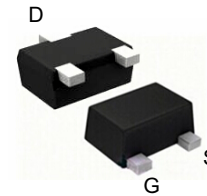
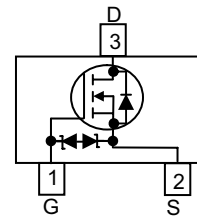
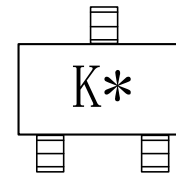


WNM3013
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)
Small Signal N-Channel, 50V, 0.25A, MOSFET

V _{DS} (V)	Typical R _{ds(on)} (Ω)
50	1.2@ V _{GS} =10V
	1.4@ V _{GS} =4.5V
	1.9@ V _{GS} =2.5V
	4.0@ V _{GS} =1.8V
ESD Rating: 2000V HBM	


SOT-723

Pin configuration (Top view)


K = Device Code

* = Month (A-Z)

Marking
Descriptions

The WNM3013 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 small signal switch. Standard Product WNM3013 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- HBM ESD protection >2 kV
- Small package SOT-723

Applications

- Driver: Relay, Solenoid, Lamps,Hammers etc.
- Power supply converters circuit
- Load/Power Switching for potable device

Order information

Device	Package	Shipping
WNM3013-3/TR	SOT-723	8000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	50		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current ^{a d}	$T_A=25^\circ\text{C}$	I_D	0.27	0.25	A
	$T_A=70^\circ\text{C}$		0.21	0.20	
Maximum Power Dissipation ^{a d}	$T_A=25^\circ\text{C}$	P_D	0.44	0.38	W
	$T_A=70^\circ\text{C}$		0.28	0.24	
Continuous Drain Current ^{b d}	$T_A=25^\circ\text{C}$	I_D	0.23	0.21	A
	$T_A=70^\circ\text{C}$		0.18	0.17	
Maximum Power Dissipation ^{b d}	$T_A=25^\circ\text{C}$	P_D	0.3	0.27	W
	$T_A=70^\circ\text{C}$		0.2	0.17	
Pulsed Drain Current ^c		I_{DM}	1.0		A
Operating Junction Temperature		T_J	-55 to 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

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	225	285	$^\circ\text{C/W}$
	Steady State		270	330	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10 \text{ s}$	$R_{\theta JA}$	330	400	
	Steady State		390	460	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	230	265	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

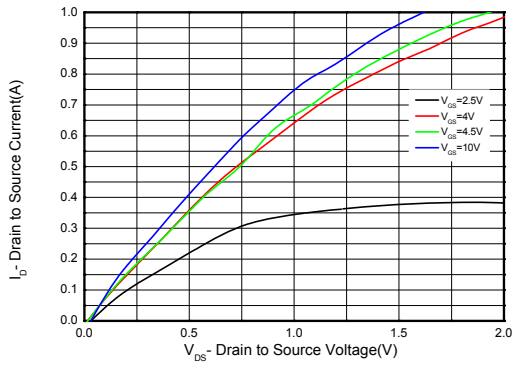
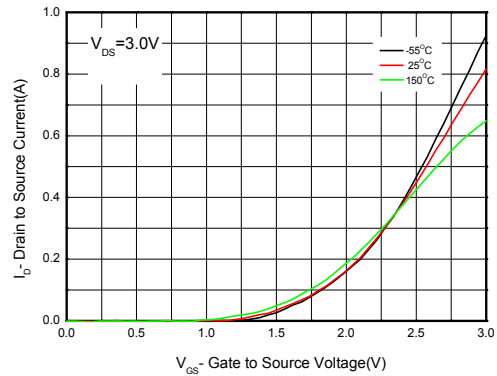
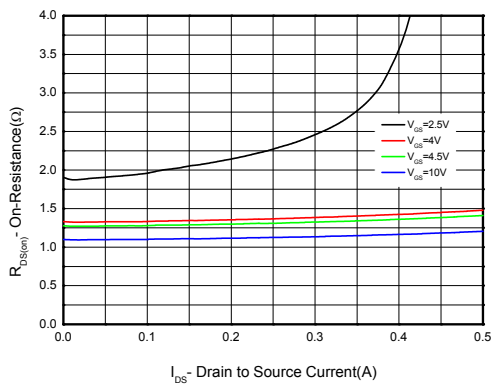
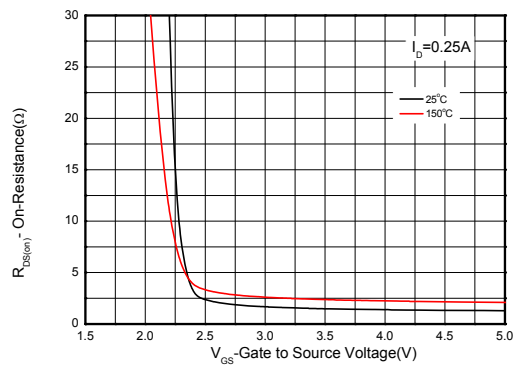
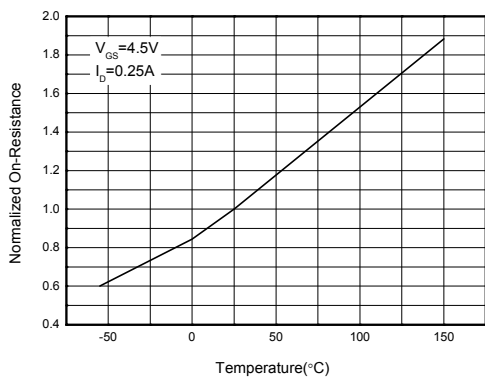
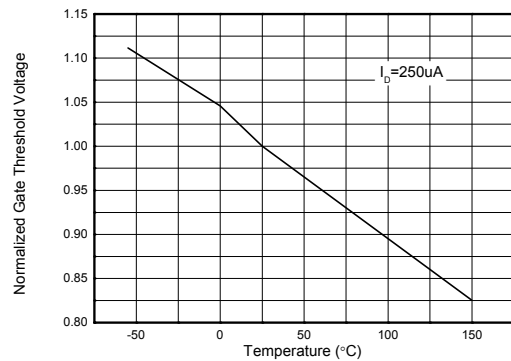
b Surface mounted on FR-4 board using minimum pad size, 1oz copper

