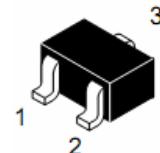


WNM2024

Single N-Channel, 20V, 3.9A, Power MOSFET

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

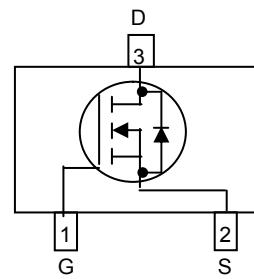
V_{DS} (V)	R_{ds(on)} (Ω)
20	0.027@ V _{GS} =4.5V
	0.031@ V _{GS} =2.5V
	0.036@ V _{GS} =1.8V



SOT-23

Descriptions

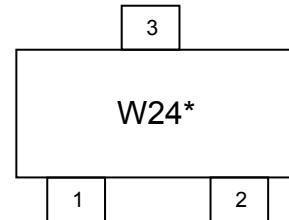
The WNM2024 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2024 is Pb-free and Halogen-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-23



W24= Device Code
* = Month (A~Z)

Marking

Applications

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

Order information

Device	Package	Shipping
WNM2024-3/TR	SOT-23	3000/Reel&Tape

Absolute Maximum ratings

Parameter	Symbol	10 S	Steady State	Unit
Drain-Source Voltage	V _{DS}	20	±8	V
Gate-Source Voltage	V _{GS}	±8		
Continuous Drain Current ^a	T _A =25°C	I _D	3.9	3.6
	T _A =70°C		3.1	2.9
Maximum Power Dissipation ^a	T _A =25°C	P _D	0.8	0.7
	T _A =70°C		0.5	0.4
Continuous Drain Current ^b	T _A =25°C	I _D	3.6	3.3
	T _A =70°C		2.8	2.6
Maximum Power Dissipation ^b	T _A =25°C	P _D	0.7	0.6
	T _A =70°C		0.4	0.3
Pulsed Drain Current ^c	I _{DM}		15	A
Operating Junction Temperature	T _J		150	°C
Lead Temperature	T _L		260	°C
Storage Temperature Range	T _{stg}		-55 to 150	°C

