

SOT-323 Plastic-Encapsulate MOSFETS

WNM6002-ALJ

N-Channel, 60V, 0.30A, Power MOSFET

Features

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

Applications

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

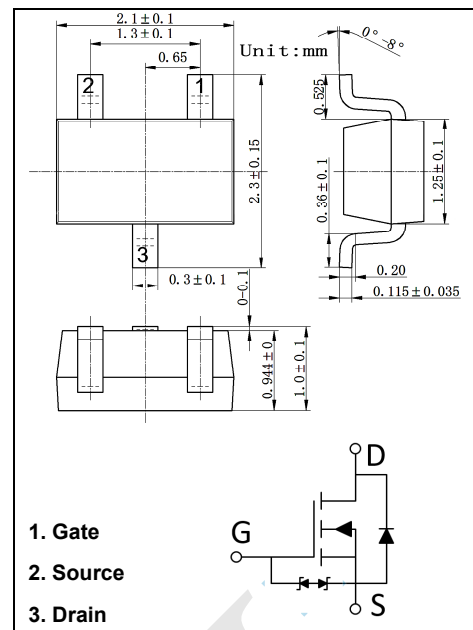
Marking:6002

Description

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 WNM6002 is Pb-free and Halogen-free.

Maximum Ratings ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter		10 S	Steady State	Unit
V_{DS}	Drain-Source Voltage		60		V
V_{GS}	Gate-Source Voltage		± 20		
I_D	Continuous Drain Current ^{1, 4)}	$T_A=25^{\circ}\text{C}$	0.30	0.28	A
		$T_A=70^{\circ}\text{C}$	0.24	0.22	
P_D	Maximum Power Dissipation ^{1, 4)}	$T_A=25^{\circ}\text{C}$	0.37	0.31	W
		$T_A=70^{\circ}\text{C}$	0.23	0.20	
I_D	Continuous Drain Current ^{2, 4)}	$T_A=25^{\circ}\text{C}$	0.27	0.24	A
		$T_A=70^{\circ}\text{C}$	0.21	0.19	
P_D	Maximum Power Dissipation ^{2, 4)}	$T_A=25^{\circ}\text{C}$	0.29	0.23	W
		$T_A=70^{\circ}\text{C}$	0.18	0.14	
I_{DM}	Pulsed Drain Current ³⁾		1.0		A
T_J	Operating Junction Temperature		150		$^{\circ}\text{C}$
T_L	Lead Temperature		260		$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range		-55 to +150		$^{\circ}\text{C}$



Thermal resistance ratings

Symbol	Parameter		Typ.	Max.	Unit
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance ¹⁾	$t \leq 10$ s	245	335	°C/W
		Steady State	325	395	
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance ²⁾	$t \leq 10$ s	375	430	
		Steady State	445	535	
$R_{\theta JC}$	Junction-to-Case Thermal Resistance	Steady State	260	300	

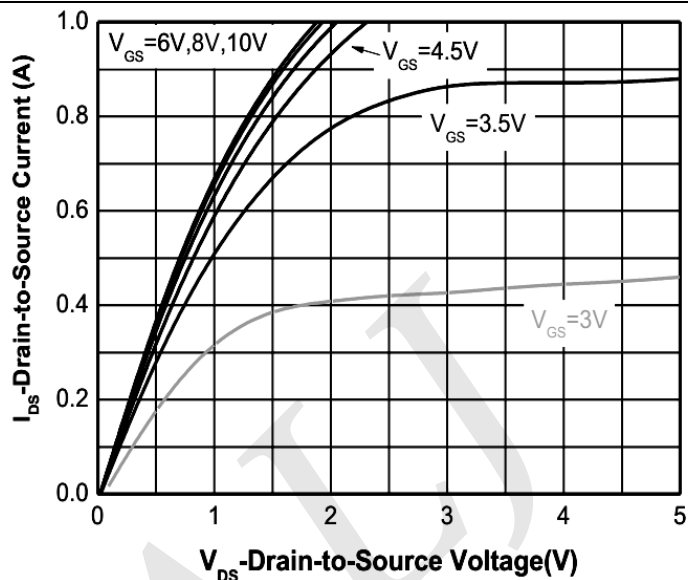
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V			1.0	μA
I _{GSS}	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±20V			±5	μA
On Characteristics						
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	0.8	1.3	2	V
R _{DS(on)}	Drain-Source On-Resistance ^{2,3)}	V _{GS} = 10V, I _D = 0.37A		1.4	2.0	Ω
		V _{GS} = 4.5V, I _D = 0.2A		1.7	2.6	
g _{fs}	Forward Trans conductance	V _{DS} = 15V, I _D = 0.25A		0.42		S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 25V f = 1.0MHz		23.37		pF
C _{oss}	Output Capacitance			7.33		
C _{rss}	Reverse Transfer Capacitance			5.2		
Q _{G(TOT)}	Total Gate Charge	V _{GS} = 10V, V _{DS} = 30V, I _D = 0.37A		1.2		nC
Q _{G(TH)}	Threshold Gate Charge			0.15		
Q _{GS}	Gate-to-Source Charge			0.21		
Q _{GD}	Gate-to-Drain Charge			0.12		
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 30V, V _{GEN} = 10V, I _D = 0.2A, R _G = 10Ω		7.6		ns
t _r	Rise Time			5.1		
t _{d(off)}	Turn-Off Delay Time			24.6		
t _f	Fall Time			10		
Body Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = 0.3A		0.9	1.5	V

