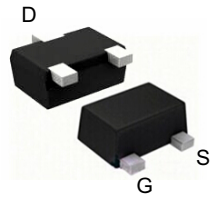
WNM3013

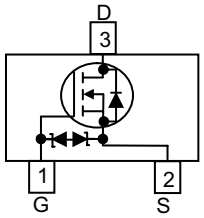
Http://www.sh-willsemi.com

Small Signal N-Channel, 50V, 0.25A, MOSFET

V_{DS} (V)	Typical Rds(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	



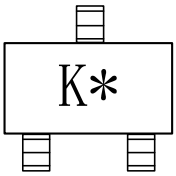
SOT-723



Pin configuration (Top view)

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.



K = Device Code

* = Month (A~Z)

Marking

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°C	I_D	0.27	0.25	A
	T_A=70°C		0.21	0.20	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	0.44	0.38	W
	T_A=70°C		0.28	0.24	
Continuous Drain Current [b d]	T_A=25°C	I_D	0.23	0.21	A
	T_A=70°C		0.18	0.17	
Maximum Power Dissipation [b d]	T_A=25°C	P_D	0.3	0.27	W
	T_A=70°C		0.2	0.17	
Pulsed Drain Current [c]		I_{DM}	1.0		A
Operating Junction Temperature		T_J	-55 to 150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	225	285	°C/W
	Steady State		270	330	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	330	400	
	Steady State		390	460	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	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

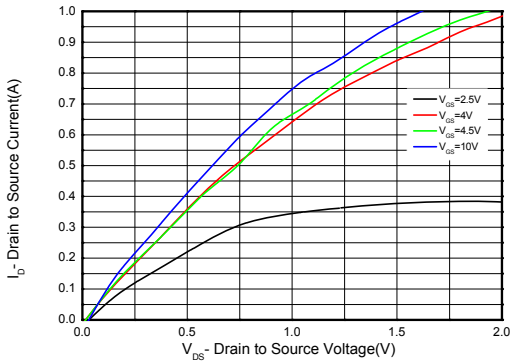
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

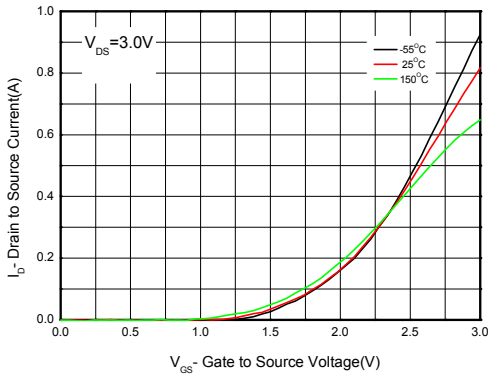
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	50			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} =±20V			±5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D =250uA	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} = 0 V, F = 1.0 MHz, V_{DS} = 5 V		36		pF
Output Capacitance	C_{OSS}			22		
Reverse Transfer Capacitance	C_{RSS}			12		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DD} = 30 V, I_D = 0.1 A		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	td(ON)	V_{GS} = 5 V, V_{DD} = 5 V, R_L=500 Ω, R_G=10 Ω, I_D =10m A		8.6		ns
Rise Time	tr			4		
Turn-Off Delay Time	td(OFF)			23.8		
Fall Time	tf			14.2		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 0.25A		0.8	1.5	V

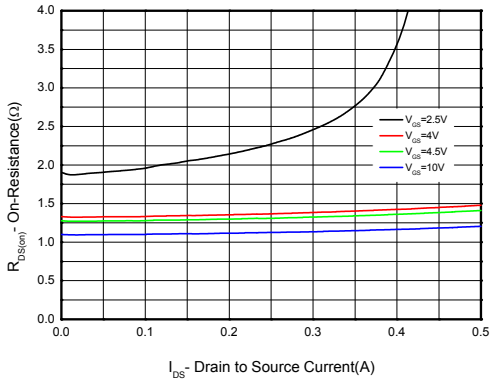
Typical Characteristics (Ta=25°C, unless otherwise noted)



