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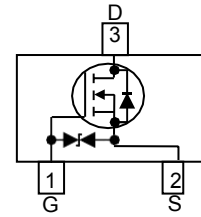
Product data sheet

**Features**

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-323

**Applications**

- DC-DC converter circuit
- Small Signal Switch
- Load Switch
- Level Shift



**Pin configuration (Top view)**

SOT-323

**N-Channel, 20V, 0.89A, Small Signal MOSFET**

V <sub>bs</sub> (V)	R <sub>ds(on)</sub> (Ω)	I <sub>b</sub> (A)
20	0.220@ V <sub>GS</sub> =4.5V	0.55
	0.260@ V <sub>GS</sub> =2.5V	0.45
	0.320@ V <sub>GS</sub> =1.8V	0.35

**Absolute Maximum ratings**

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V <sub>DS</sub>	20		V
Gate-Source Voltage		V <sub>GS</sub>	±6		
Continuous Drain Current <sup>a</sup>	T <sub>A</sub> =25°C	I <sub>D</sub>	0.89	0.82	A
	T <sub>A</sub> =70°C		0.71	0.65	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> =25°C	P <sub>D</sub>	0.37	0.31	W
	T <sub>A</sub> =70°C		0.23	0.20	
Continuous Drain Current <sup>b</sup>	T <sub>A</sub> =25°C	I <sub>D</sub>	0.78	0.70	A
	T <sub>A</sub> =70°C		0.62	0.56	
Maximum Power Dissipation <sup>b</sup>	T <sub>A</sub> =25°C	P <sub>D</sub>	0.29	0.23	W
	T <sub>A</sub> =70°C		0.18	0.14	
Pulsed Drain Current <sup>c</sup>		I <sub>DM</sub>	1.4		A
Operating Junction Temperature		T <sub>J</sub>	150		°C
Lead Temperature		T <sub>L</sub>	260		°C
Storage Temperature Range		T <sub>stg</sub>	-55 to 150		°C

**Thermal resistance ratings**

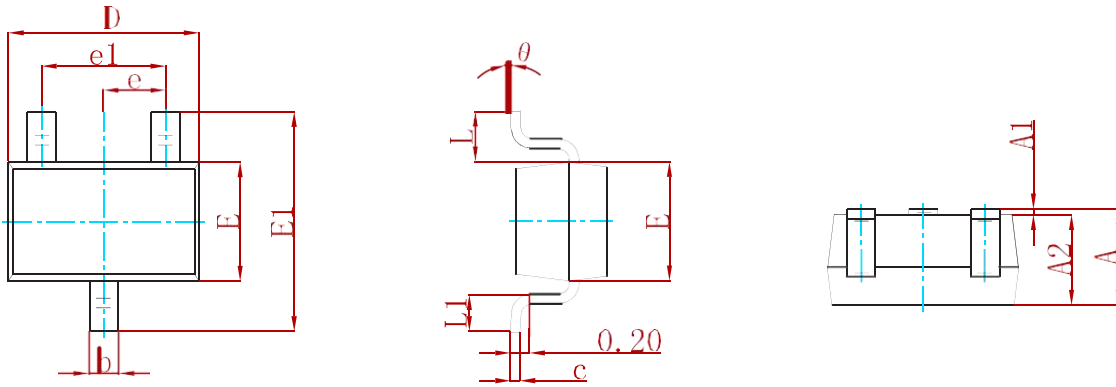
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup>	t ≤ 10 s	R <sub>θJA</sub>	275	335	°C/W
	Steady State		325	395	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	t ≤ 10 s	R <sub>θJA</sub>	375	430	
	Steady State		445	535	
Junction-to-Case Thermal Resistance	Steady State	R <sub>θJC</sub>	260	300	

- 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<sub>p</sub>=10μs, Duty Cycle=1%
- d Repetitive rating, pulse width limited by junction temperature T<sub>J</sub>=150°C.

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

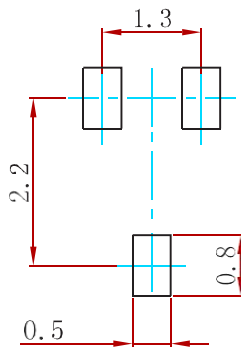
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			100	nA
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			5	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.45	0.58	0.85	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 0.55\text{ A}$		220	260	m $\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 0.45\text{ A}$		260	310	
		$V_{GS} = 1.8\text{ V}, I_D = 0.35\text{ A}$		320	380	
Forward Transconductance	$g_{FS}$	$V_{DS} = 5\text{ V}, I_D = 0.55\text{ A}$		2.0		S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 10\text{ V}$		50		pF
Output Capacitance	$C_{OSS}$			13		
Reverse Transfer Capacitance	$C_{RSS}$			8		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 0.55\text{ A}$		1.15		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.06		
Gate-to-Source Charge	$Q_{GS}$			0.15		
Gate-to-Drain Charge	$Q_{GD}$			0.23		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, R_L = 3\ \Omega, R_G = 6\ \Omega$		22		ns
Rise Time	$t_r$			80		
Turn-Off Delay Time	$t_d(OFF)$			700		
Fall Time	$t_f$			380		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 0.35\text{ A}$	0.5	0.7	1.1	V

**PACKAGE MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
theta	0°	8°	0°	8°

**Suggested Pad Layout**



Note:  
 1. Controlling dimension: in millimeters.  
 2. General tolerance: ±0.05mm.  
 3. The pad layout is for reference purposes only.

**REEL SPECIFICATION**

P/N	PKG	QTY
WNM2021-3/MS	SOT-323	3000

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