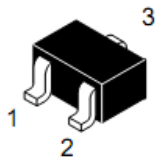
WPM3012

Single P-Channel, -30V, -3.1A, Power MOSFET

Http://www.sh-willsemi.com

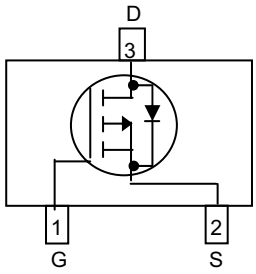
V_{DS} (V)	Rds(on) (Ω)
-30	0.058@ V_{GS}=−10V
	0.080@ V_{GS}=−4.5V



SOT-23

Descriptions

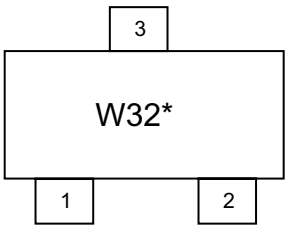
The WPM3012 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM3012 is Pb-free and Halogen-free.



Pin configuration (Top view)

Features

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



W32= Device Code
* = Month (A~Z)

Marking

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

Device	Package	Shipping
WPM3012-3/TR	SOT-23	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	-30		V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current [a]	T_A=25°C	I_D	-3.1	-2.9	A
	T_A=70°C		-2.5	-2.3	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.9	0.8	W
	T_A=70°C		0.6	0.5	
Continuous Drain Current [b]	T_A=25°C	I_D	-2.8	-2.6	A
	T_A=70°C		-2.2	-2.1	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.7	0.6	W
	T_A=70°C		0.5	0.4	
Pulsed Drain Current [c]		I_{DM}	-15		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

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	105	130	°C/W
	Steady State		120	155	
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	$R_{\theta JC}$	60	75	

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

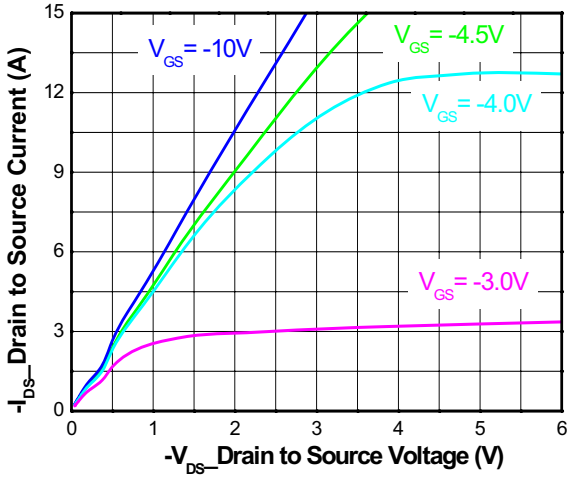
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

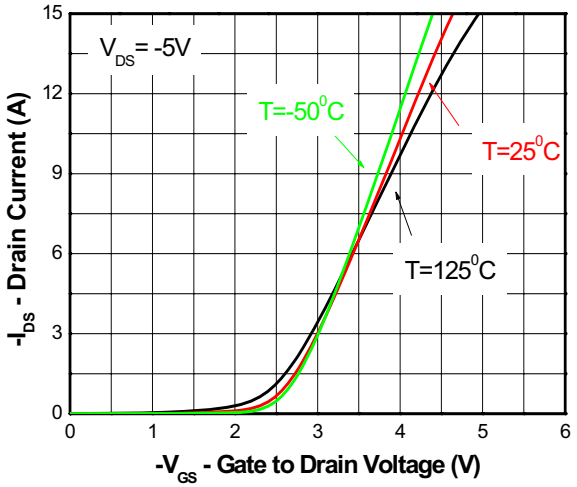
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = -250uA	-30			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			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = -250uA	-1.5	-1.9	-2.5	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = -10V, I_D = -3.1A		58	68	mΩ
		V_{GS} = -4.5V, I_D = -2.8A		80	95	
Forward Transconductance	g_{FS}	V_{DS} = -5 V, I_D =-5.0A		8.2		s
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V,		654		pF
Output Capacitance	C_{OSS}	f = 1.0 MHz,		67		
Reverse Transfer Capacitance	C_{RSS}	V_{DS} = -20V		56		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = -10 V, V_{DS} = -15V, I_D = -3.1A		1.55		nC
Threshold Gate Charge	$Q_{G(TH)}$			2.03		
Gate-to-Source Charge	Q_{GS}			3.15		
Gate-to-Drain Charge	Q_{GD}			12.9		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = -10 V, V_{DS} = -15 V, R_L=5Ω, R_G=15 Ω		9.6		ns
Rise Time	tr			4.0		
Turn-Off Delay Time	td(OFF)			34.8		
Fall Time	tf			7.2		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -1.0A		-0.8	-1.5	V

