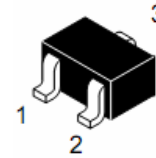


**WNM2024**

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

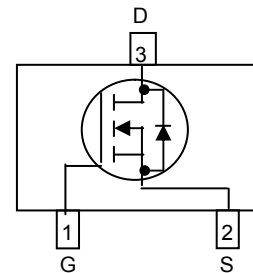
V <sub>DS</sub> (V)	R <sub>ds(on)</sub> (Ω)
20	0.027@ V <sub>GS</sub> =4.5V
	0.031@ V <sub>GS</sub> =2.5V
	0.036@ V <sub>GS</sub> =1.8V



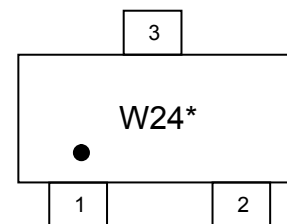
**SOT-23**

**Descriptions**

The WNM2024 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<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 WNM2024 is Pb-free.



**Pin configuration (Top view)**



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

**Marking**

**Features**

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

**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		V
Gate-Source Voltage		$V_{GS}$	$\pm 8$		
Continuous Drain Current <sup>a</sup>	$T_A=25^\circ\text{C}$	$I_D$	3.9	3.6	A
	$T_A=70^\circ\text{C}$		3.1	2.9	
Maximum Power Dissipation <sup>a</sup>	$T_A=25^\circ\text{C}$	$P_D$	0.8	0.7	W
	$T_A=70^\circ\text{C}$		0.5	0.4	
Continuous Drain Current <sup>b</sup>	$T_A=25^\circ\text{C}$	$I_D$	3.6	3.3	A
	$T_A=70^\circ\text{C}$		2.8	2.6	
Maximum Power Dissipation <sup>b</sup>	$T_A=25^\circ\text{C}$	$P_D$	0.7	0.6	W
	$T_A=70^\circ\text{C}$		0.4	0.3	
Pulsed Drain Current <sup>c</sup>		$I_{DM}$	15		A
Operating Junction Temperature		$T_J$	150		$^\circ\text{C}$
Lead Temperature		$T_L$	260		$^\circ\text{C}$
Storage Temperature Range		$T_{stg}$	-55 to 150		$^\circ\text{C}$

## Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$t \leq 10$ s	$R_{\theta JA}$	120	145	$^\circ\text{C/W}$
	Steady State		132	168	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$t \leq 10$ s	$R_{\theta JA}$	145	174	
	Steady State		158	202	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	60	75	

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,  $t_p=10\mu\text{s}$ , Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature  $T_J=150^\circ\text{C}$ .

## 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	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	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	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
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
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		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 4.5\text{ V}, V_{DS} = 6\text{ V}, I_D = 2.0\text{ A}, R_G = 6\ \Omega$		6.5		ns
Rise Time	$t_r$			11.5		
Turn-Off Delay Time	$t_d(OFF)$			48		
Fall Time	$t_f$			20		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 1.5\text{ A}$	0.5	0.6	1.5	V