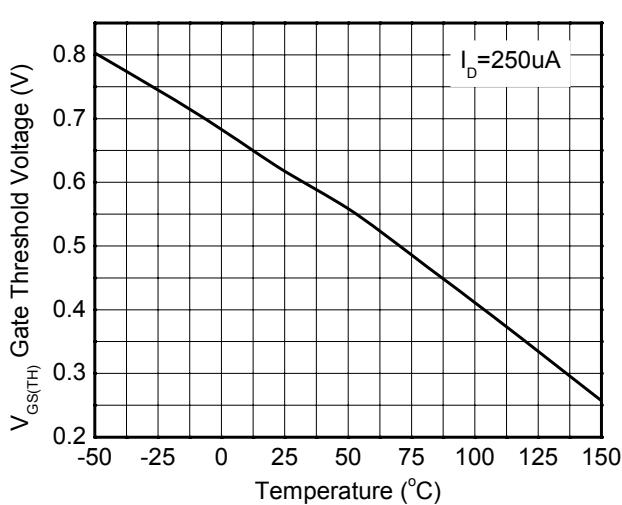
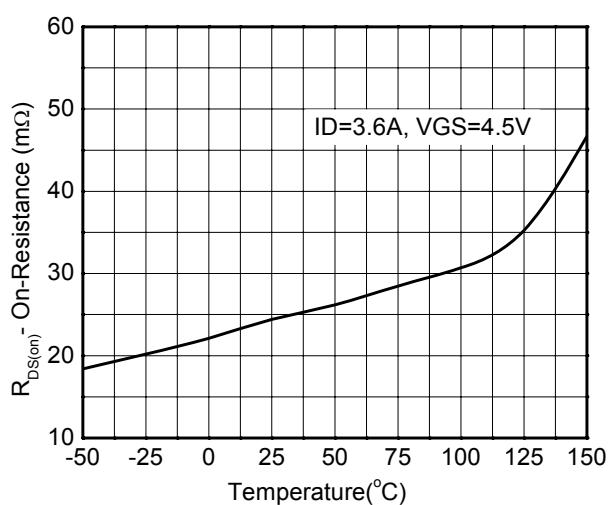
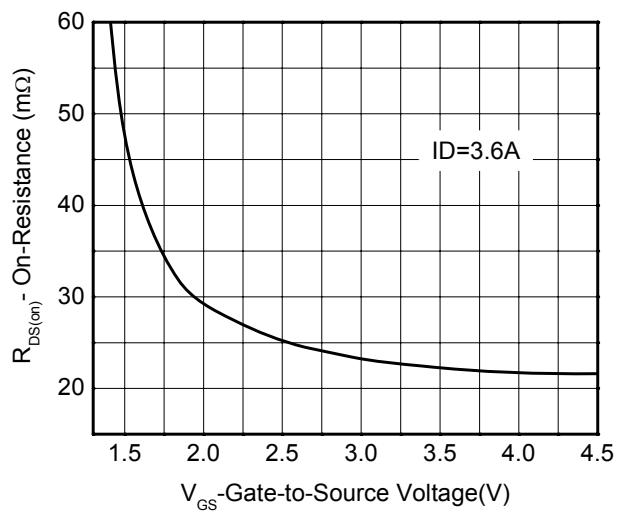
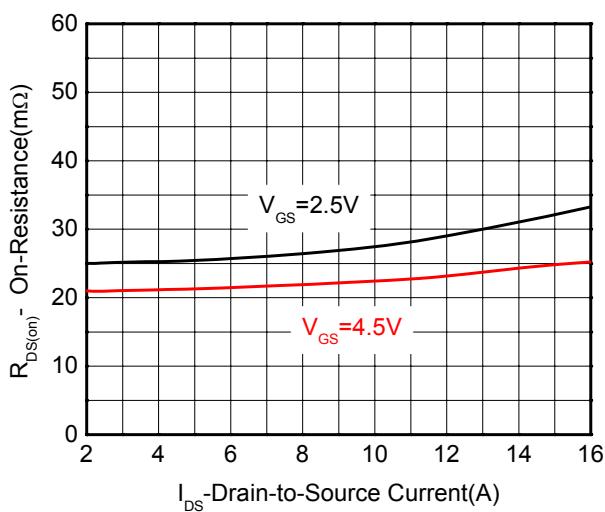
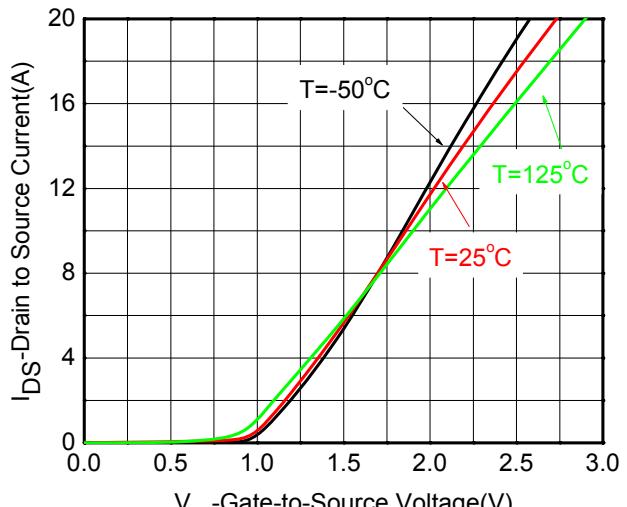
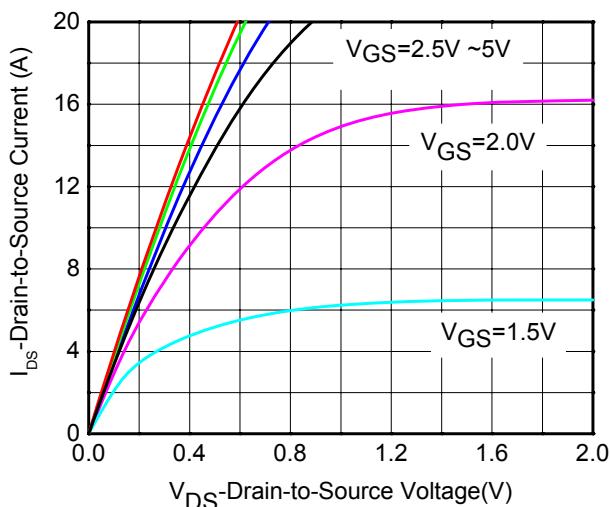
Thermal resistance ratings

