

SuperMOS – SOT-323 20V BV_{DSS} , 155m Ω $R_{DS(ON)}$, N-channel MOSFET

1. Description

The WNM2021-3/TR-ES is N-Channel enhancement MOS Field Effect Transistor. Uses advanced technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM2021-3/TR-ES is Pb-free.

2. Features

- 20V, $R_{DS(ON)}=155m\Omega(Typ.) @ V_{GS}=4.5V$
- $R_{DS(ON)}=220m\Omega(Typ.) @ V_{GS}=2.5V$
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

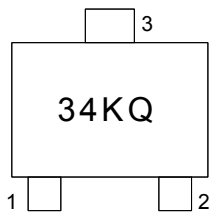
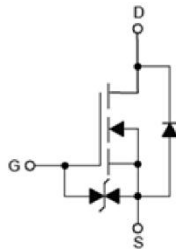
3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
WNM2021-3/TR-ES	SOT-323	34KQ	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	BV_{DSS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	0.9
		$T_A=100^\circ\text{C}$	0.6
Maximum Power Dissipation	P_D	0.23	W
Pulsed Drain Current	I_{DM}	3.6	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

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$t \leq 10\text{s}$	$R_{\theta JA}$		543	$^\circ\text{C/W}$

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$			± 10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.65	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=0.5A$		155	195	$m\Omega$
		$V_{GS}=2.5V, I_D=0.3A$		220	330	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, f=1MHz, V_{DS}=10V$		60		pF
Output Capacitance	C_{OSS}			22		
Reverse Transfer Capacitance	C_{RSS}			12		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=4.5V, V_{DS}=10V, I_D=0.9A$		1		nC
Gate-to-Source Charge	Q_{GS}			0.28		
Gate-to-Drain Charge	Q_{GD}			0.22		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=4.5V, V_{DS}=10V, I_D=0.5A, R_G=10\Omega$		2		ns
Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(OFF)}$			10		
Fall Time	t_f			23		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=0.9A$			1.5	V