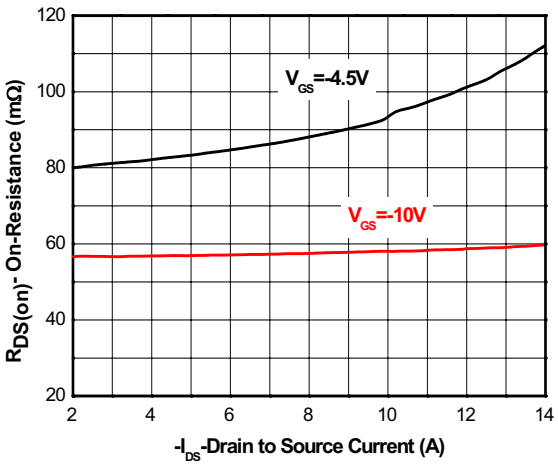
Typical Characteristics (Ta=25°C, unless otherwise noted)



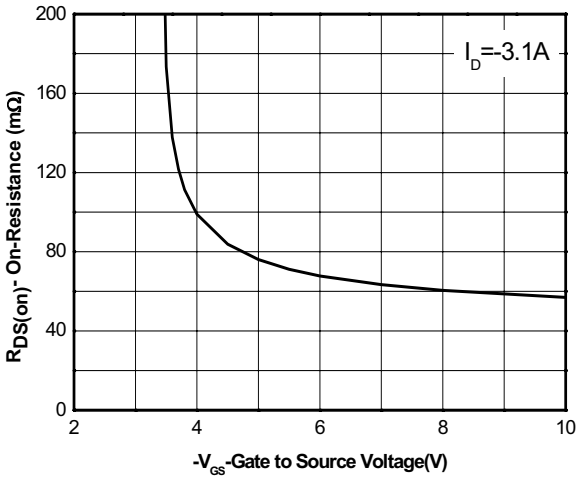
Output characteristics



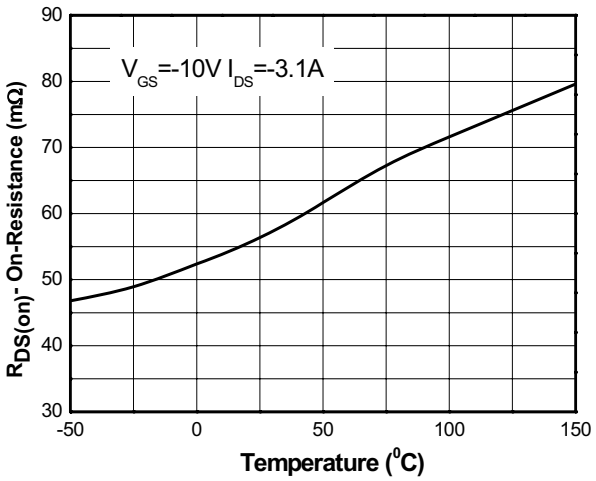
Transfer characteristics



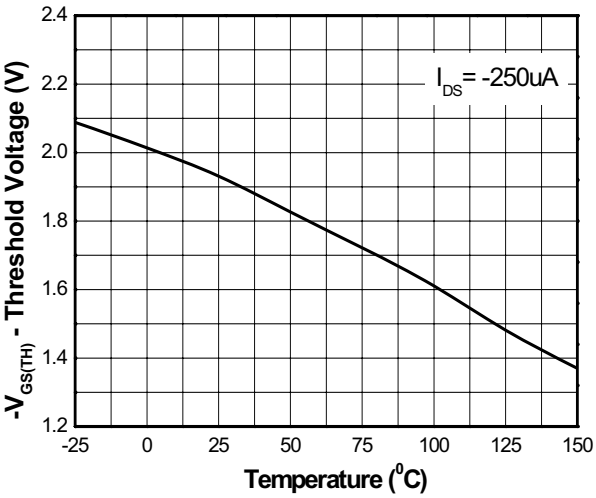
On-Resistance vs. Drain current



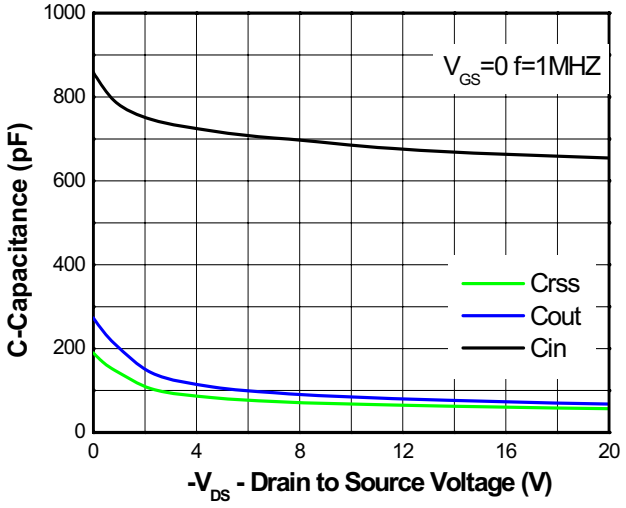
On-Resistance vs. Gate-to-Source voltage



