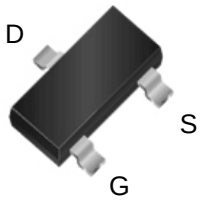
WNM7002

Single N-Channel, 60V, 0.3A, Power MOSFET

Http://www.sh-willsemi.com

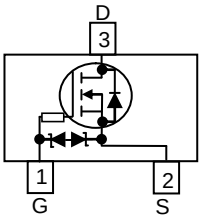
V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
60	3.7 @ V_{GS}= 10V
	3.8 @ V_{GS}= 4.5V
ESD protected	



SOT-23

Descriptions

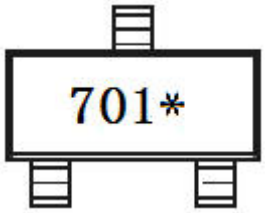
The WNM7002 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM7002 is Pb-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-23



701 = Device Code

* = Month

Marking

Applications

- DC/DC converters
- Power supply converters circuit
- Load/Power Switching for portable device

Order information

Device	Package	Shipping
WNM7002-3/TR	SOT-23	3000/Tape&Reel

Absolute Maximum ratings

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	60		V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current [a d]	T_A=25°C	I_D	0.30	0.28	A
	T_A=70°C		0.24	0.22	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	0.96	0.83	W
	T_A=70°C		0.61	0.53	
Continuous Drain Current [b d]	T_A=25°C	I_D	0.26	0.25	A
	T_A=70°C		0.21	0.20	
Maximum Power Dissipation [b d]	T_A=25°C	P_D	0.78	0.66	W
	T_A=70°C		0.50	0.42	
Pulsed Drain Current [c]		I_{DM}	1.2		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

Single Operation					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	105	130	°C/W
	Steady State		130	150	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	130	160	
	Steady State		145	190	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	40	60	

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

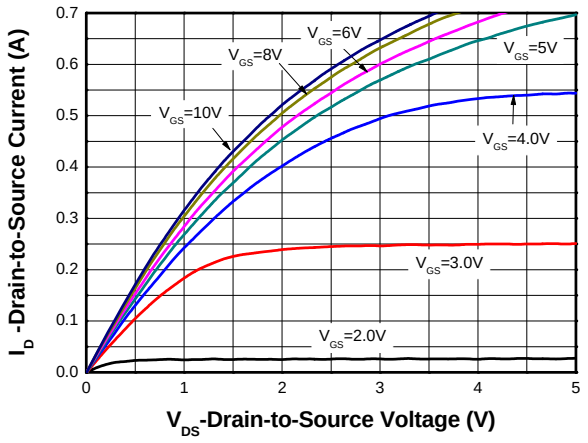
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

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

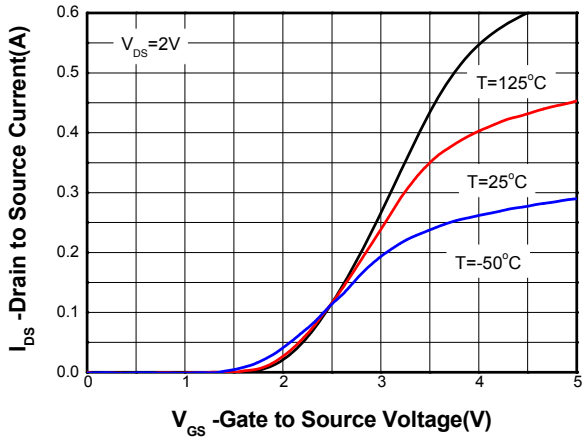
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =48V, 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	1.0	1.4	2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =0.3A		3.7	4.7	Ω
		V_{GS} = 4.5V, I_D = 0.2A		3.8	5.6	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0MHz, V_{DS} = 25 V		14.4		pF
Output Capacitance	C_{OSS}			5.1		
Reverse Transfer Capacitance	C_{RSS}			0.27		
Total Gate Charge1	$Q_{G(4.5V\ TOT)}$	V_{GS} = 4.5&10 V, V_{DS} = 15 V, I_D =0.5 A		0.26		nC
Total Gate Charge2	$Q_{G(10V\ TOT)}$			0.41		
Threshold Gate Charge	$Q_{G(TH)}$			0.06		
Gate-to-Source Charge	Q_{GS}			0.1		
Gate-to-Drain Charge	Q_{GD}			0.14		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = 10 V, V_{DS} = 30 V, R_L=60 Ω , R_G=25Ω		5.2		ns
Rise Time	tr			17.2		
Turn-Off Delay Time	td(OFF)			32.4		
Fall Time	tf			19.0		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 200mA		0.8	1.2	V