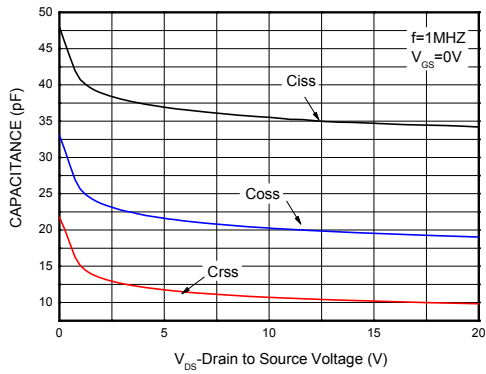
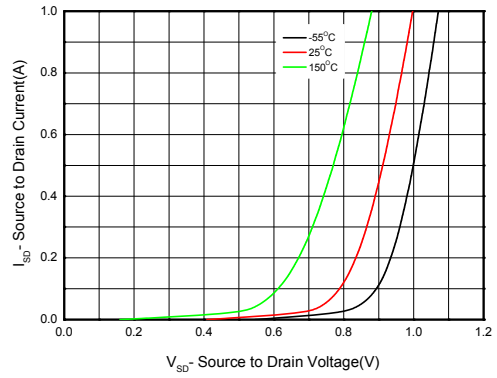
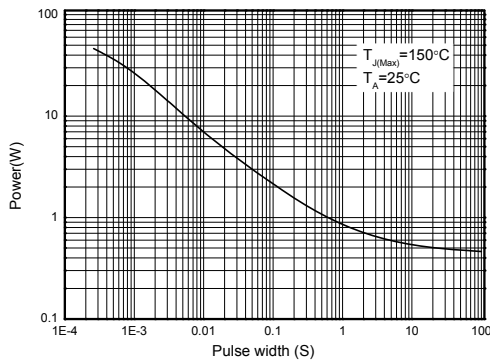
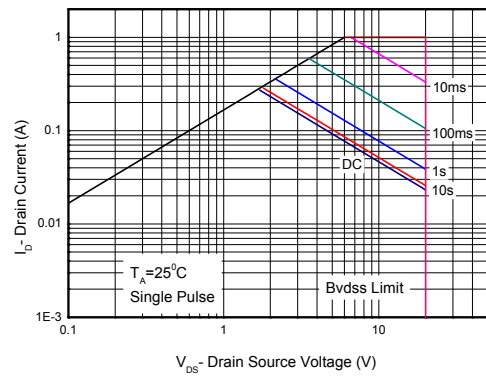
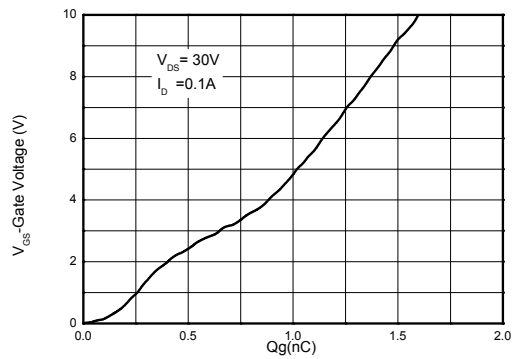
c Pulse width < 380 μs , Duty Cycle < 2%