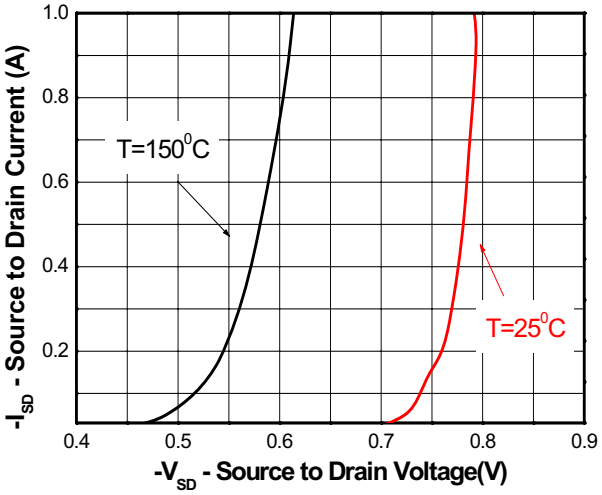
On-Resistance vs. Junction temperature



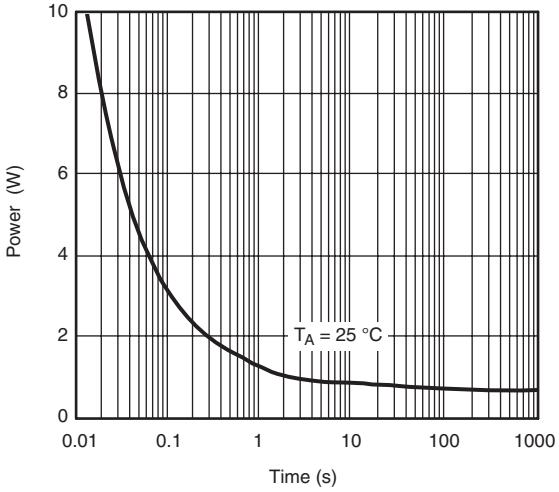
Threshold voltage vs. Temperature



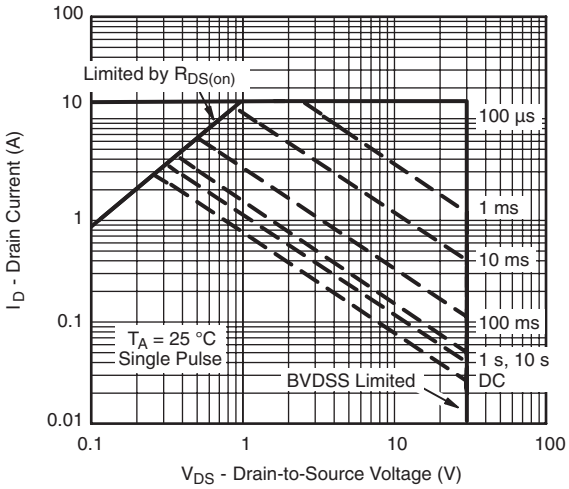
Capacitance



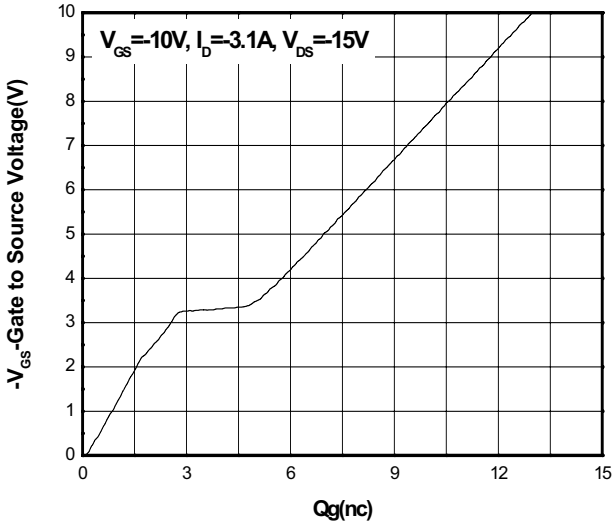