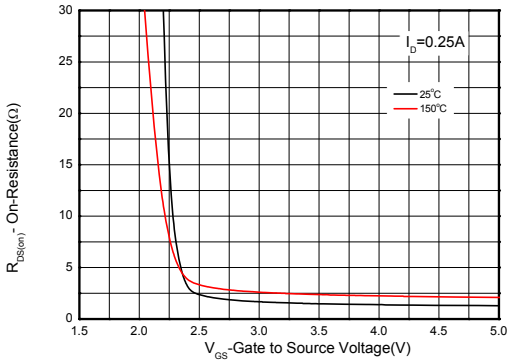
Output characteristics



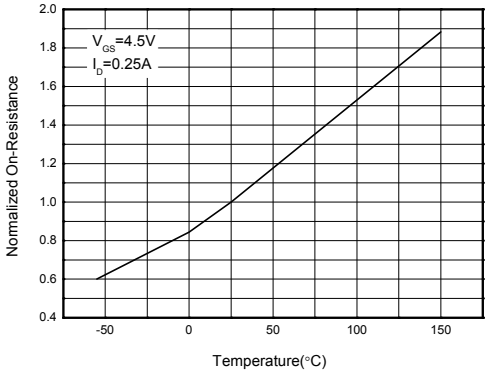
Transfer characteristics



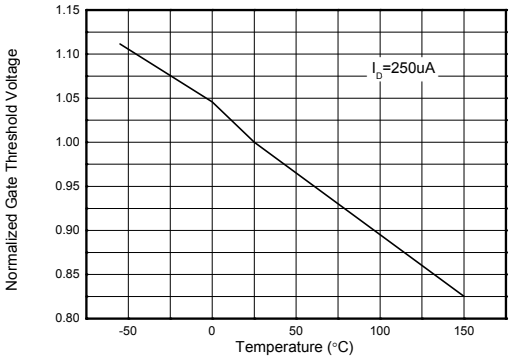
On-Resistance vs. Drain current



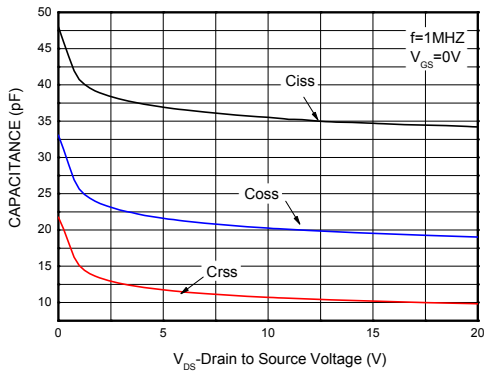
On-Resistance vs. Gate-to-Source voltage



