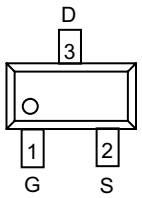
WNM4002

Small Signal N-Channel, 20V, 0.3A, MOSFET

Http://www.willsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ.
20 V	1.4Ω @ 4.5V
	2.2Ω @ 2.5V
	3.8Ω @ 1.8V

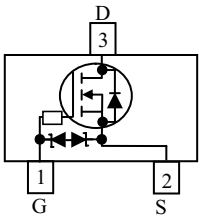
Top



SOT-523

Descriptions

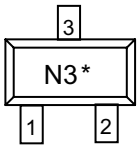
The WNM4002 is the N-Channel enhancement MOS Field Effect Transistor, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in small signal switch. Standard product WNM4002 is Pb-free.



Pin Configuration

Features

- Trench N-Channel
- Supper high density cell design for extremely low Rds(on)
- Exceptional ON resistance and maximum DC current capability
- Small package design with SOT-523



N3 = Device Code

* = Month

Marking

Applications

- Driver: Relays, Solenoids, Lamps, Hammers
- Power supply converters circuit
- Load/Power Switching for potable device

Order Information

Device	Package	Shipping
WNM4002-3/TR	SOT-523	3000/Tape&Reel

Absolute Maximum Ratings

(T_A=25°C unless otherwise noted)

Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain-to-Source Voltage	20	V
V_{GSS}	Gate-to-Source Voltage	±6.0	V
I_D	Drain Current – Continue **Note1**	0.3	A
	Drain Current – Pulsed (t<300us, Duty<2%) **Note1**	0.6	A
P_D	Power Dissipation – **Note1**	0.25	W
T_J	Operation junction temperature range	150	°C
T_{SG}	Storage temperature range	-55~150	°C

Thermal Resistance Ratings

(T_A=25°C unless otherwise noted)

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient – **Note1**	500	620	°C/W

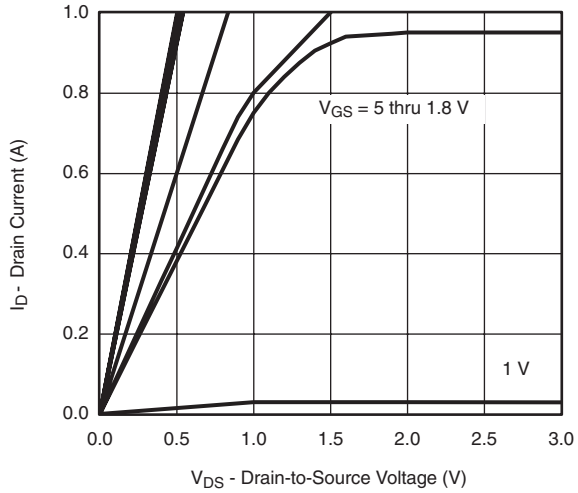
Note1: Surface mounted on a 2 oz copper, 1 in^2 pad, FR-4 board.