Body diode forward voltage



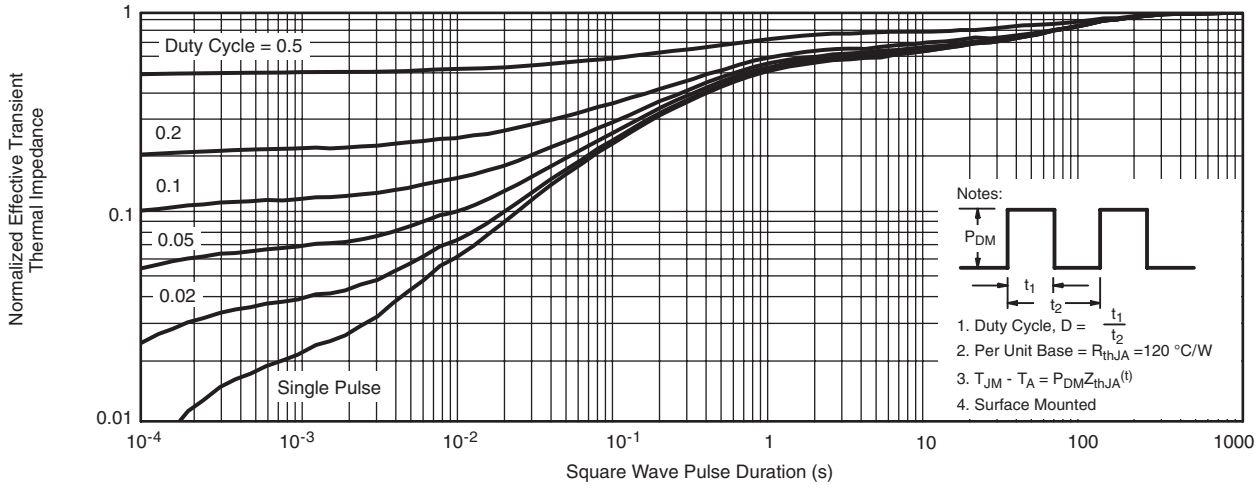
Single pulse power



Safe operating power



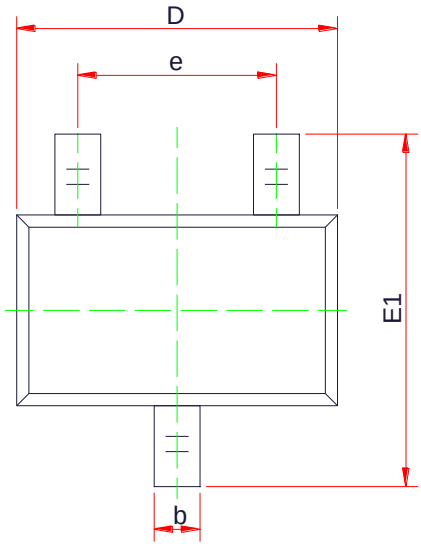
Gate Charge Characteristics



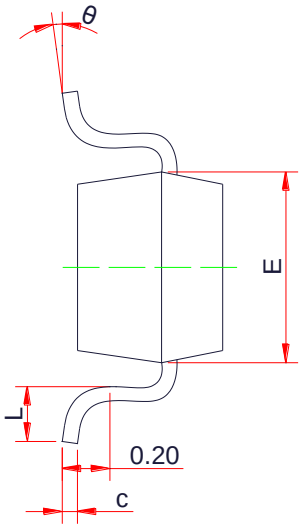
Transient thermal response (Junction-to-Ambient)

