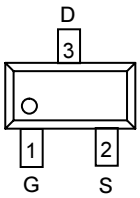
WNM4153

N-Channel, 20V, 0.88A, Small Signal MOSFET

Http://www.willsemi.com

V_{DS} (V)	$R_{DS(on)}$ (Ω)
20	0.220 @ V_{GS}=4.5V
	0.260 @ V_{GS}=2.5V
	0.320 @ V_{GS}=1.8V

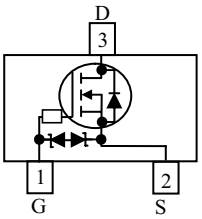
Top



SOT-523

Descriptions

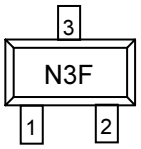
The WNM4153 is the N-Channel enhancement MOS Field Effect Transistor, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion applications. Standard Product WNM4153 is Pb-free.



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

F = Month

Marking

Applications

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

Order Information

Device	Package	Shipping
WNM4153-3/TR	SOT-523	3000/Tape&Reel

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	+20		V
Gate-Source Voltage		V_{GS}	±6		
Continuous Drain Current [a]	T_A=25°C	I_D	0.88	0.80	A
	T_A=70°C		0.71	0.64	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.37	0.30	W
	T_A=70°C		0.23	0.19	
Continuous Drain Current [b]	T_A=25°C	I_D	0.76	0.69	A
	T_A=70°C		0.60	0.55	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.27	0.22	W
	T_A=70°C		0.17	0.14	
Pulsed Drain Current [c]		I_{DM}	1.4		A
Operating Junction Temperature		T_J	150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal Resistance Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	285	335	°C/W
	Steady State		340	405	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	385	450	
	Steady State		455	545	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	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

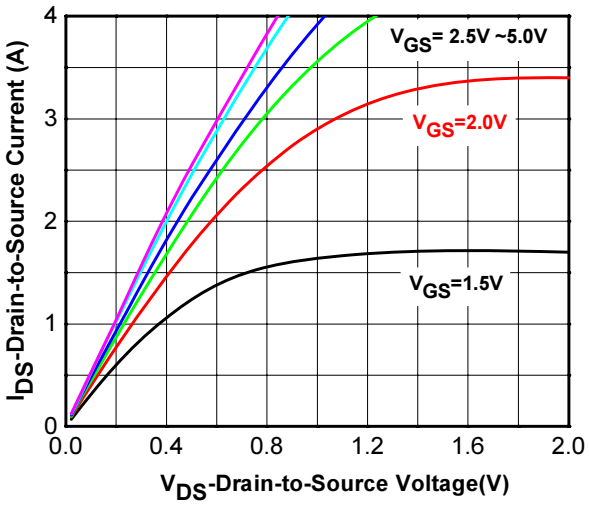
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

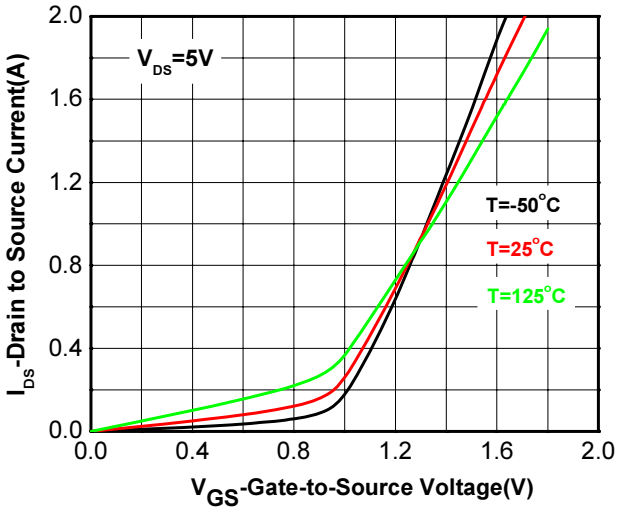
Electronics Characteristics (T_A=25°C unless otherwise noted)

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}=16V, 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	0.45	0.55	1.0	V
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V, I_D=0.55A		220	310	mΩ
		V_{GS}=2.5V, I_D=0.45A		260	360	mΩ
		V_{GS}=1.8V, I_D=0.35A		320	460	mΩ
g_{FS}	Forward Transconductance	V_{DS}=10V, I_D=0.4A		1.0		S
Dynamic Characteristics						
Ciss	Input Capacitance	V_{DS}=10V, V_{GS}=0V, f=100khz		68		pF
Coss	Output Capacitance			9.0		pF
Crss	Reverse Transfer Capacitance			7.5		pF
$Q_{G(TOT)}$	Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_D=0.55A		1.15		nC
$Q_{G(TH)}$	Threshold gate charge			0.06		nC
Q_{GS}	Gate-Source Charge			0.15		nC
Q_{GD}	Gate-Drain Charge			0.23		nC
Switching Characteristics						
td(on)	Turn-On Delay Time	V_{DD}=10V, V_{GS}=4.5V, I_D=0.55A, 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
Body Diode Characteristics						
V_{SD}	Forward Diode Voltage	V_{GS}=0V, I_S=0.35A	0.5	0.7	1.5	V