Electronics Characteristics

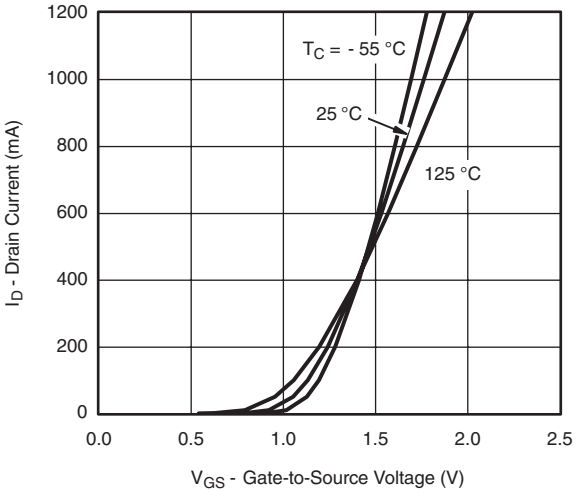
(T_A=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ.	Max	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V			1	uA
I_{GSS}	Gate –Source leakage current	V_{DS}=0V, V_{GS}=±5V			5	uA
ON Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250uA	0.35		1.0	V
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V, I_D=0.3A			2.0	Ω
		V_{GS}=2.5V, I_D=0.1A			3.5	Ω
		V_{GS}=1.8V, I_D=0.01A			5.0	Ω
g_{FS}	Forward Transconductance	V_{DS}=6V, I_D=0.1A		1.0		S
Dynamic Characteristics						
Ciss	Input Capacitance	V_{DS}=6V, V_{GS}=0V, F=100kHz		72		pF
Coss	Output Capacitance			12		pF
Crss	Reverse Transfer Capacitance			10		pF
$Q_{G(TOT)}$	Total Gate Charge	V_{DS}=6V, V_{GS}=4.5V, I_D=0.01A		1.1		nC
Q_{GS}	Gate-Source Charge			0.11		nC
Q_{GD}	Gate-Drain Charge			0.45		nC
Switching Characteristics						
td(on)	Turn-On Delay Time	V_{DS}=10V, V_{GS}=4.5V, I_D=0.1A, R_G=6Ω		22		ns
tr	Turn-On Rise Time			80		ns
td(off)	Turn-Off Delay Time			700		ns
tf	Turn-Off Fall Time			380		ns
Drain-to-Source Diode Characteristics						
V_{SD}	Forward Diode Voltage	V_{GS}=0V, I_S=0.15A		-0.7		V