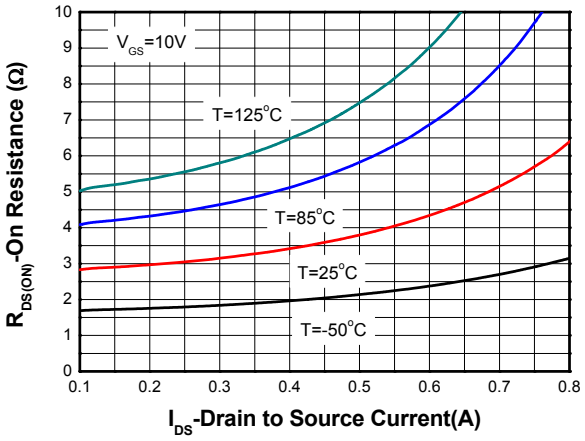
Typical Characteristics (Ta=25°C, unless otherwise noted)



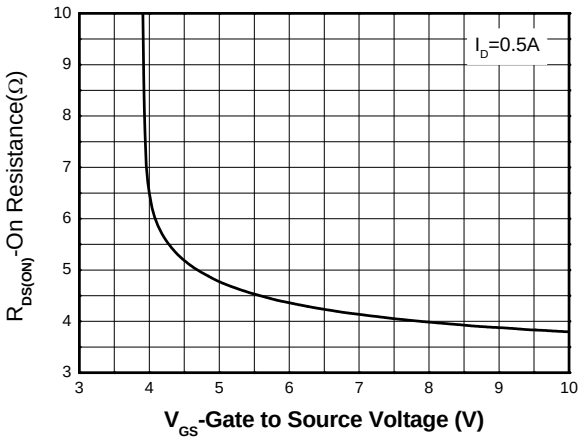
Output characteristics



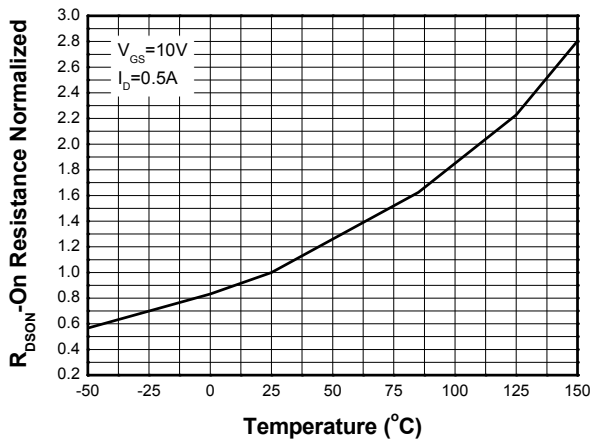
Transfer characteristics



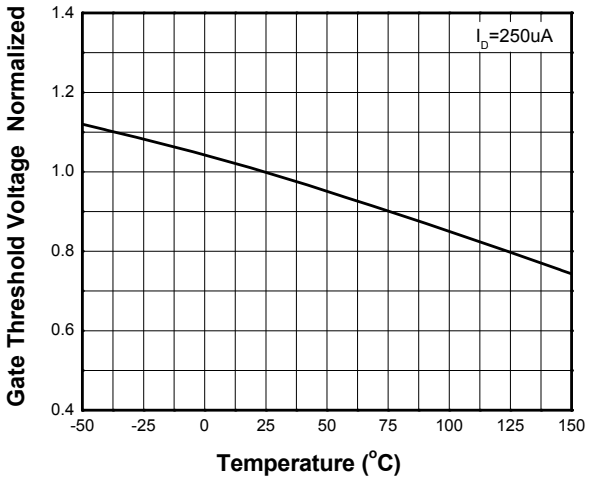
On-Resistance vs. Drain current



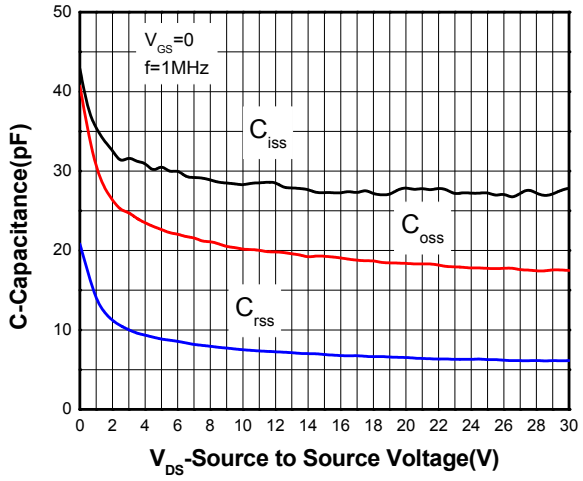
On-Resistance vs. Gate-to-source voltage