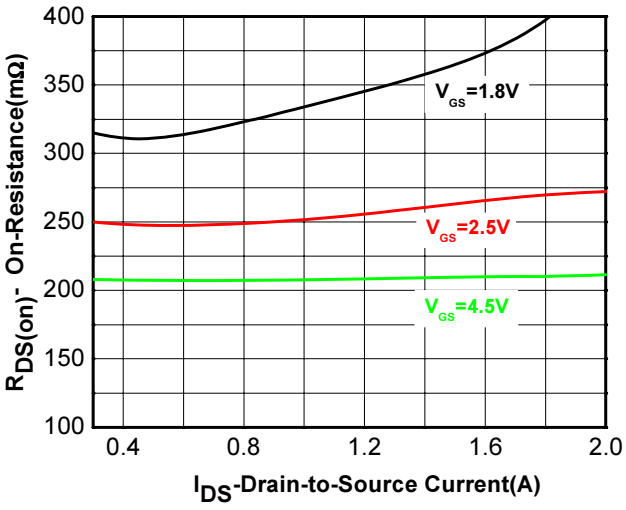
Typical Performance Graph



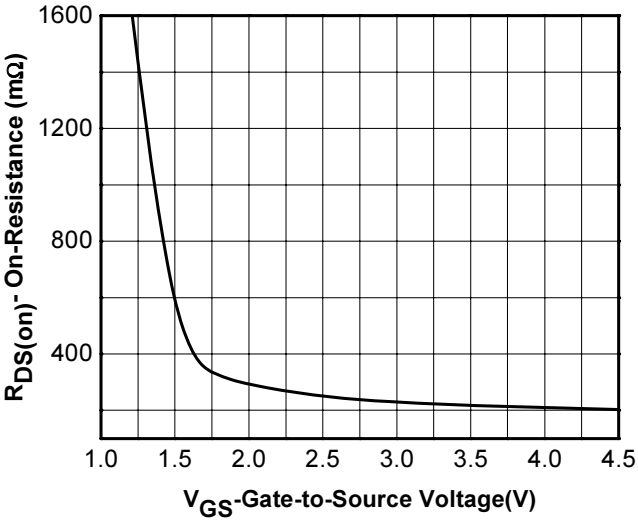
Output Characteristics



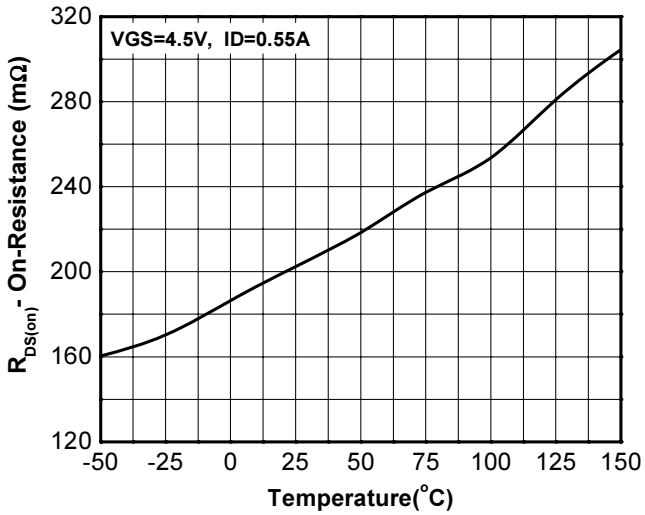
Transfer Characteristics



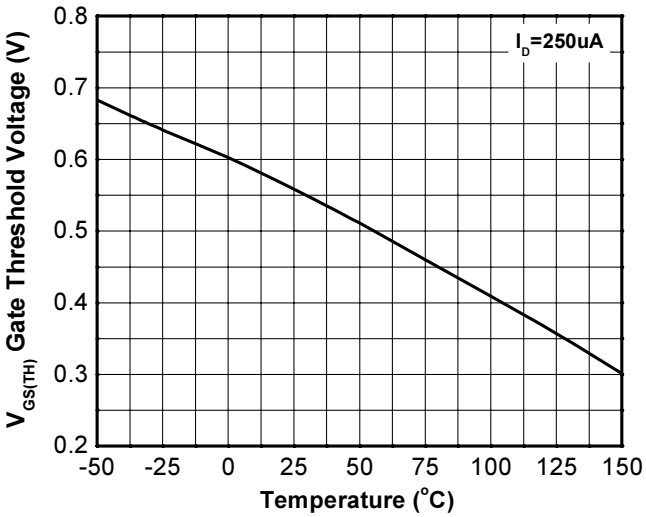
On Resistance vs. Drain Current



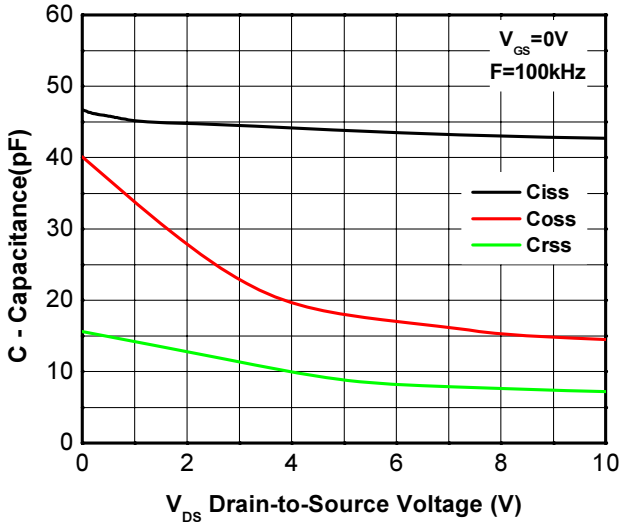
On Resistance vs. V_{GS} vs. Temperature