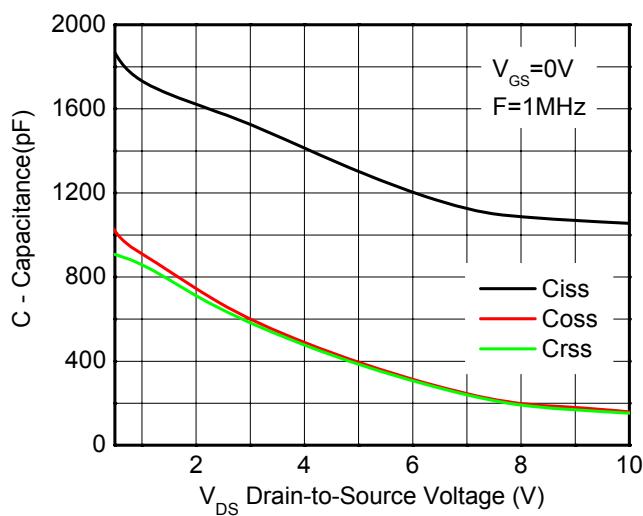
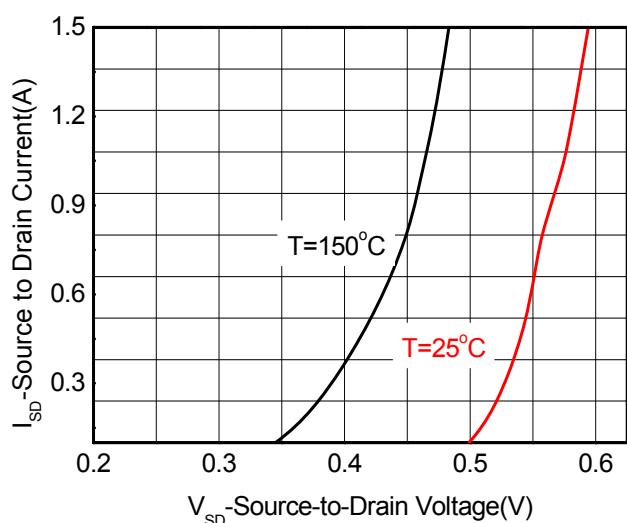
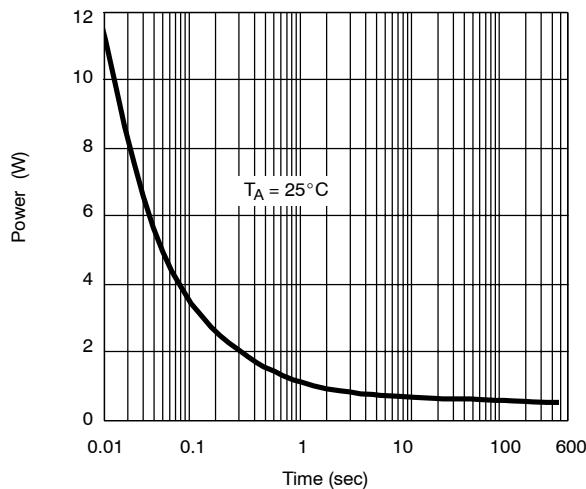
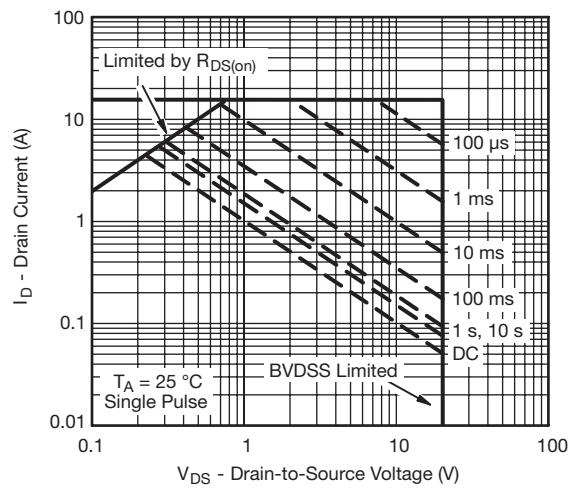
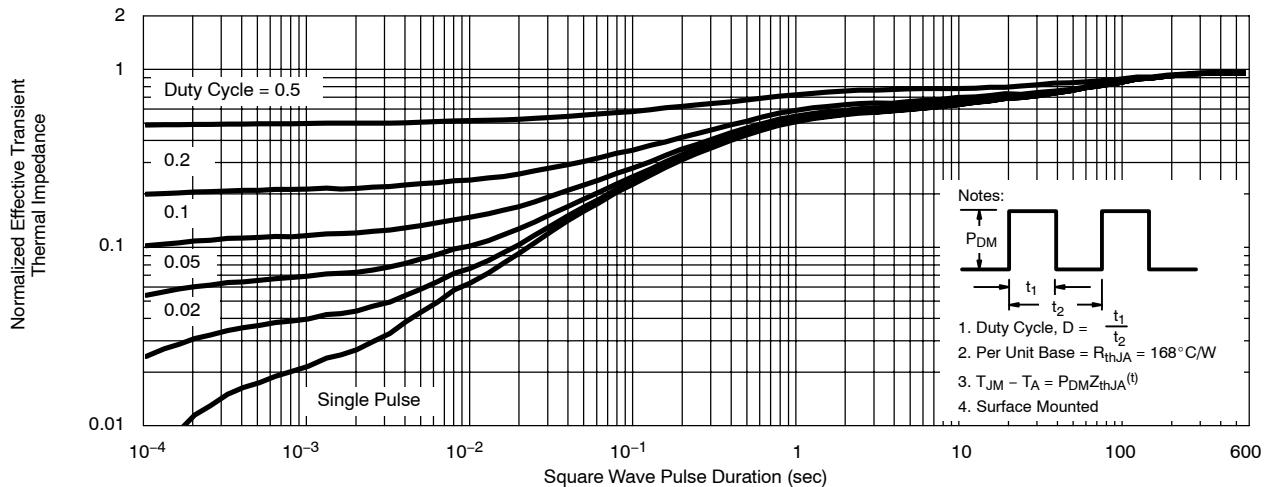
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	t ≤ 10 s	R _{θJA}	120	145
	Steady State		132	168
Junction-to-Ambient Thermal Resistance ^b	t ≤ 10 s	R _{θJA}	145	174
	Steady State		158	202
Junction-to-Case Thermal Resistance	R _{θJC}	60	75	°C/W

