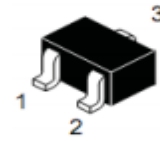


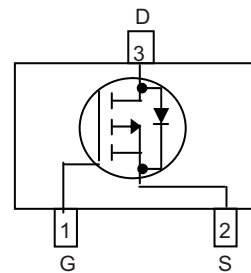
**WPM3023**
**Single P-Channel, -30V, -3.9A, Power MOSFET**
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

$V_{DS}$ (V)	Typical $R_{DS(on)}$ (m $\Omega$ )
-30	37 @ $V_{GS}=-10V$
	50 @ $V_{GS}=-4.5V$

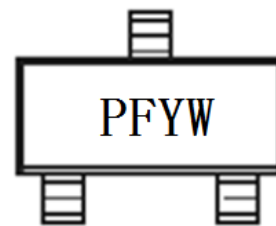

**Descriptions**

The WPM3023 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 WPM3023 is Pb-free.

SOT-23


**Pin configuration (Top view)**
**Features**

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



PF = Device Code  
 Y = Year  
 W = Week(A~z)

**Applications**

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

**Marking**
**Order information**

Device	Package	Shipping
WPM3023-3/TR	SOT-23	3000/Tape&Reel

**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 <sup>a d</sup>	$I_D$	$T_A=25^{\circ}C$	-3.9	-3.3	A
		$T_A=70^{\circ}C$	-3.1	-2.6	
Maximum Power Dissipation <sup>a d</sup>	$P_D$	$T_A=25^{\circ}C$	1.2	0.9	W
		$T_A=70^{\circ}C$	0.8	0.6	
Continuous Drain Current <sup>b d</sup>	$I_D$	$T_A=25^{\circ}C$	-3.1	-2.8	A
		$T_A=70^{\circ}C$	-2.5	-2.3	
Maximum Power Dissipation <sup>b d</sup>	$P_D$	$T_A=25^{\circ}C$	0.8	0.7	W
		$T_A=70^{\circ}C$	0.5	0.4	
Pulsed Drain Current <sup>c</sup>	$I_{DM}$	-15.6		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	