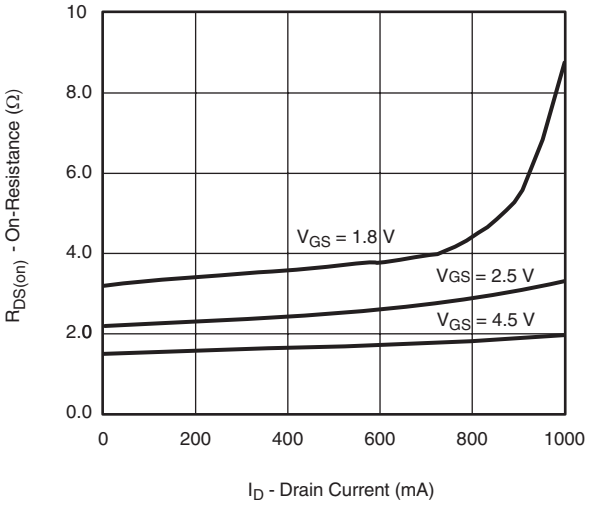
Typical Performance Graph



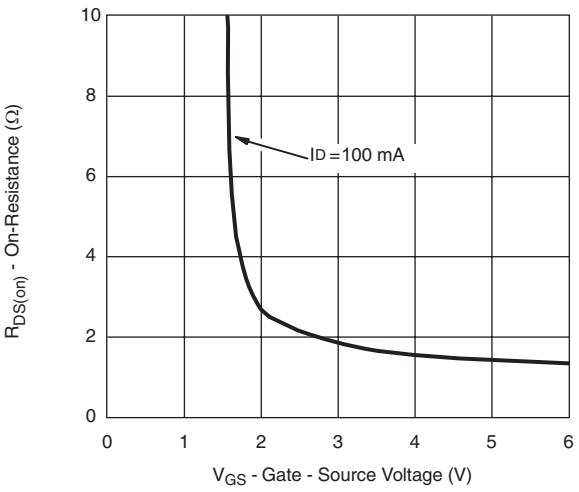
Output Characteristics



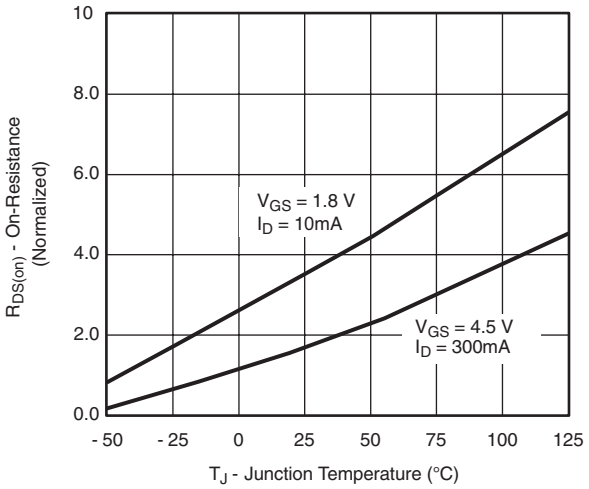
Transfer Characteristics



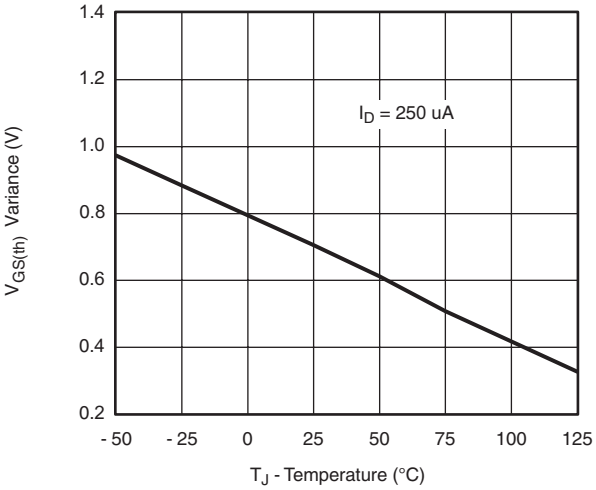
On Resistance vs. Drain Current



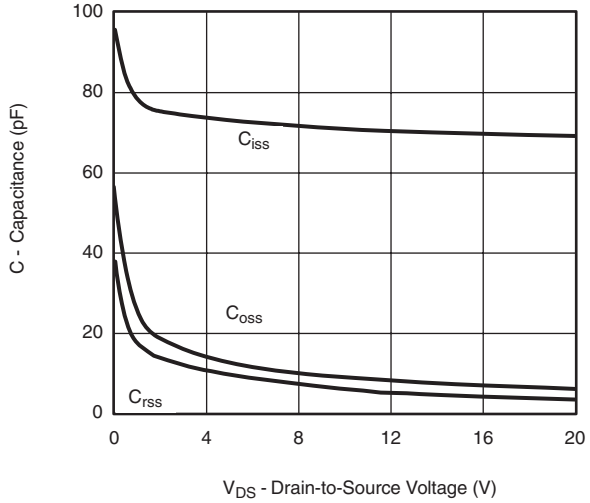
On Resistance vs. Gate - Source Voltage