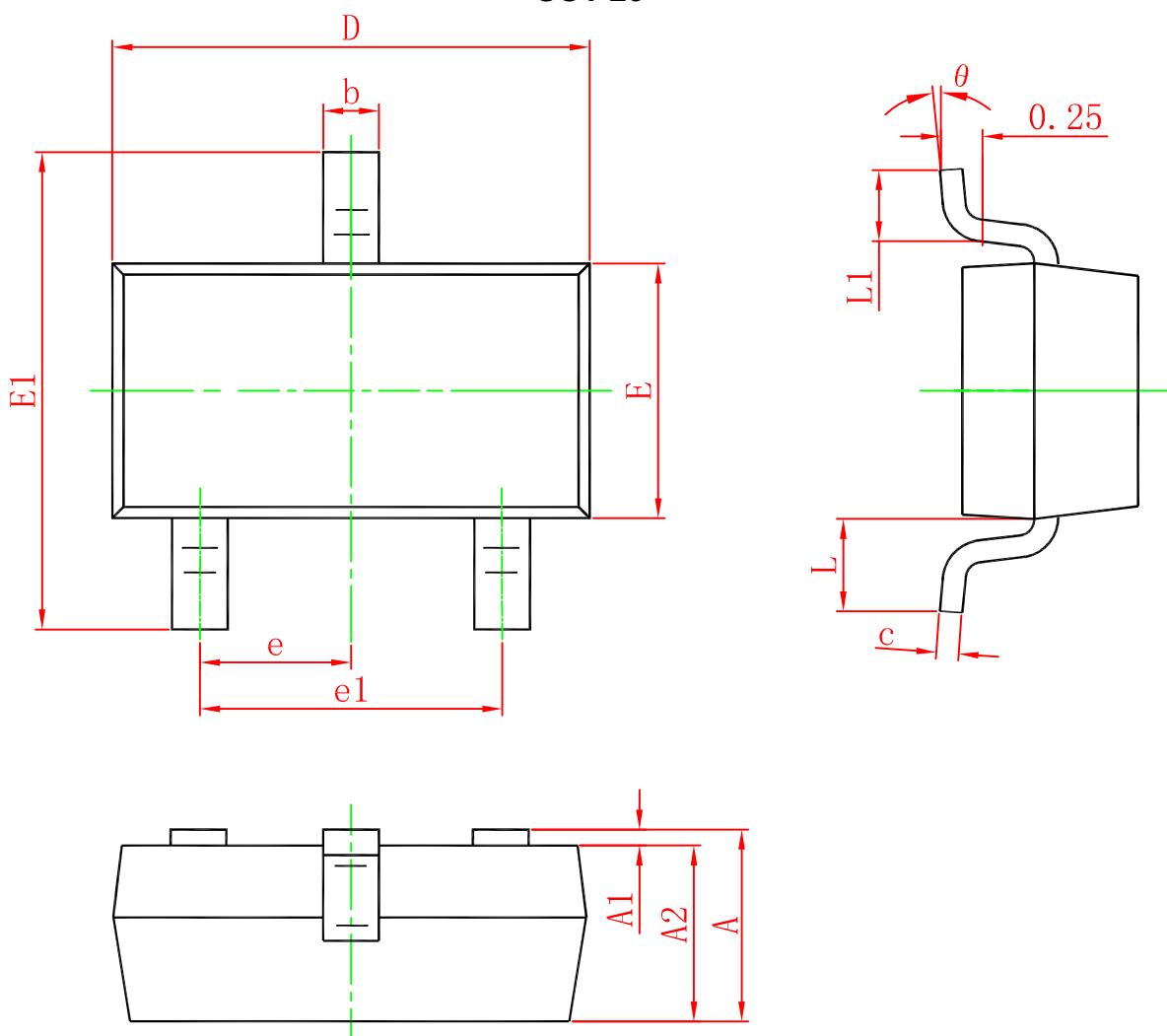
- a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper
- b Surface mounted on FR4 board using minimum pad size, 1oz copper
- c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%
- d Repetitive rating, pulse width limited by junction temperature 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}	$V_{GS} = 0 \text{ V}, I_D = 250\mu\text{A}$	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}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8\text{V}$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.4	0.62	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{V}, I_D = 3.6\text{A}$		27	36	$\text{m}\Omega$
		$V_{GS} = -2.5\text{V}, I_D = 2.8\text{A}$		31	41	
		$V_{GS} = 1.8\text{V}, I_D = 2.0\text{A}$		36	47	
Forward Transconductance	g_{FS}	$V_{DS} = 5 \text{ V}, I_D = 3.6\text{A}$		10		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS} = 0 \text{ V}, f = 1.0 \text{ MHz}, V_{DS} = 10 \text{ V}$		1025		pF
Output Capacitance	C_{OSS}			125		
Reverse Transfer Capacitance	C_{RSS}			120		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5 \text{ V}, V_{DS} = 10 \text{ V}, I_D = 3.6\text{A}$		12.0		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.66		
Gate-to-Source Charge	Q_{GS}			1.0		
Gate-to-Drain Charge	Q_{GD}			3.3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$td(\text{ON})$	$V_{GS} = 4.5 \text{ V}, V_{DS} = 6 \text{ V}, I_D = 2.0\text{A}, R_G = 6 \Omega$		6.5		ns
Rise Time	tr			11.5		
Turn-Off Delay Time	$td(\text{OFF})$			48		
Fall Time	tf			20		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0 \text{ V}, I_S = 1.5\text{A}$	0.5	0.6	1.5	V

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



Capacitance

Body diode forward voltage

Single pulse power

Safe operating area

Transient thermal response (Junction-to-Ambient)

Package outline dimensions
SOT-23


Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.900	1.025	1.150
A1	0.000	0.050	0.100
A2	0.900	0.975	1.050
b	0.300	0.400	0.500
c	0.080	0.115	0.150
D	2.800	2.900	3.000
E	1.200	1.300	1.400
E1	2.250	2.400	2.550
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.550REF		
L1	0.300		0.500
θ	0°		8°