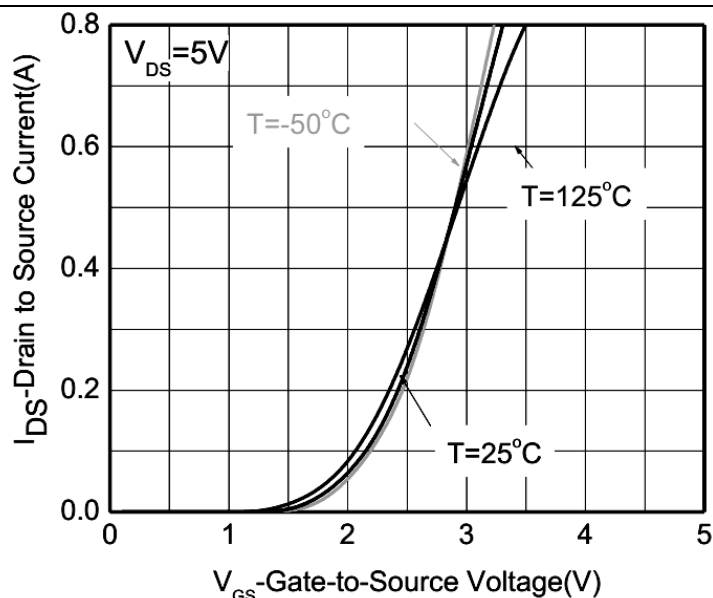
Notes

1. Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper
2. Surface mounted on FR-4 board using minimum pad size, 1oz copper
3. Pulse width < 380 μ s
4. Maximum junction temperature $T_J=150^\circ\text{C}$.