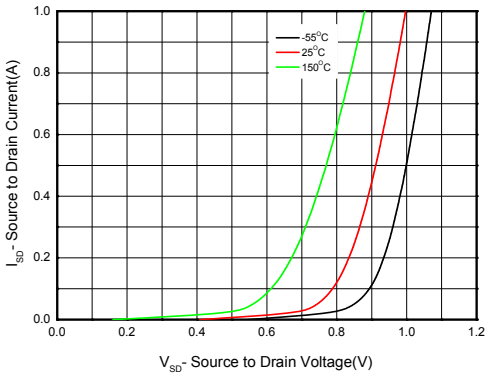
On-Resistance vs. Junction temperature



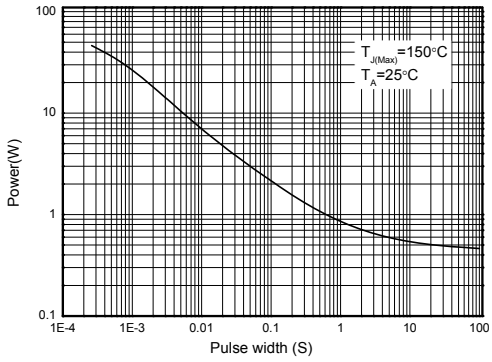
Threshold voltage vs. Temperature



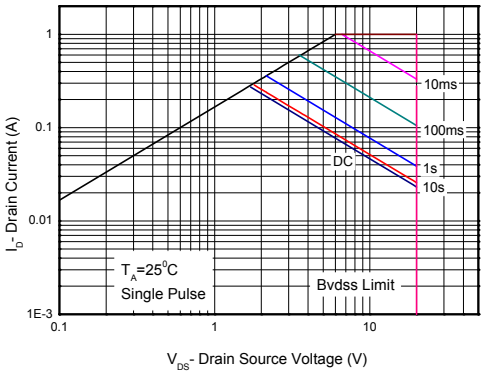
Capacitance



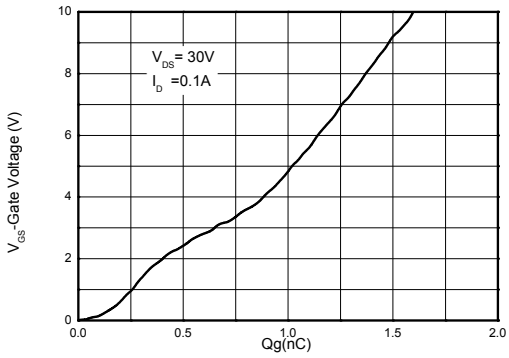
Body diode forward voltage



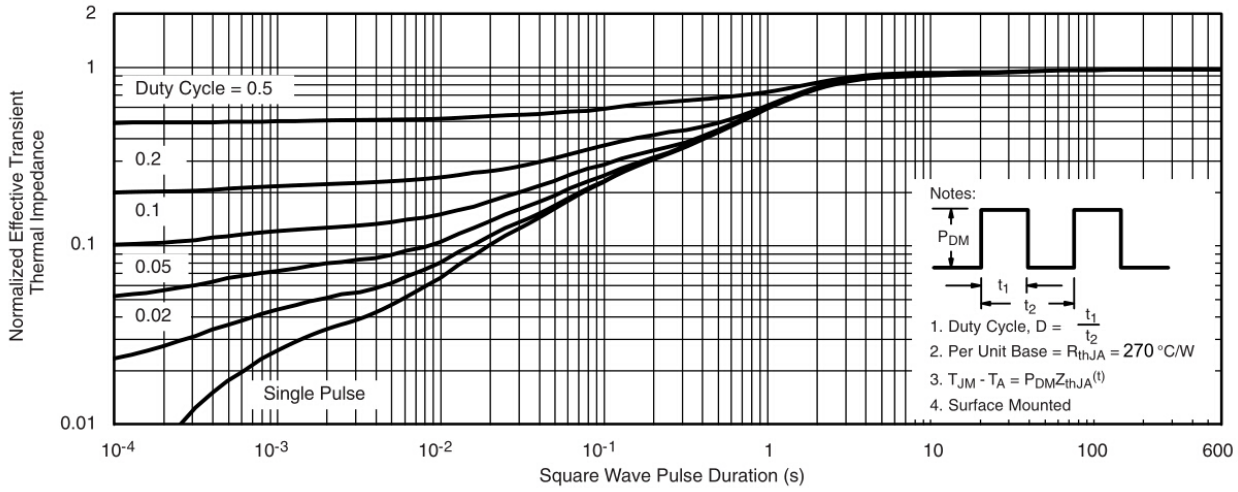
Single pulse power



Safe operating power



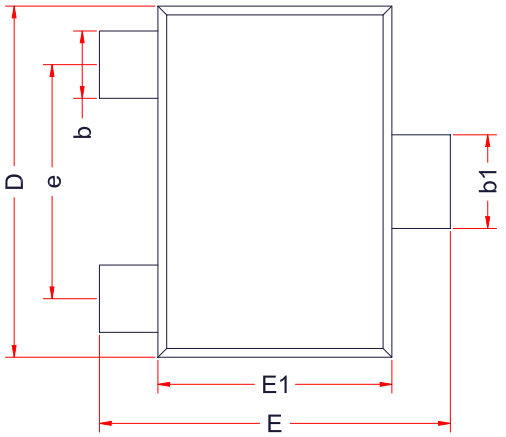
Gate charge Characteristics



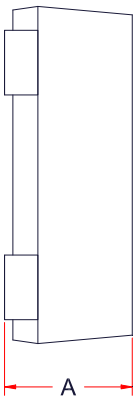
Transient thermal response (Junction-to-Ambient)