7. Typical Characteristic

Figure 1: Output Characteristics

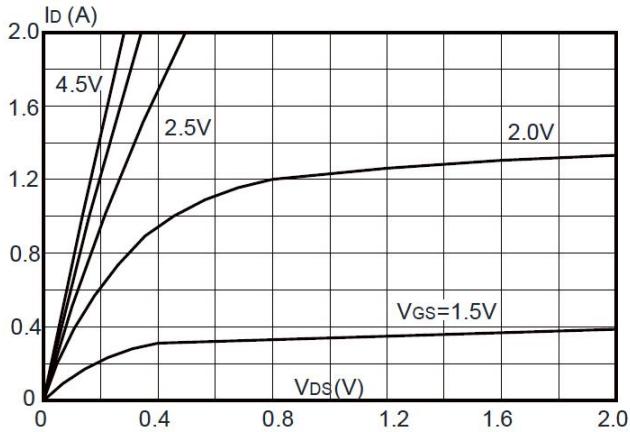


Figure 2: Typical Transfer Characteristics

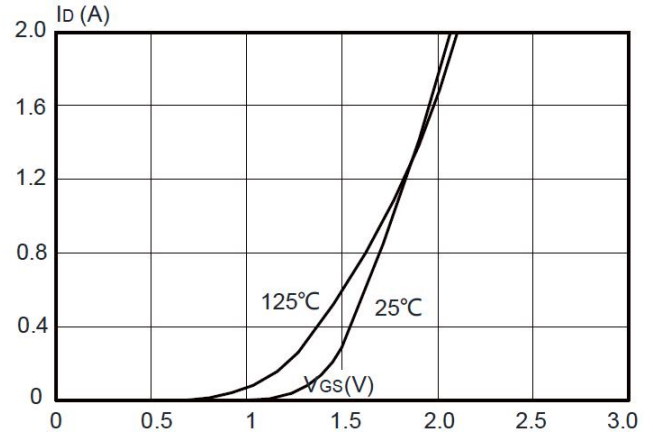


Figure 3: On-resistance vs. Drain Current

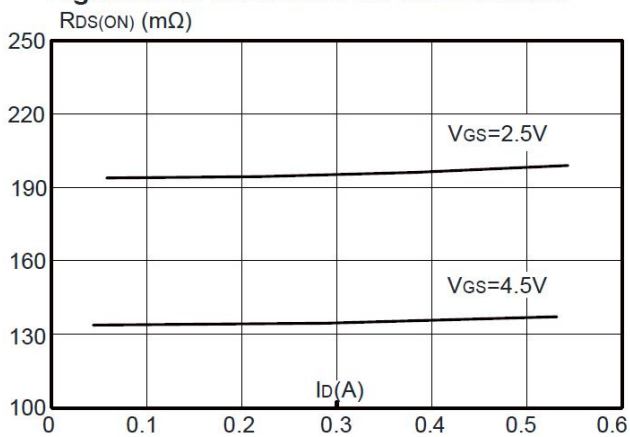


Figure 4: Body Diode Characteristics

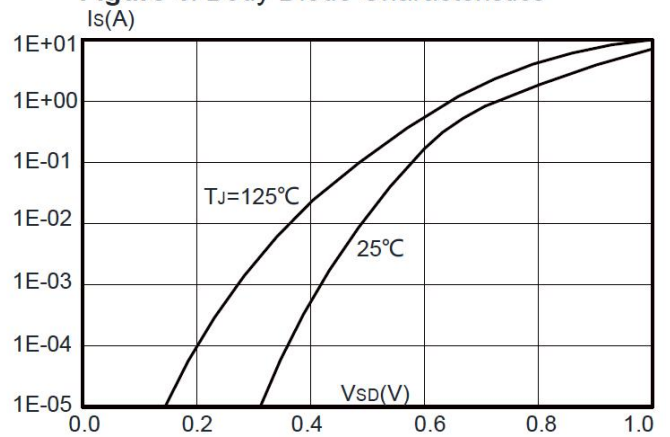


Figure 5: Gate Charge Characteristics

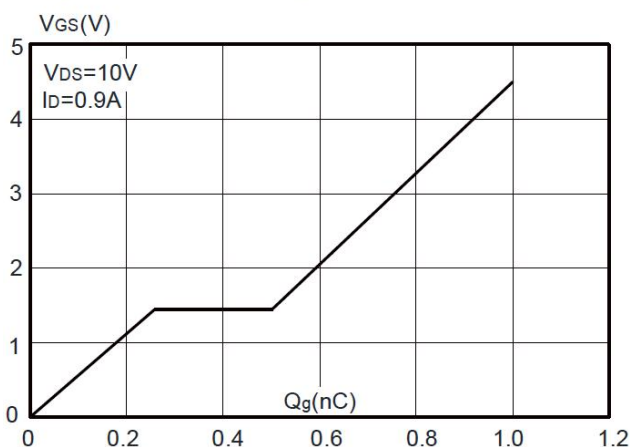


Figure 6: Capacitance Characteristics

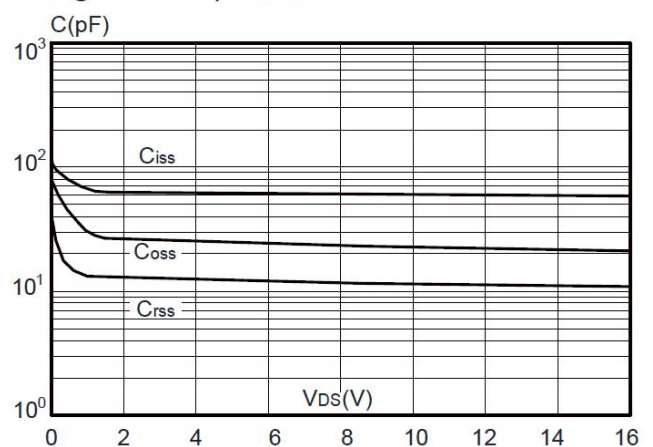


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

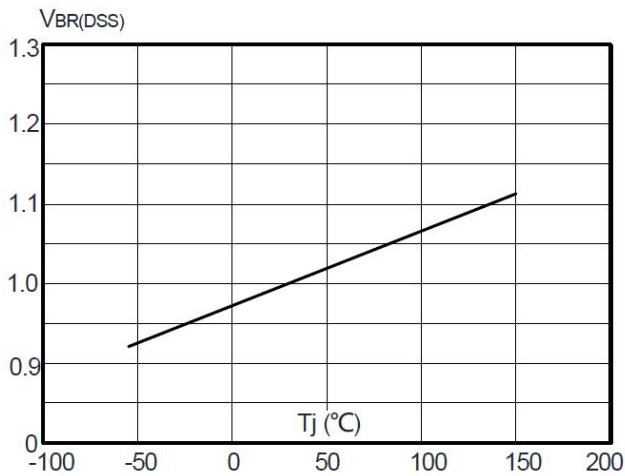


Figure 8: Normalized on Resistance vs. Junction Temperature