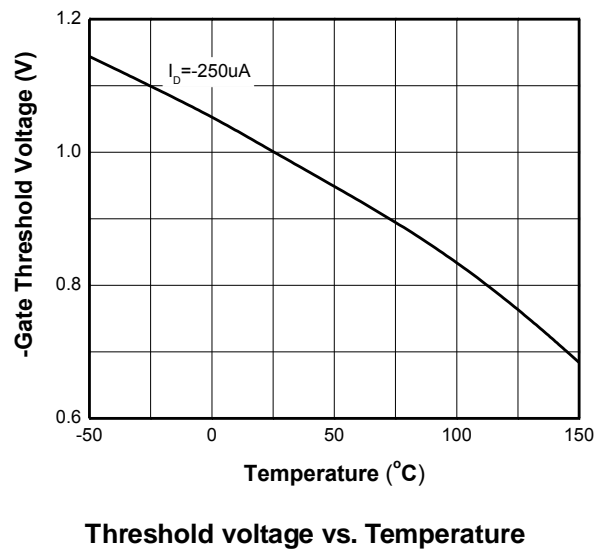
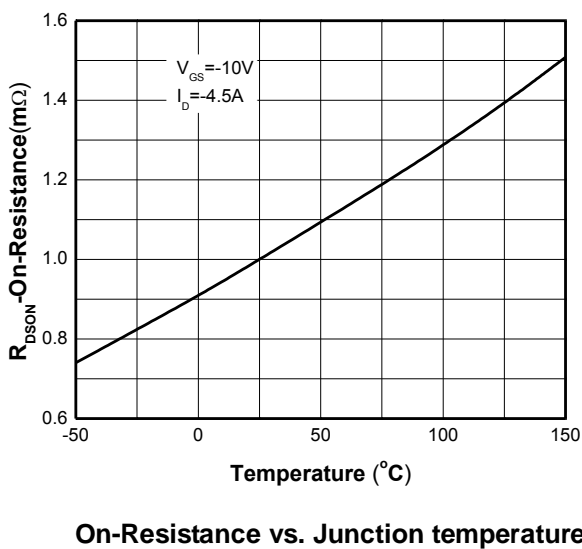
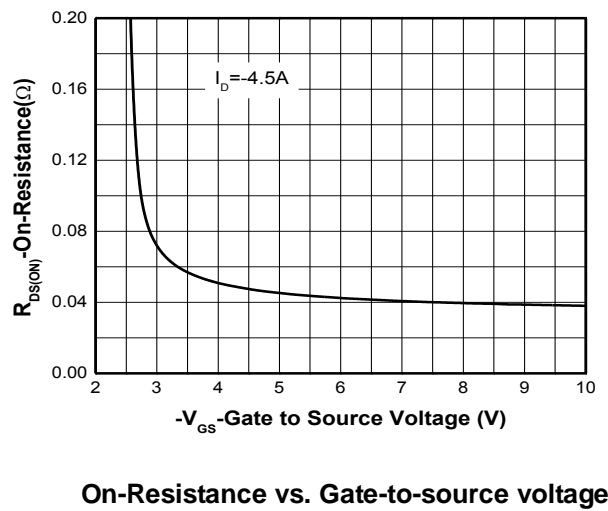
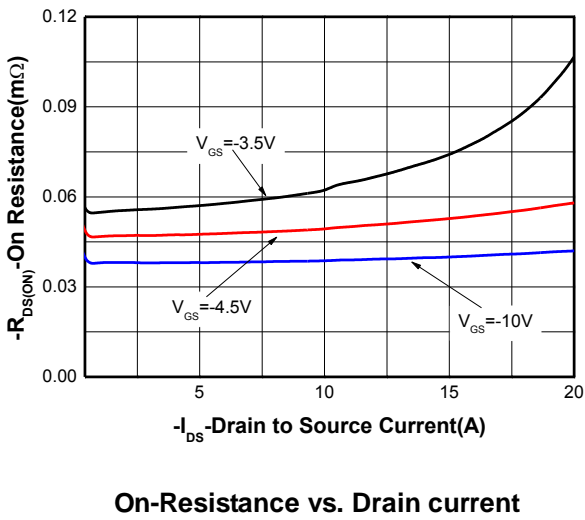
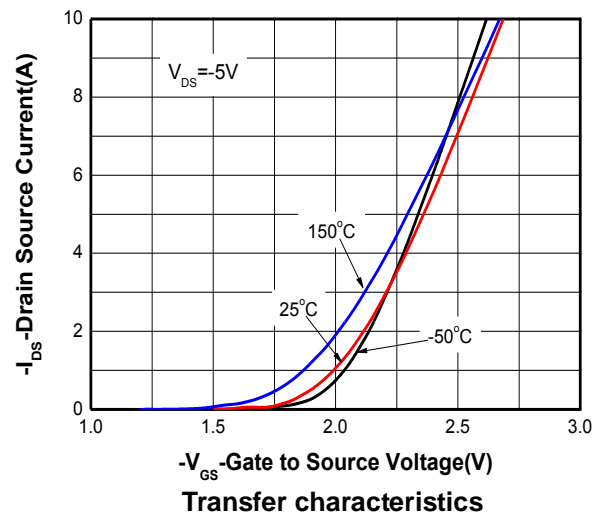
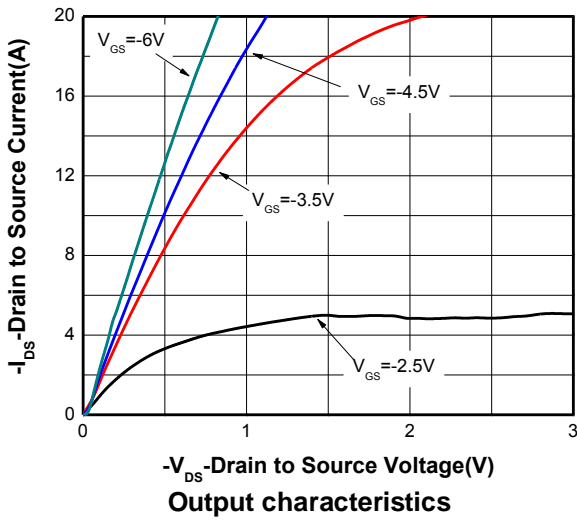
**Thermal resistance ratings**