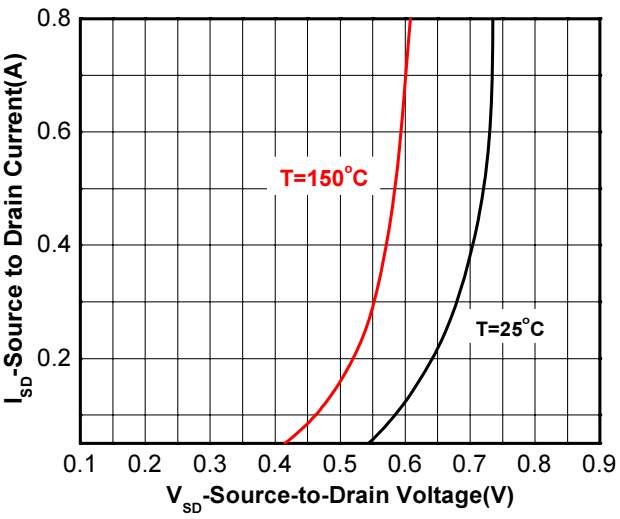
On Resistance vs. Junction Temperature



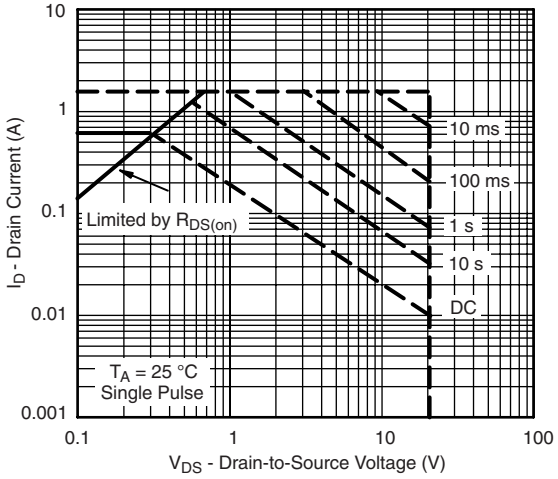
Threshold Voltage



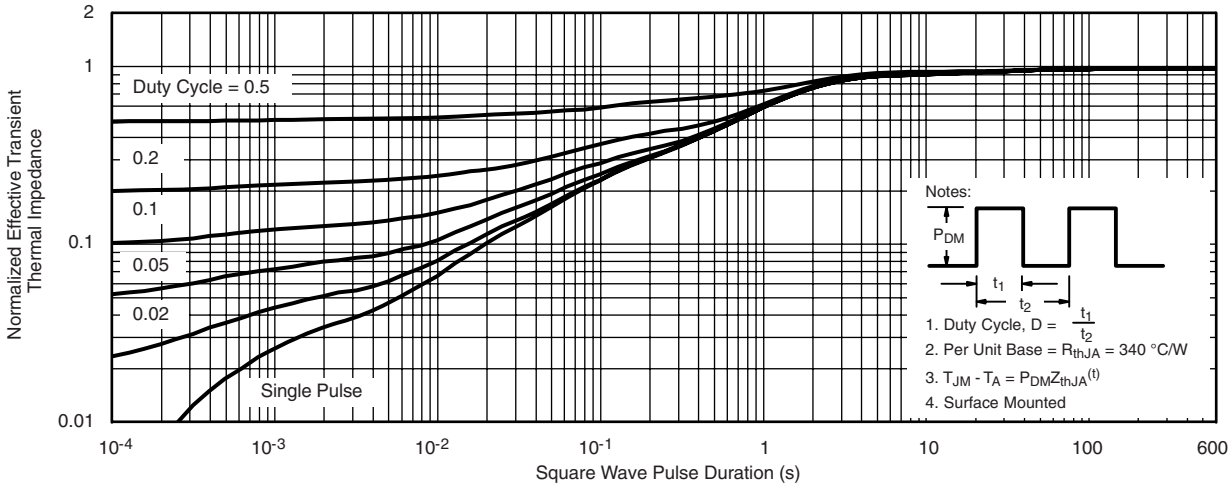
Capacitance



Body Diode Characteristics



