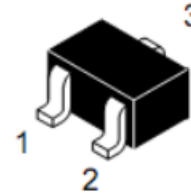


# WPM3012

**Single P-Channel, -30V, -4.6A, Power MOSFET**

<https://www.omnivision-group.com>

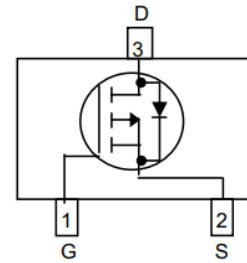
V <sub>DS</sub> (V)	Max. R <sub>DS(on)</sub> (mΩ)
-30	53@ V <sub>GS</sub> =-10V
	93@ V <sub>GS</sub> =-4.5V



**SOT-23**

## Descriptions

The WPM3012 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<sub>DS(ON)</sub> 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.



## Features

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

## Pin configuration (Top view)



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		$V_{GS}$	$\pm 20$		
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	$I_D$	-4.6	-3.8	A
	$T_A=70^{\circ}\text{C}$		-3.7	-3.0	
Maximum Power Dissipation <sup>b</sup>	$T_A=25^{\circ}\text{C}$	$P_D$	1.7	1.1	W
	$T_A=70^{\circ}\text{C}$		1.1	0.7	
Pulsed Drain Current <sup>c</sup>		$I_{DM}$	-16		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 <sup>a</sup>	$t \leq 10\text{ s}$	$R_{\theta JA}$	62	74	$^{\circ}\text{C/W}$
	Steady State		91	109	
Junction-to-Lead Thermal Resistance	Steady State	$R_{\theta JL}$	39	47	

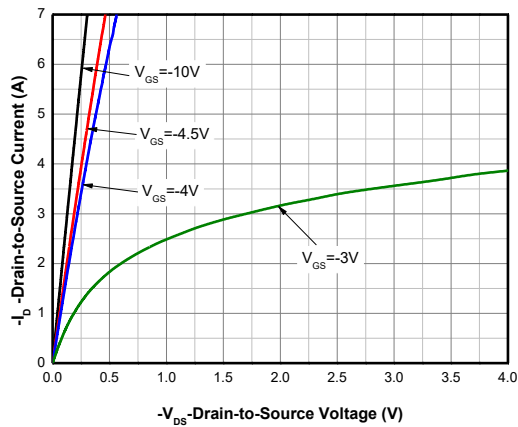
Note:

- FR-4 board (38mm X 38mm X t1.6mm, 70um Copper) partially covered with copper (645mm<sup>2</sup> area)
- The power dissipation  $P_D$  is based on Junction-to-Ambient thermal resistance  $R_{\theta JA}$   $t \leq 10\text{ s}$  value and the  $T_{J(\text{MAX})}=150^{\circ}\text{C}$ .
- Repetitive rating, ~10us pulse width, duty cycle ~1%, keep initial  $T_J = 25^{\circ}\text{C}$ , the maximum allowed junction temperature of  $150^{\circ}\text{C}$ .
- The static characteristics are obtained using ~380us pulses, duty cycle ~1%.