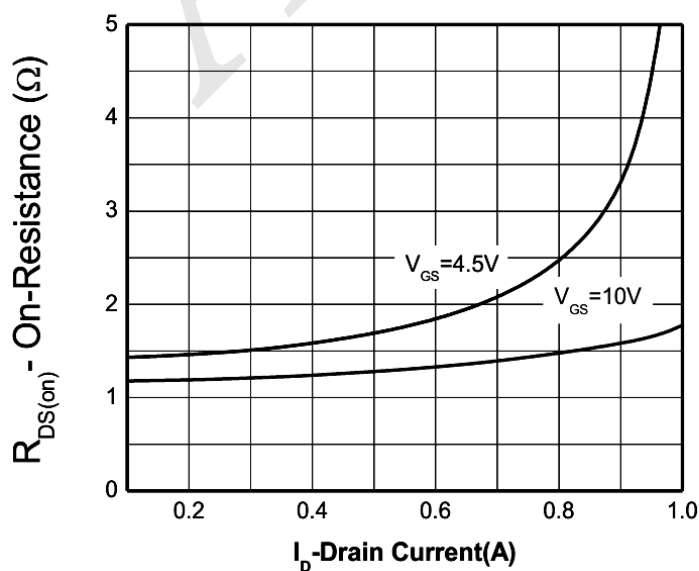
Typical Characteristics



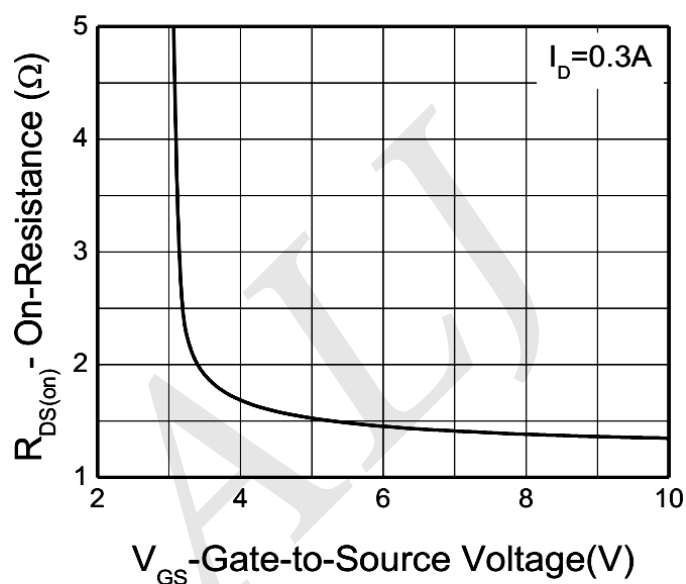
Output characteristics



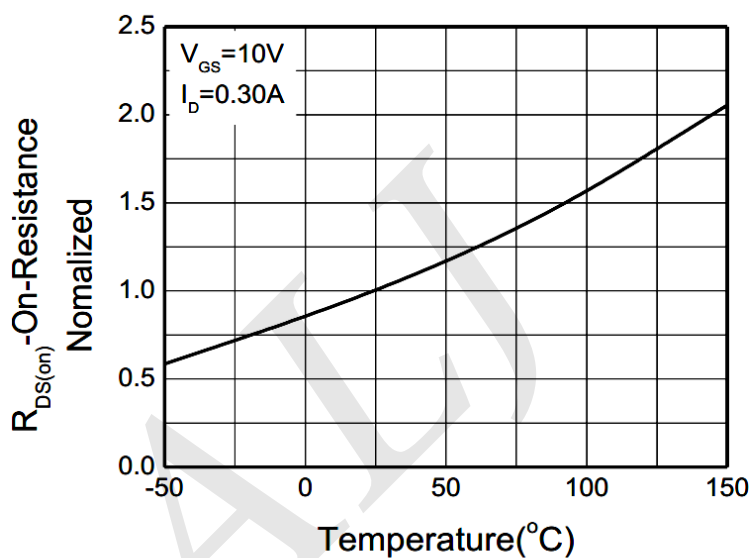
Transfer characteristics



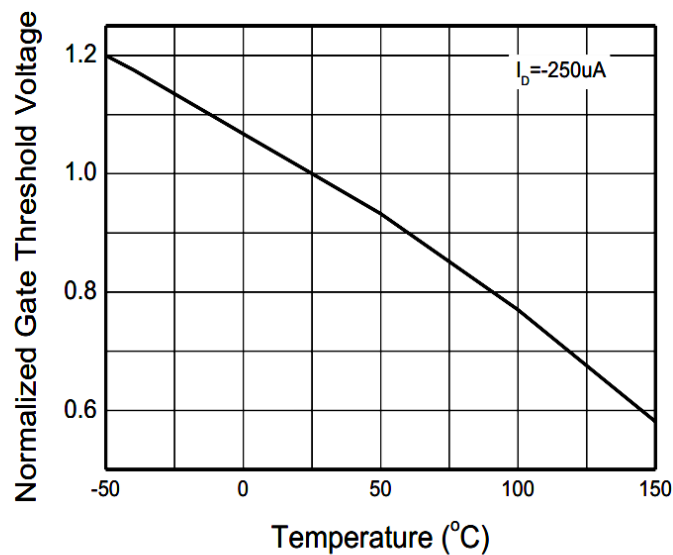
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage