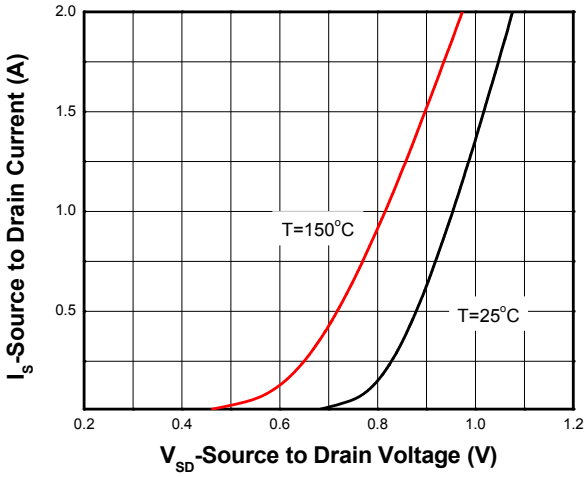
On-Resistance vs. Junction temperature



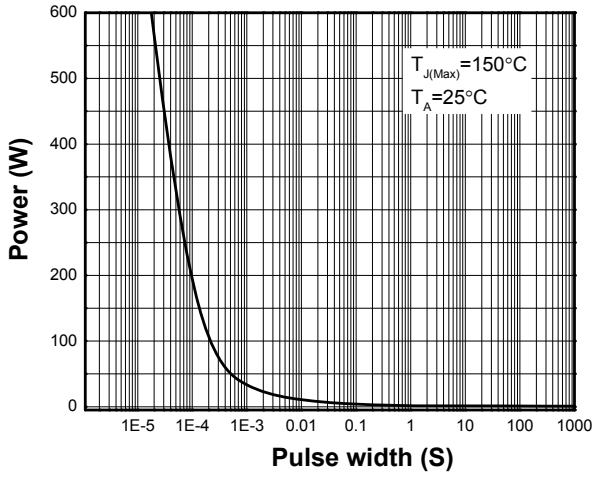
Threshold voltage vs. Temperature



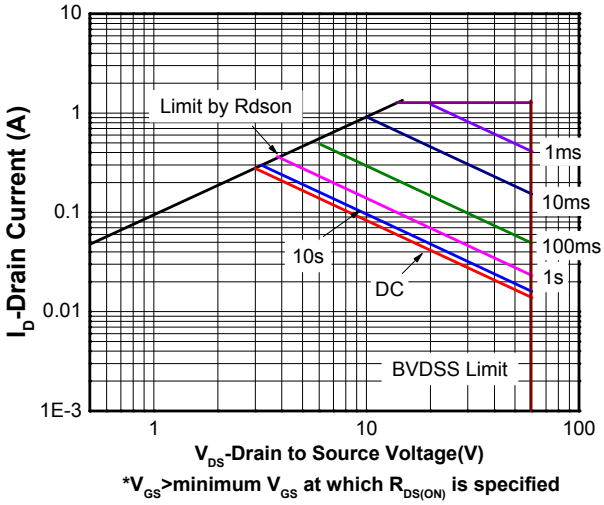
Capacitance



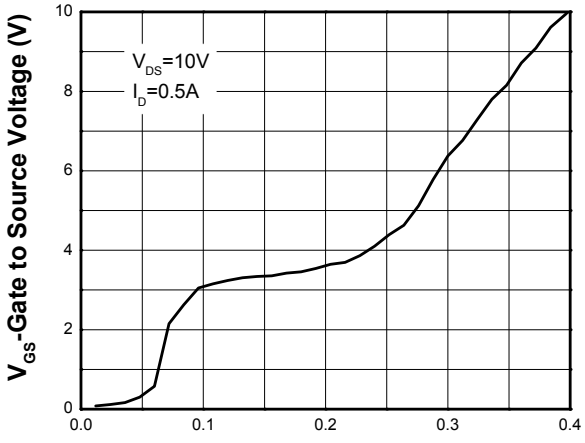