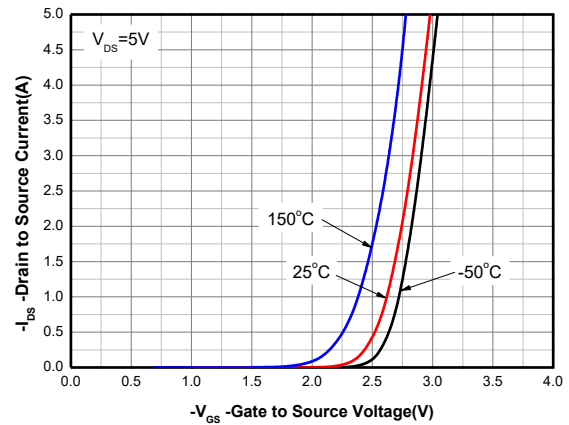
**Electronics Characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250uA	-30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0V			-1	uA
Gate-to-source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = -250uA	-1.4	-1.9	-2.5	V
Drain-to-source On-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4A		42	53	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A		64	93	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, f = 1.0 MHz, V <sub>DS</sub> = -20 V		366		pF
Output Capacitance	C <sub>OSS</sub>			62		
Reverse Transfer Capacitance	C <sub>RSS</sub>			54		
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>GS</sub> = -10 V, V <sub>DS</sub> = -15 V, I <sub>D</sub> = -3.1A		12		nC
Threshold Gate Charge	Q <sub>G(TH)</sub>			1.24		
Gate-to-Source Charge	Q <sub>GS</sub>			1.96		
Gate-to-Drain Charge	Q <sub>GD</sub>			2.37		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	td(ON)	V <sub>GS</sub> = -10 V, V <sub>DS</sub> = -15 V, R <sub>L</sub> = 5 Ω, R <sub>G</sub> = 15 Ω		5.6		ns
Rise Time	tr			12.7		
Turn-Off Delay Time	td(OFF)			31.9		
Fall Time	tf			18.7		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = -1.0A		-0.8	-1.2	V

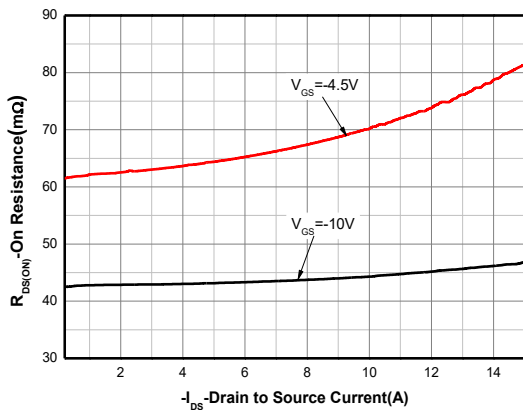
Typical Characteristics (Ta=25°C, unless otherwise noted)



