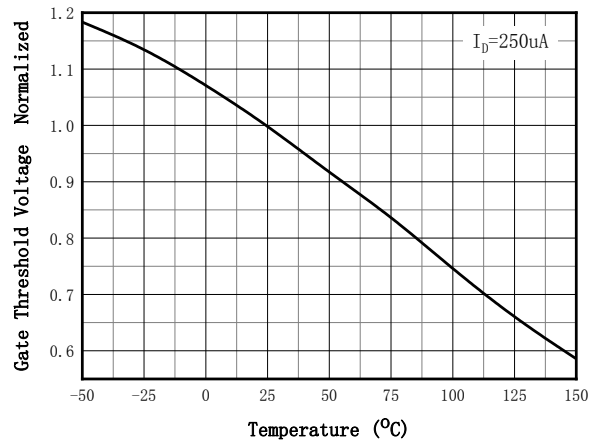
Threshold Voltage vs. Temperature
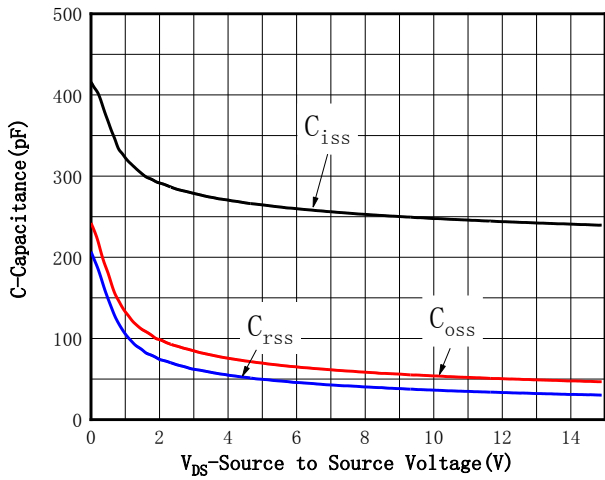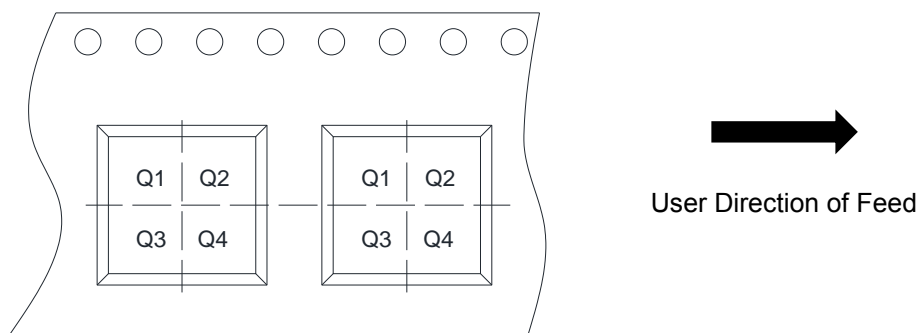
Capacitance
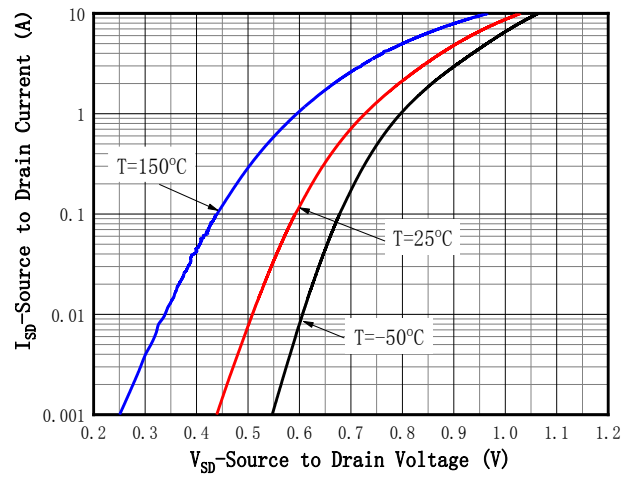
Body Diode Forward Voltage