Body diode forward voltage



Single pulse power

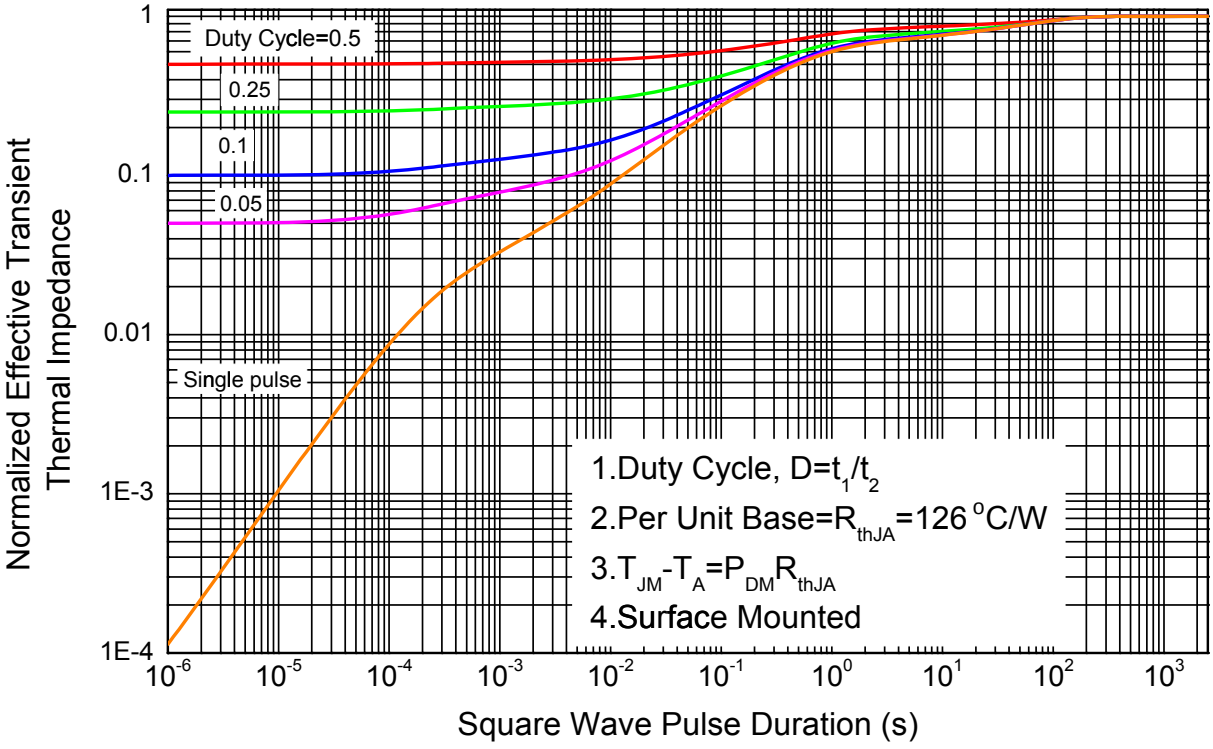


Safe operating power



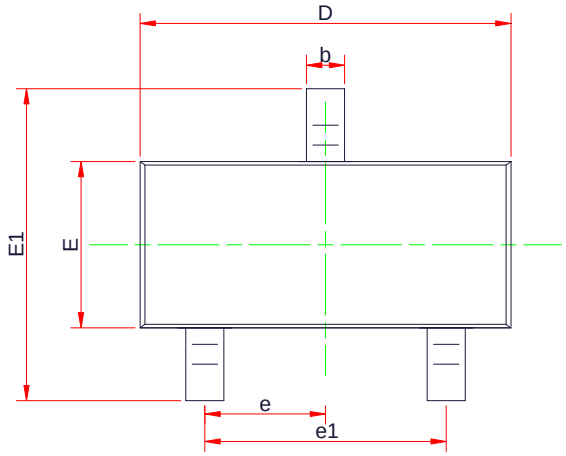
Gate Charge Characteristics

Transient thermal response (Junction-to-Ambient)