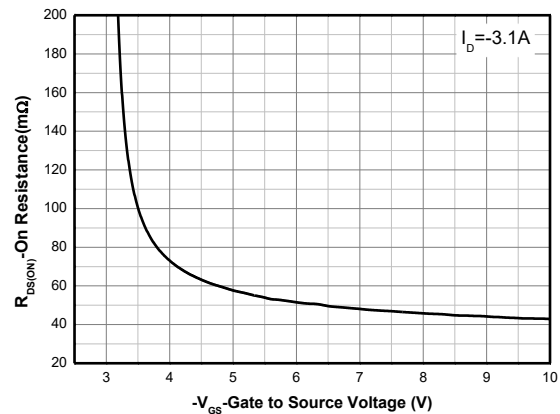
Output Characteristics



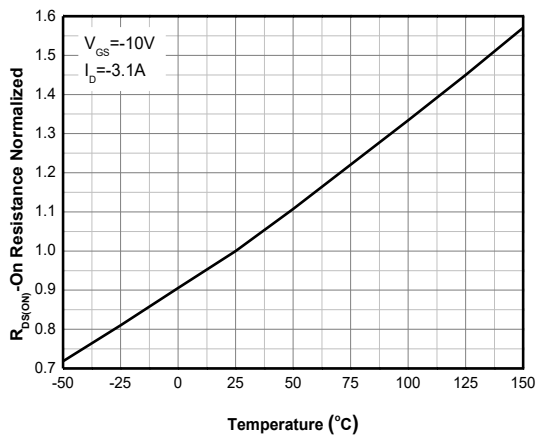
Transfer Characteristics



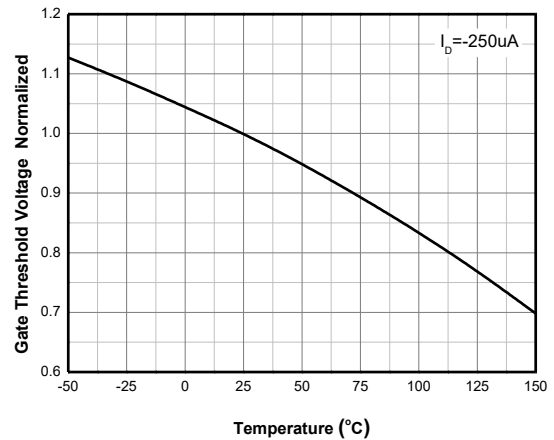
On-Resistance vs. Drain Current



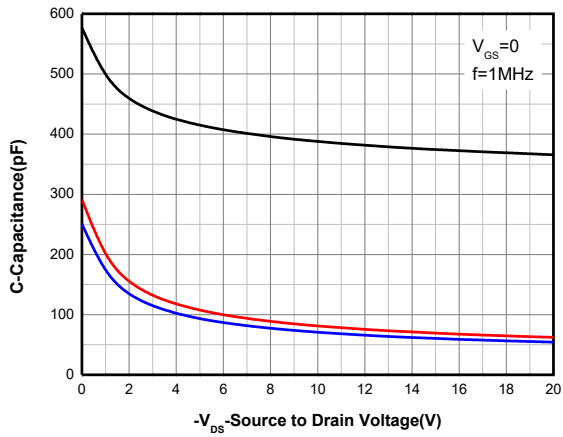
On-Resistance vs. Gate-to-Source Voltage