Single Pulse power

Safe Operating Power
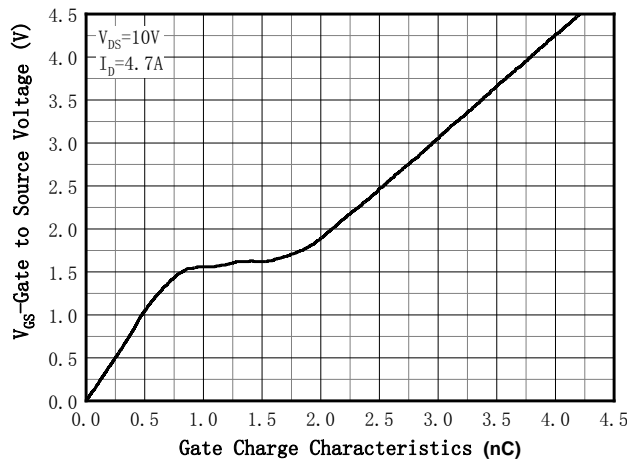
Gate Charge Characteristics

In Descending Order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pluse

1.Duty Cycle, $D = T_{on}/T$
2.Per Unit Base= $R_{\theta JA}$ =98°C/W
3. $T_{J,Max} - T_A = P_{DM} \cdot Z_{\theta JA} \cdot R_{\theta JA}$
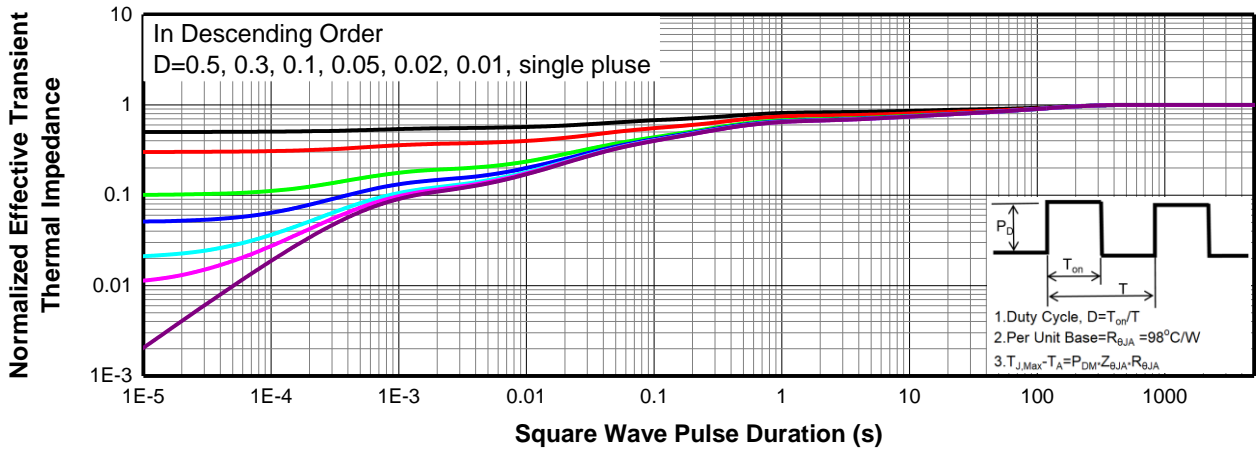
Transient Thermal Response (Junction-to-Ambient)