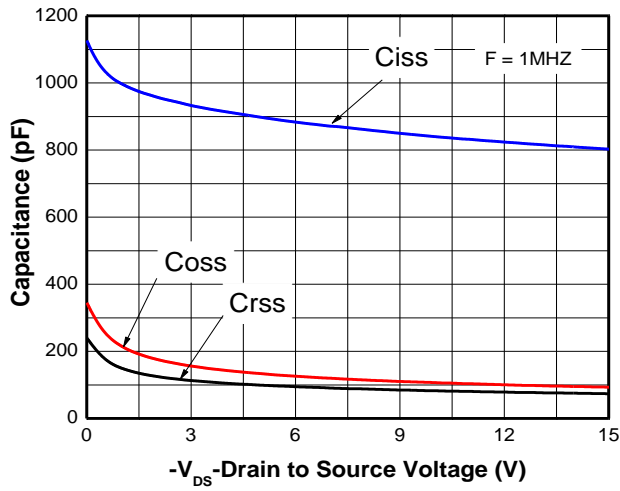
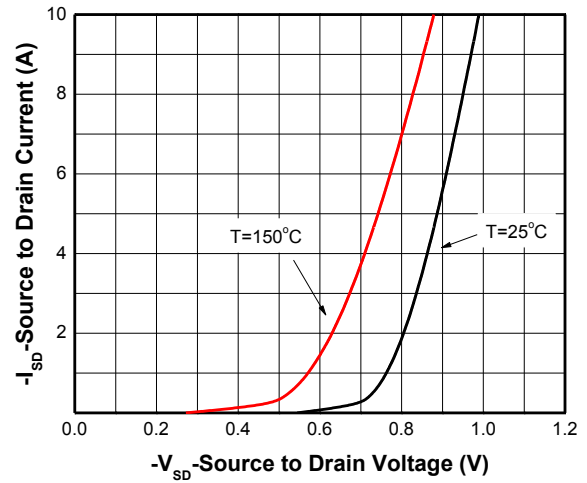
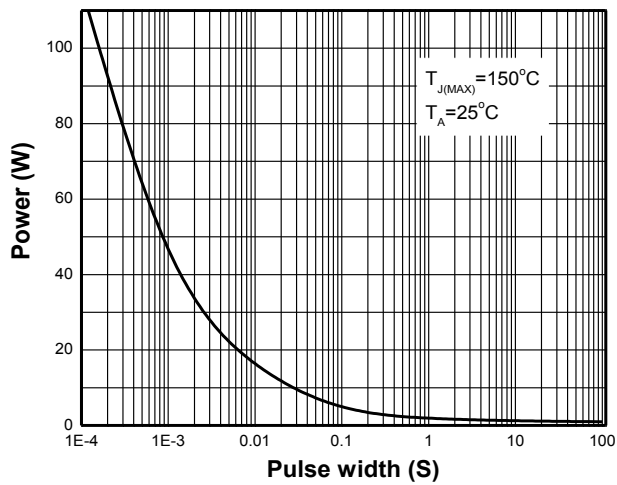
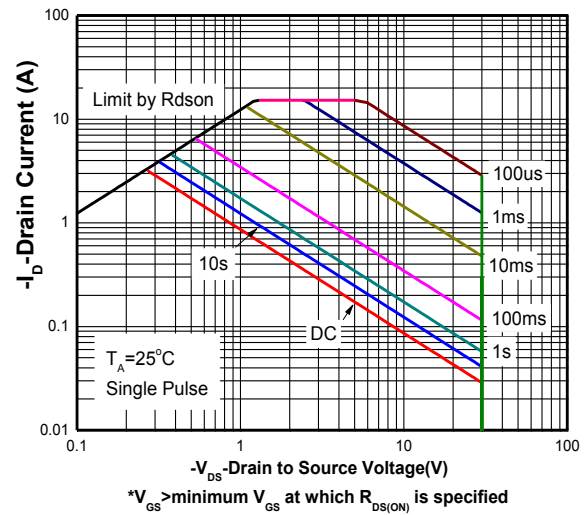
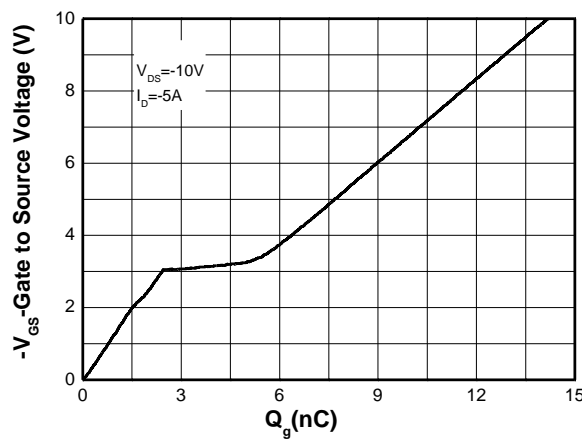
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$R_{\theta JA}$	$t \leq 10$ s	84	102	°C/W
		Steady State	120	145	
Junction-to-Ambient Thermal Resistance <sup>b</sup>	$R_{\theta JA}$	$t \leq 10$ s	130	160	
		Steady State	145	190	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	60	75		