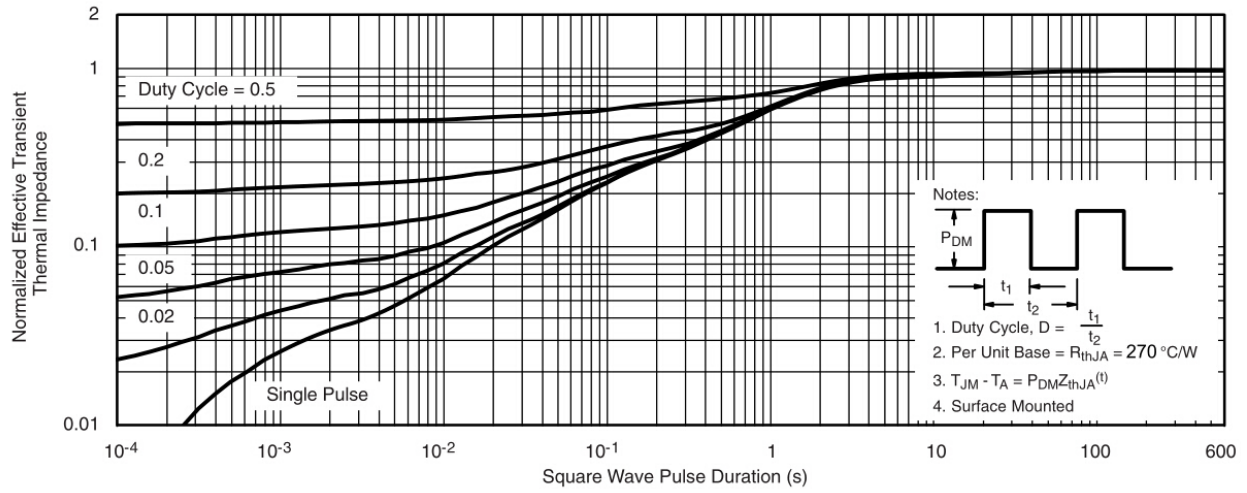
d Maximum junction temperature $T_J=150^\circ\text{C}$.

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

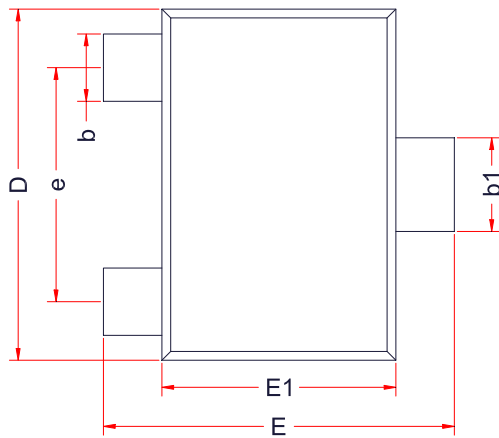
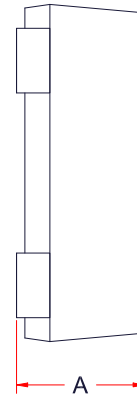
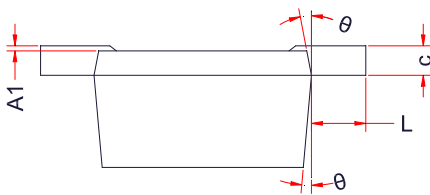
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	50			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24V, V_{GS} = 0V$			1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 5	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	0.8	1.0	1.5	V
Drain-to-source On-resistance ^{b, c}	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 0.45A$		1.2	3	Ω
		$V_{GS} = 4.5V, I_D = 0.25A$		1.3	4	
		$V_{GS} = 4.0V, I_D = 0.25A$		1.4	4	
		$V_{GS} = 2.5V, I_D = 0.01A$		1.9	6	
		$V_{GS} = 1.8V, I_D = 0.01A$		4.0	15	
Forward Trans conductance	g_{fs}	$V_{DS} = 15V, I_D = 0.1A$		0.5		S
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	$V_{GS} = 0V,$ $F = 1.0MHz,$ $V_{DS} = 5V$		36		μF
Output Capacitance	C_{OSS}			22		
Reverse Transfer Capacitance	C_{RSS}			12		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10V,$ $V_{DD} = 30V,$ $I_D = 0.1A$		1.6		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.25		
Gate-to-Source Charge	Q_{GS}			0.4		
Gate-to-Drain Charge	Q_{GD}			0.45		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 5V,$ $V_{DD} = 5V,$ $R_L = 500\Omega,$ $R_G = 10\Omega, I_D = 10mA$		8.6		ns
Rise Time	t_r			4		
Turn-Off Delay Time	$t_d(OFF)$			23.8		
Fall Time	t_f			14.2		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 0.25A$		0.8	1.5	V