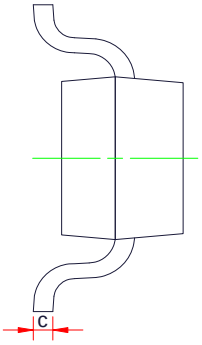


Package outline dimensions

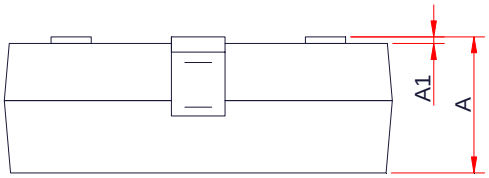
SOT-23



TOP VIEW



SIDE VIEW

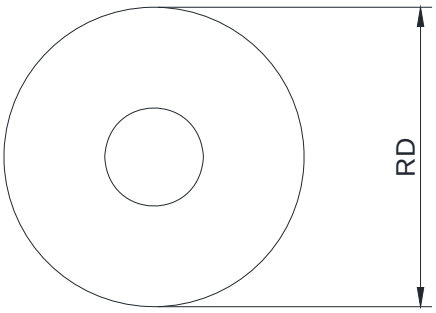


SIDE VIEW

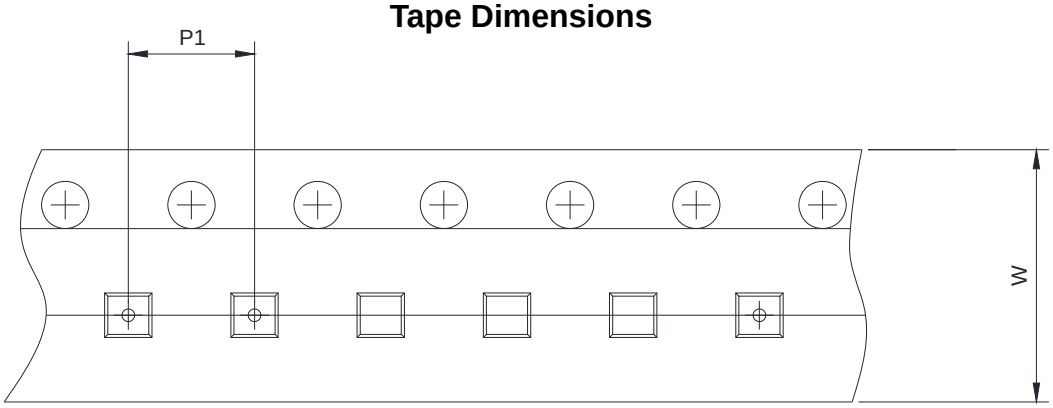
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.89	1.10	1.30
A1	0.00	-	0.10
b	0.30	0.43	0.55
c	0.05	-	0.20
D	2.70	2.90	3.10
E	1.15	1.33	1.50
E1	2.10	2.40	2.70
e	0.95 Typ.		
e1	1.70	1.90	2.10

TAPE AND REEL INFORMATION

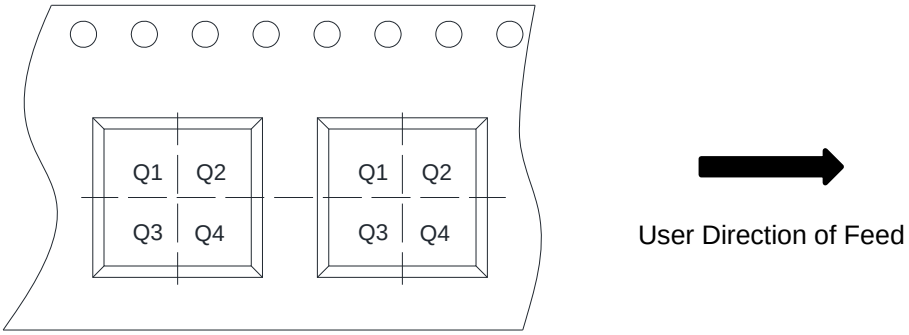
Reel Dimensions



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