PACKAGE OUTLINE DIMENSIONS

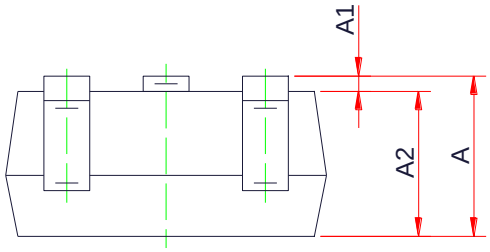
SOT-323



TOP VIEW



SIDE VIEW

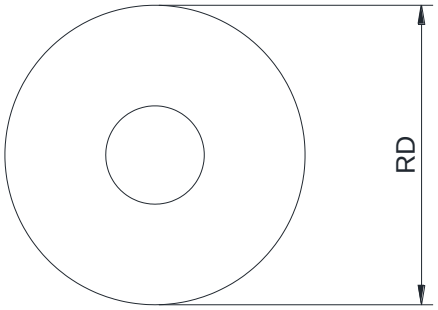


SIDE VIEW

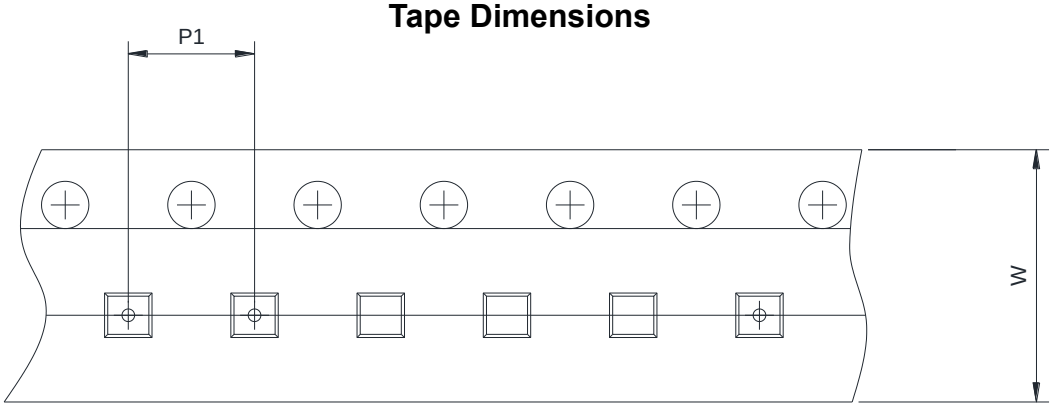
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.80	0.95	1.10
A1	0.00	-	0.10
A2	0.80	0.90	1.00
b	0.20	0.30	0.40
c	0.05	0.10	0.15
D	1.90	2.05	2.20
E	1.15	1.25	1.25
E1	2.00	2.20	2.45
e	1.20	1.30	1.40
L	0.20	-	-
θ	6° Ref		

TAPE AND REEL INFORMATION

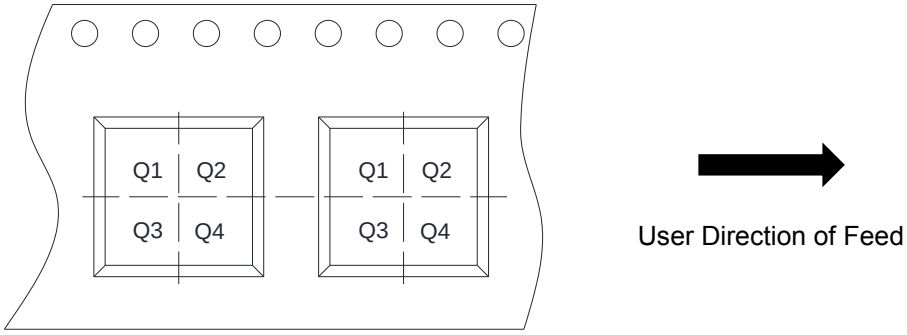
Reel Dimensions



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