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

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

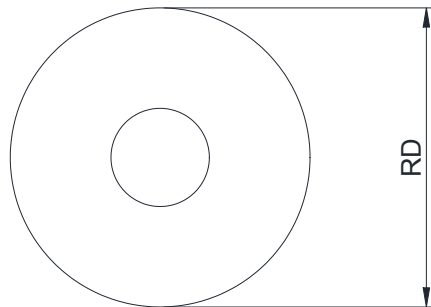
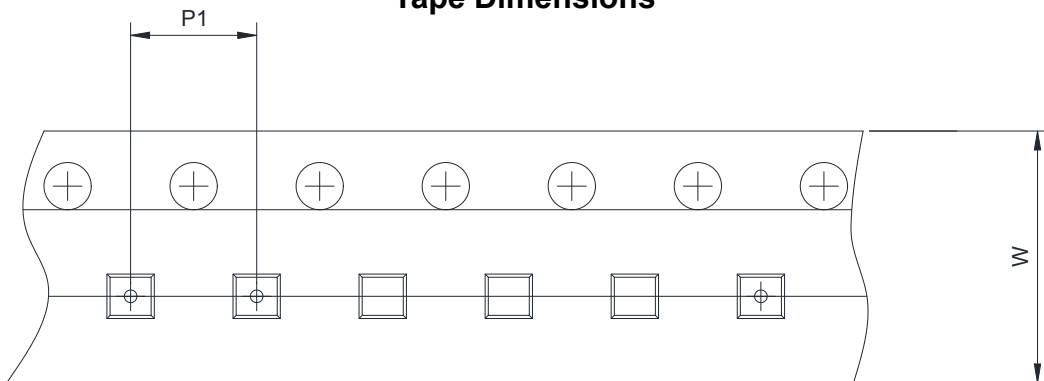
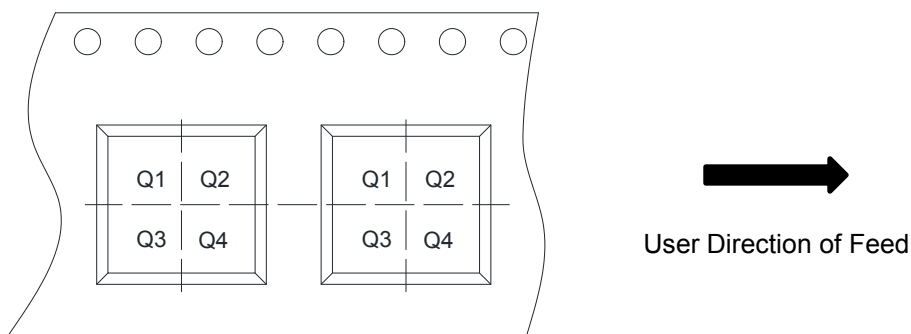

Capacitance

Body diode forward voltage

Single pulse power

Safe operating power

Gate charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions
SOT-723

TOP VIEW

SIDE VIEW

SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.43	-	0.55
A1	0.00	-	0.05
c	0.08	0.13	0.18
b1	0.27	-	0.37
b	0.17	-	0.27
L1	0.15	0.20	0.25
D	1.15	1.20	1.25
E	1.15	1.20	1.25
E1	0.75	0.80	0.85
e	0.80 Ref.		
θ	7 ° Ref.		

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input checked="" type="checkbox"/> 2mm	<input type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input type="checkbox"/> Q1	<input type="checkbox"/> Q2 <input checked="" type="checkbox"/> Q3 <input type="checkbox"/> Q4