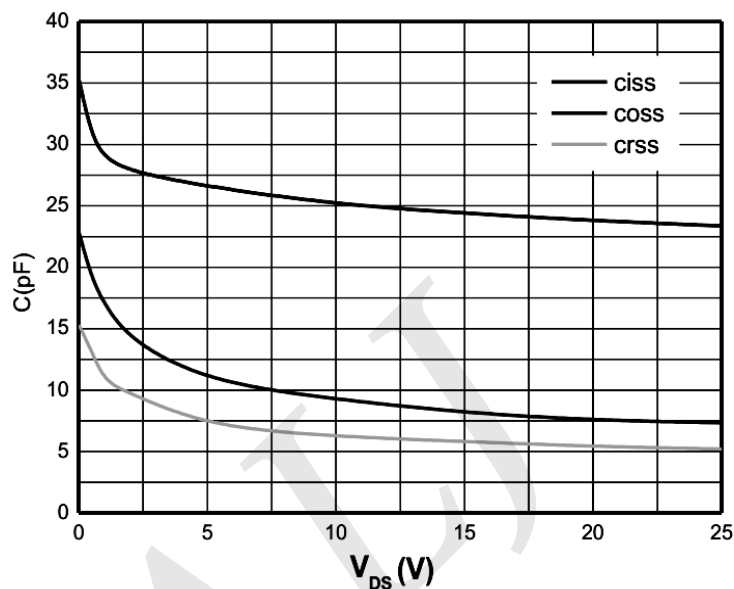


On-Resistance vs. Junction temperature

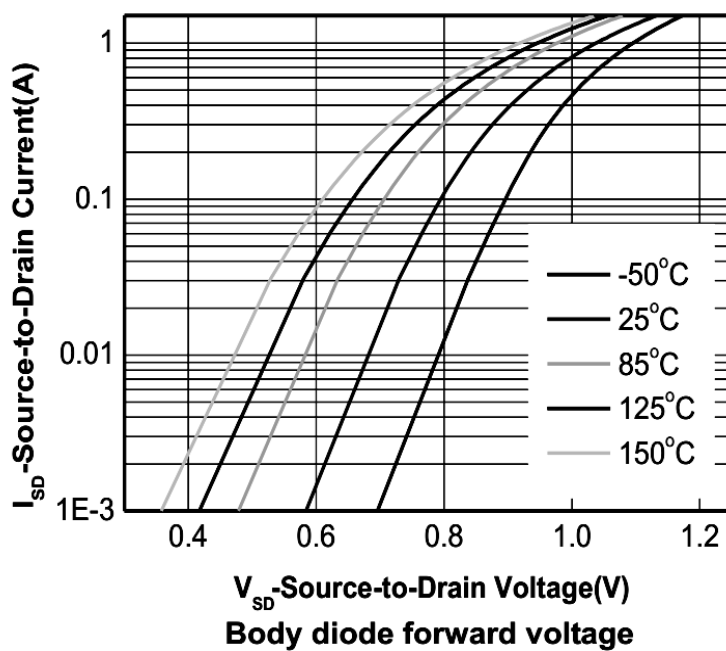


Threshold voltage vs. Temperature

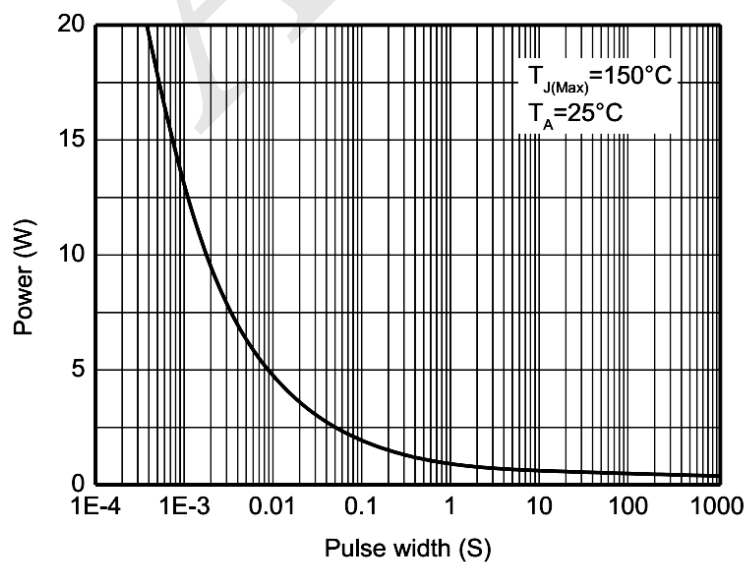
Typical Characteristics (Cont.)



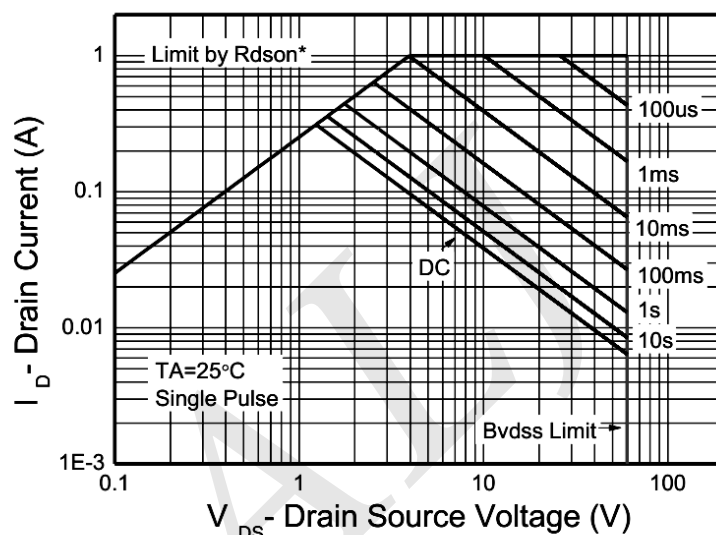
Capacitance



Body diode forward voltage



Single pulse power



Safe operating power