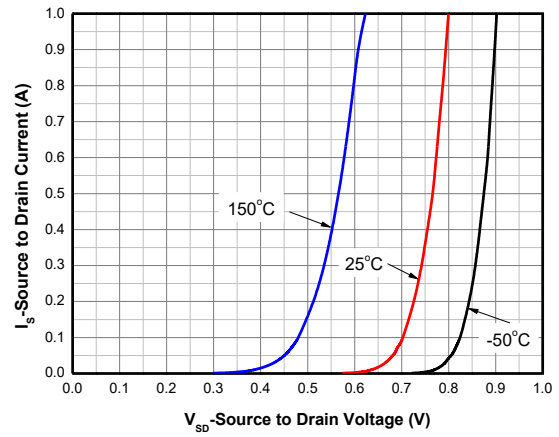
On-Resistance vs. Junction Temperature



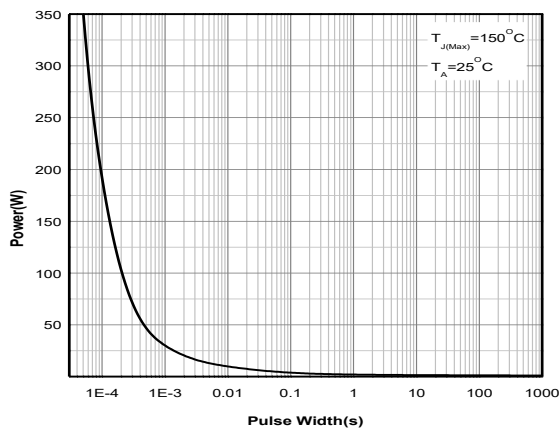
Threshold Voltage vs. Temperature



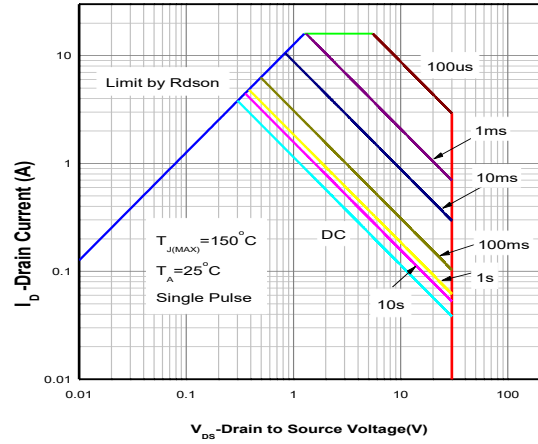
Capacitance



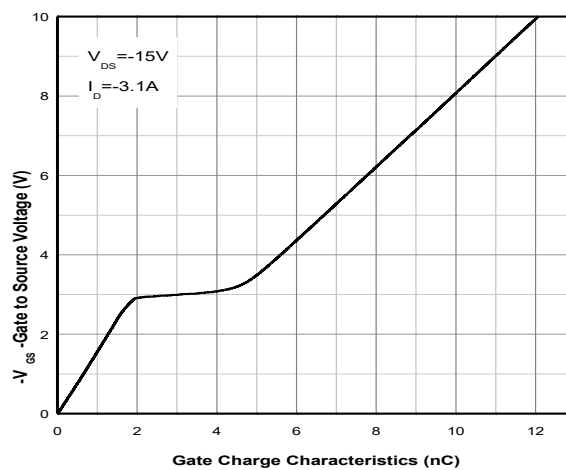
Body Diode Forward Voltage



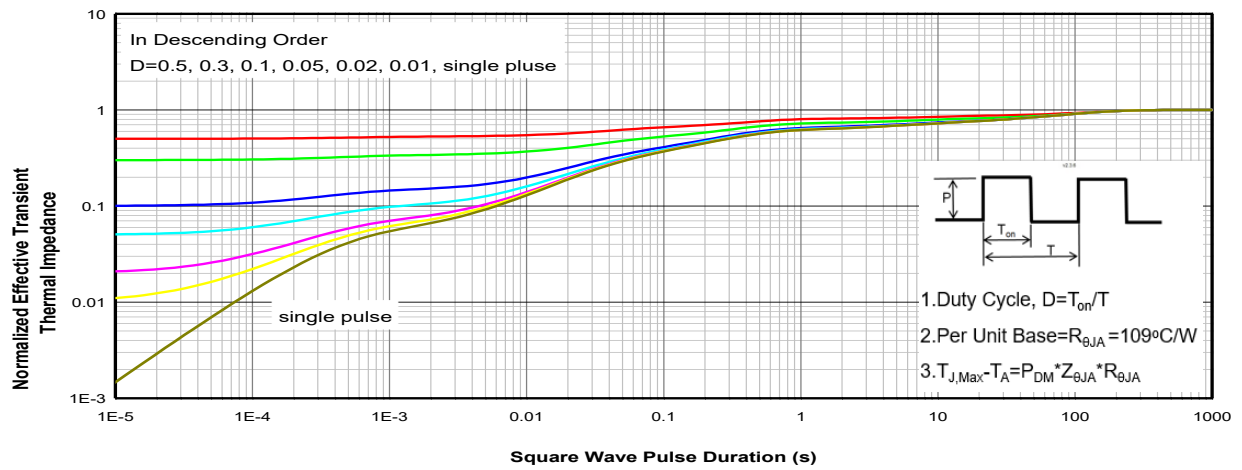
Single pulse power



Safe operating power



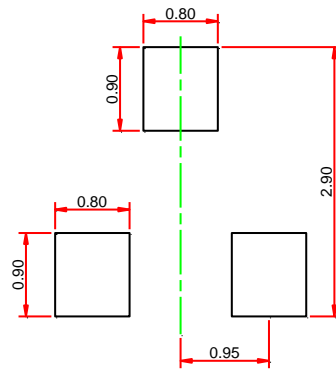
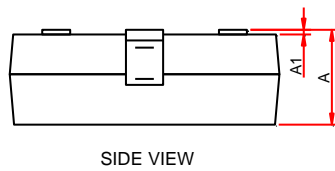
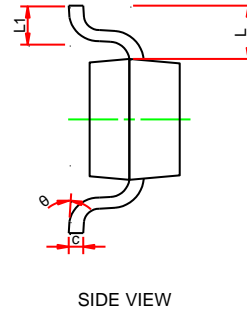
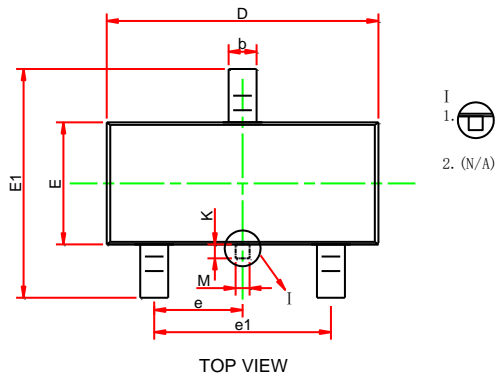
Gate Charge Characteristics