PACKAGE OUTLINE DIMENSIONS

SOT-23

TOP VIEW

SIDE VIEW

SIDE VIEW

RECOMMENDED LAND PATTERN(unit:mm)
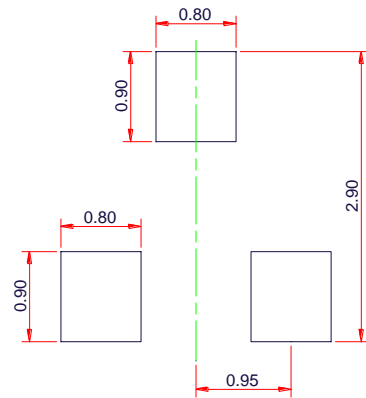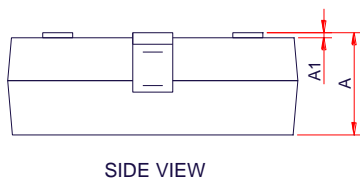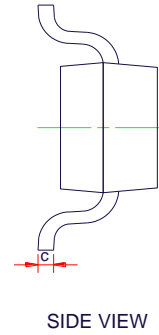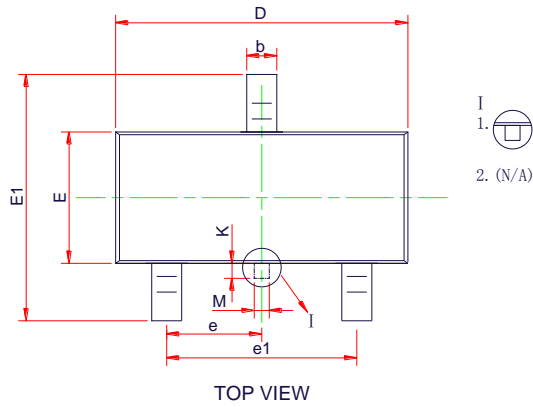
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.89	1.10	1.30
A1	0.00	-	0.10
b	0.30	0.43	0.55
c	0.05	-	0.21
D	2.70	2.90	3.10
E	1.15	1.33	1.50
E1	2.10	2.40	2.70
e	0.95 Typ.		
e1	1.70	1.90	2.10
M	0.10	0.15	0.25
K	0.00	-	0.25

TAPE AND REEL INFORMATION

Reel Dimensions
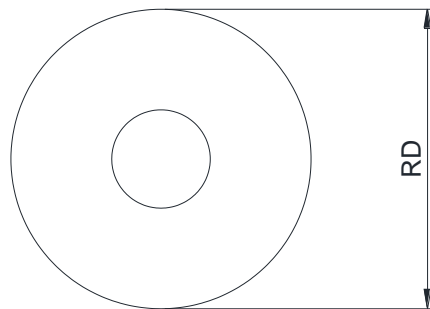
Tape Dimensions
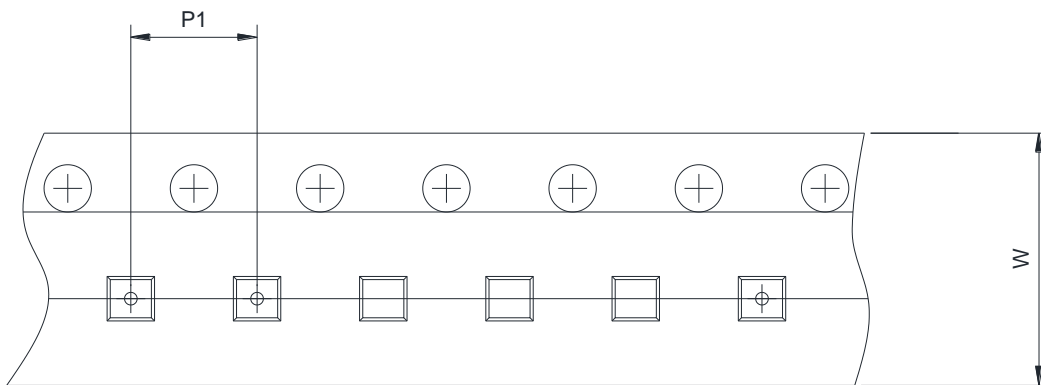
Quadrant Assignments For PIN1 Orientation In Tape

User Direction of Feed

RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☐ 2mm	☑ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☐ Q1	☐ Q2	☑ Q3	☐ Q4

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