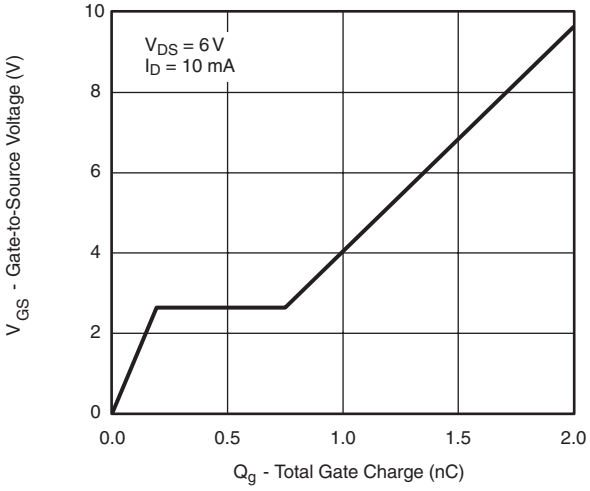
On Resistance vs. Junction Temperature



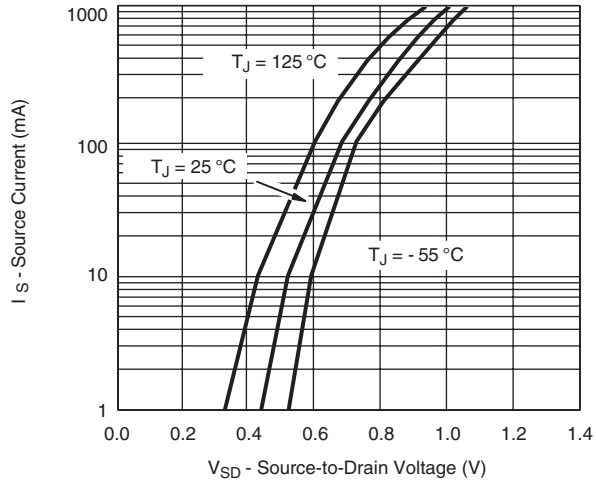
Threshold Voltage



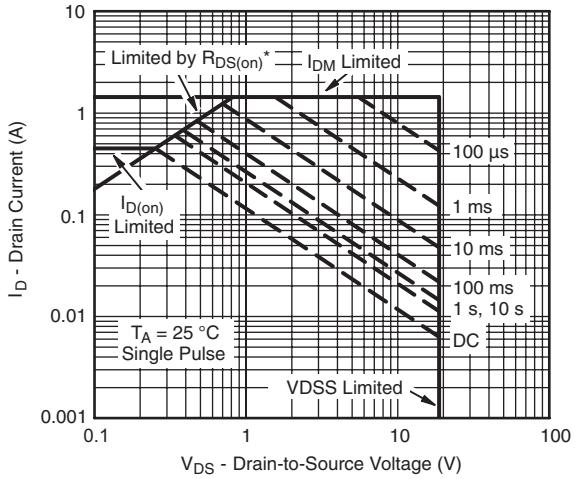
Capacitance



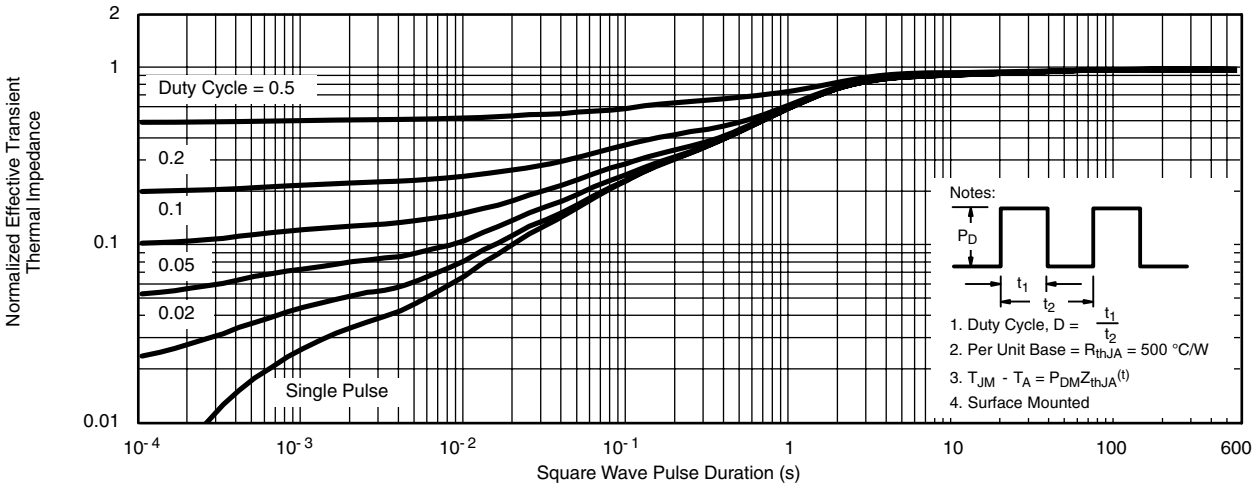
Gate Charge



Source-Drain Diode Forward Voltage



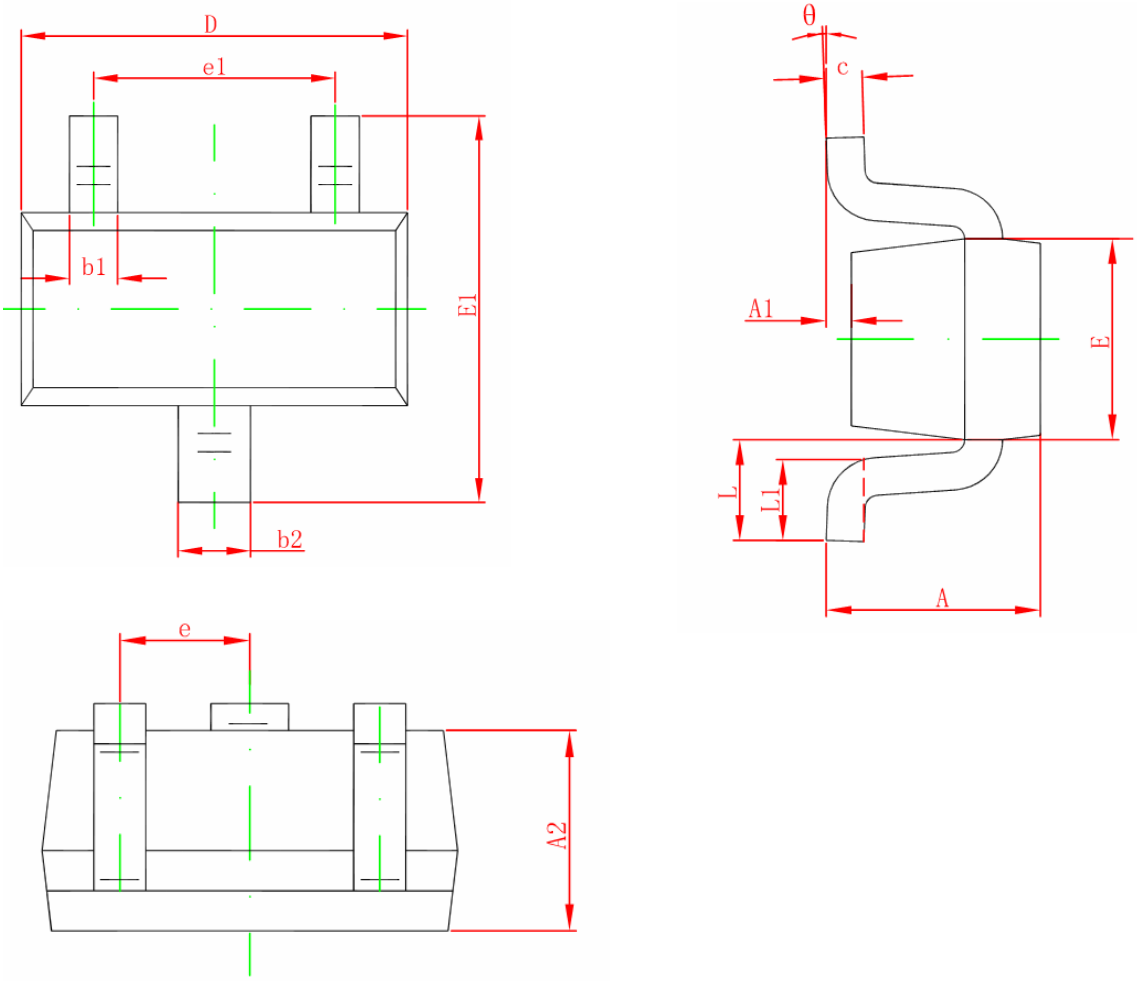
Safe Operation Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

Package Outline Dimension

SOT-523



Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.700	0.900
A1	0.000	0.100
A2	0.700	0.800
b1	0.150	0.250
b2	0.250	0.350
c	0.100	0.200
D	1.500	1.700
E	0.700	0.900
E1	1.450	1.750
e	0.500 Typ.	
e1	0.900	1.100
L	0.400 Ref.	
L1	0.260	0.460
θ	0°	8