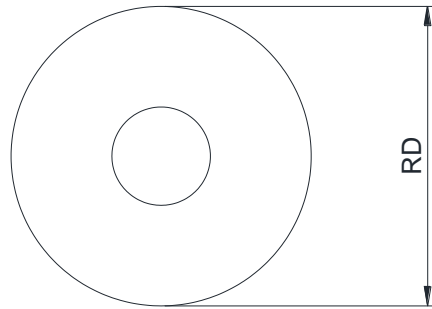
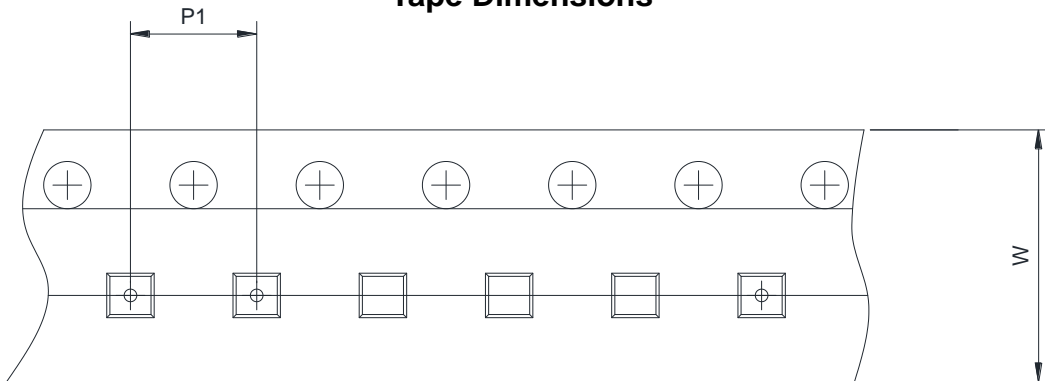
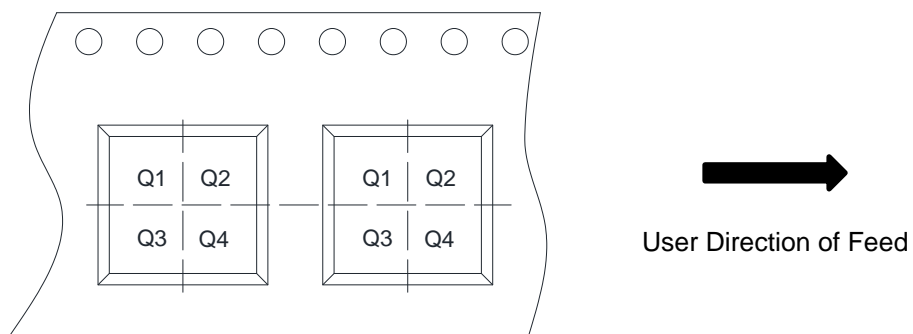
Transient thermal response (Junction-to-Ambient)

# PACKAGE OUTLINE DIMENSIONS

## SOT-23



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
L	0.45	0.55	0.65
L 1	0.20	0.35	0.60
M	0.10	0.15	0.25
K	0.00	-	0.25
$\theta$	0 °	-	8 °

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


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