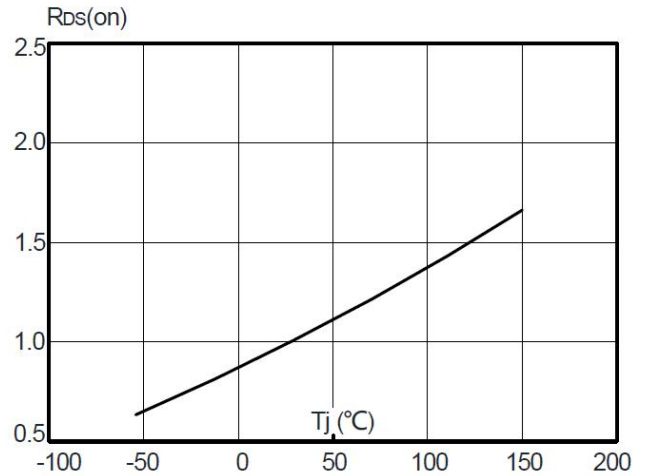


Figure 9: Maximum Safe Operating Area

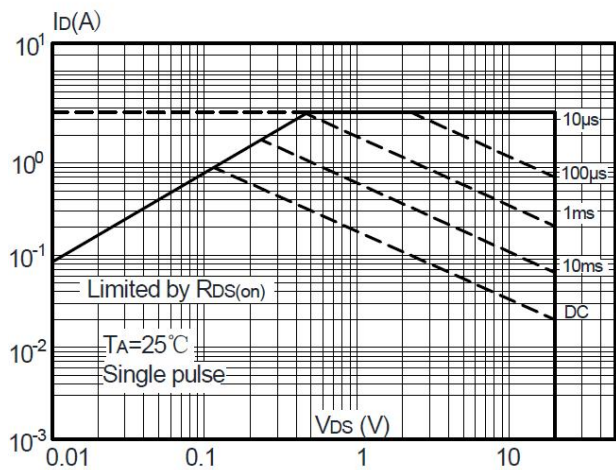


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

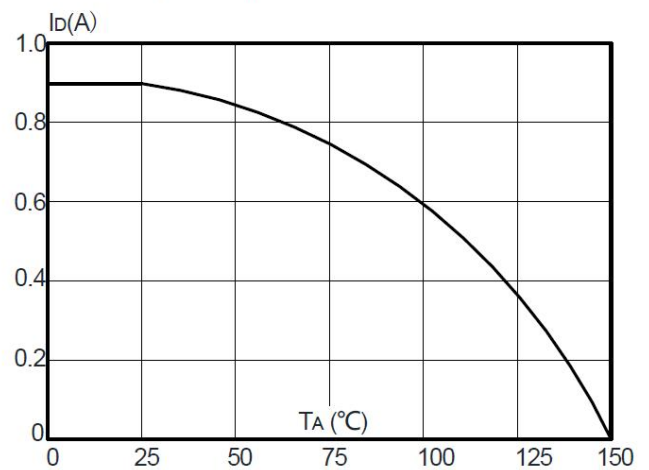
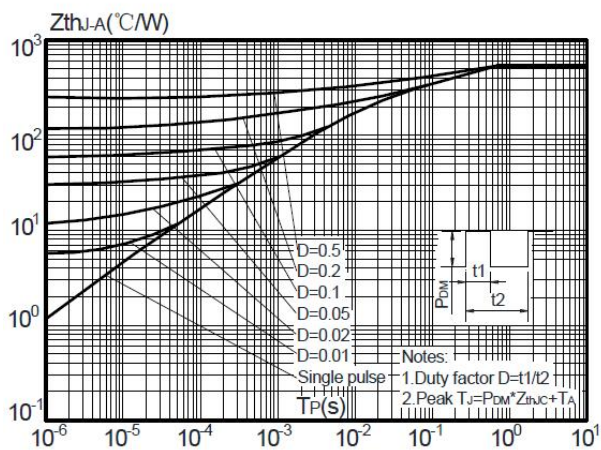
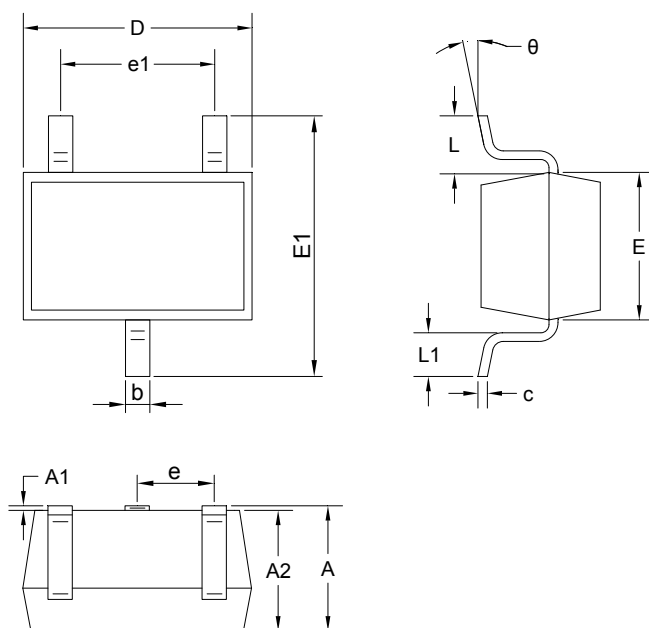


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



8. Dimension (SOT-323)



Symbol	Millimeters		Symbol	Millimeters	
	Min	Max		Min	Max
A	0.80	1.00	E1	2.05	1.35
A1	0.00	0.10	e	0.65 TYP	
A2	0.80	0.90	e1	1.20	1.40
b	0.20	0.40	L	0.45 REF	
c	0.08	0.15	L1	0.26	0.46
D	2.00	2.20	theta	0°	8°
E	1.15	1.35			

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