Package outline dimensions

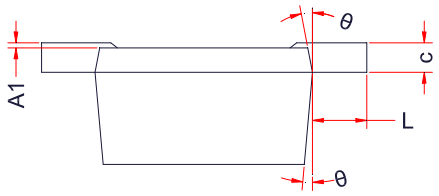
SOT-723



TOP VIEW



SIDE VIEW

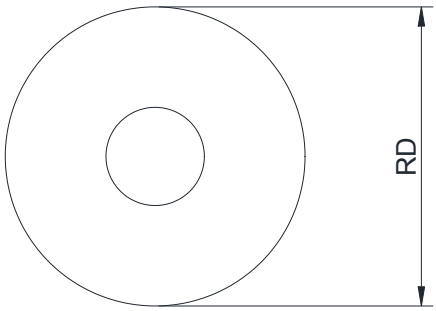


SIDE VIEW

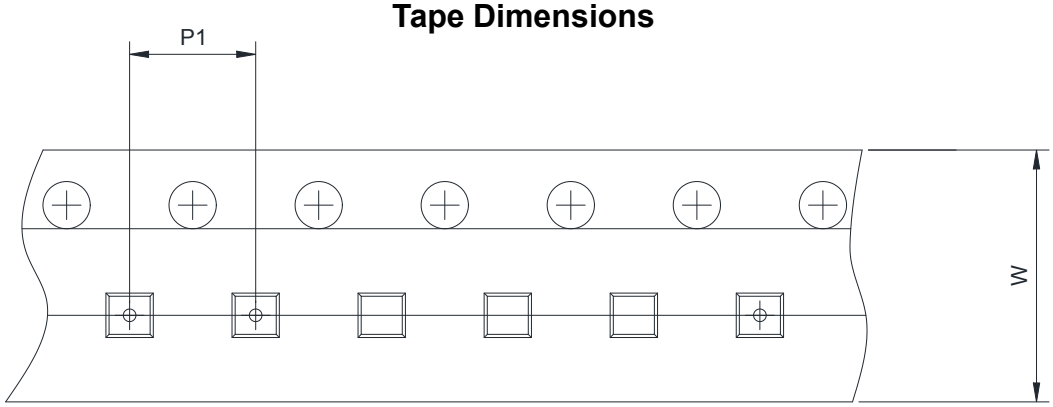
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.43	-	0.55
A1	0.00	-	0.05
c	0.08	0.13	0.18
b1	0.27	-	0.37
b	0.17	-	0.27
L1	0.15	0.20	0.25
D	1.15	1.20	1.25
E	1.15	1.20	1.25
E1	0.75	0.80	0.85
e	0.80 Ref.		
θ	7 ° Ref.		

TAPE AND REEL INFORMATION

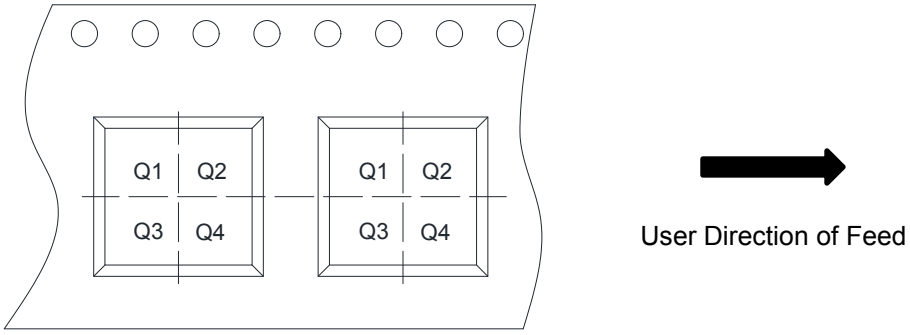
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☑ 2mm	☐ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☐ Q1	☐ Q2	☑ Q3	☐ Q4