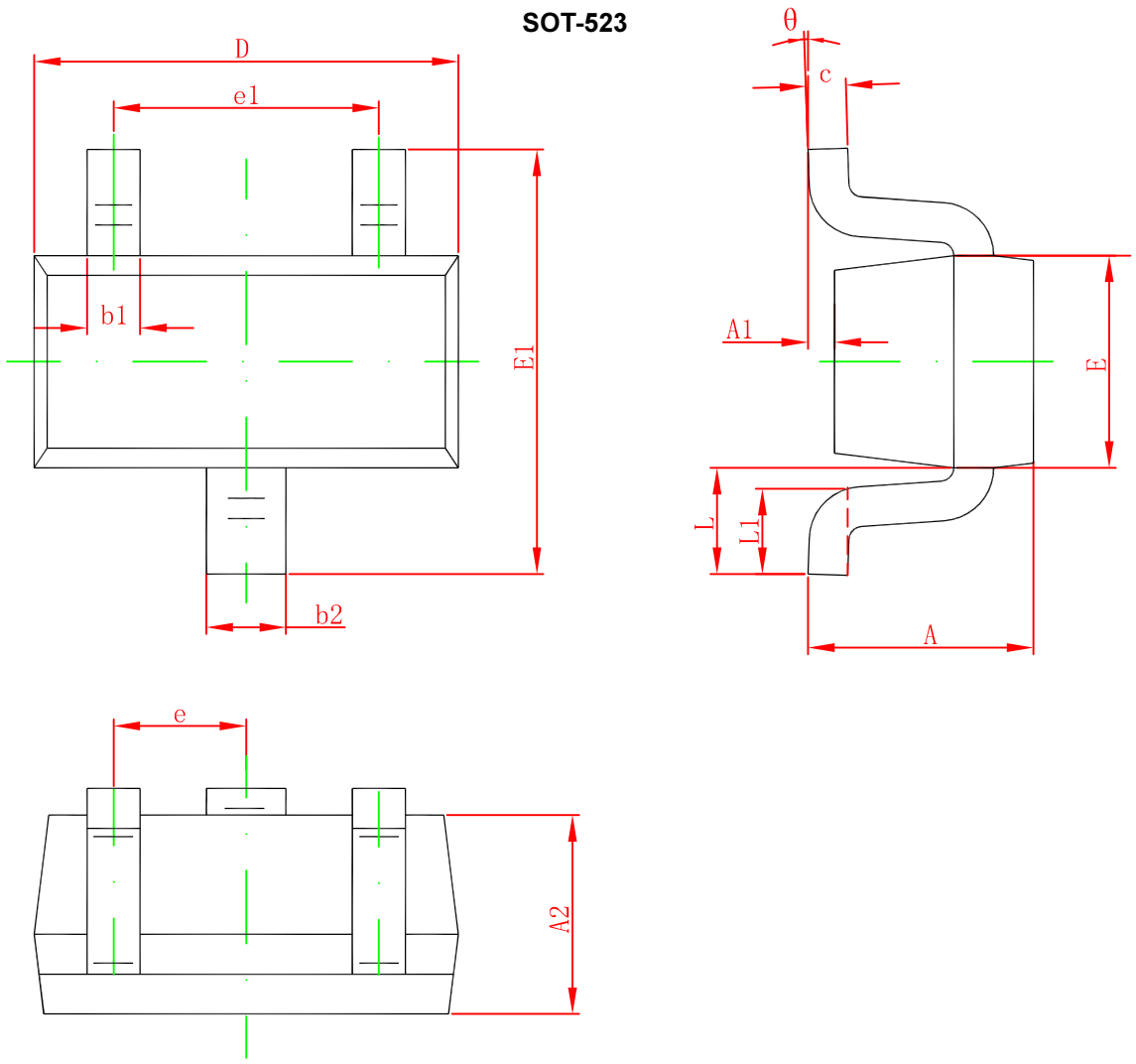
Safe Operation Area, Junction-to-Ambient



Transient thermal response (Junction-to-Ambient)

Package Outline Dimensions

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°