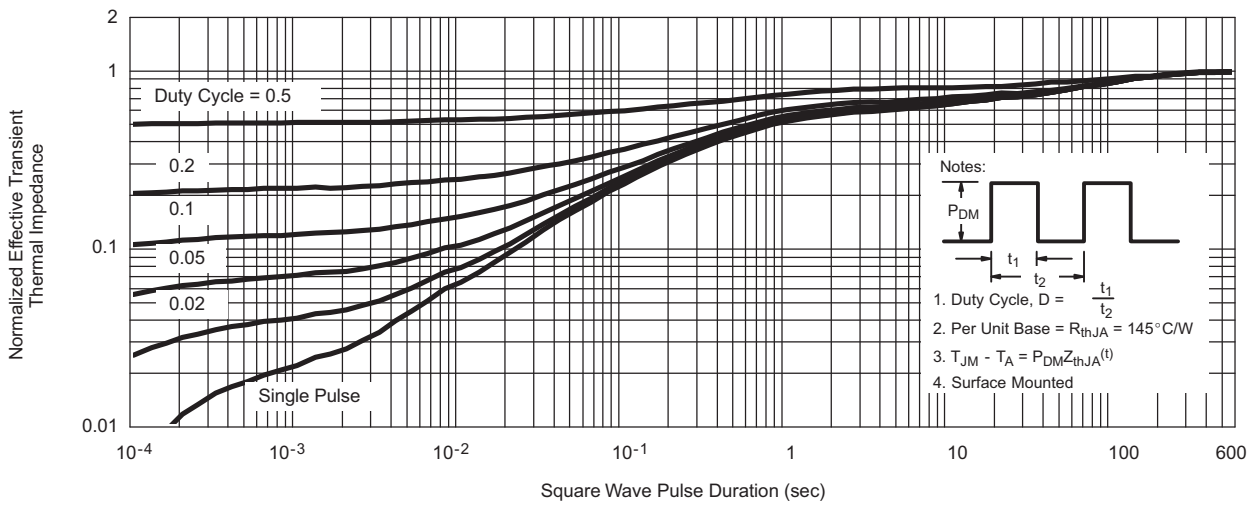
- a. Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.
- b. Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.
- c. Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu s$ , Duty Cycle=1%.
- d. Repetitive rating, pulse width limited by junction temperature  $T_J(MAX)=150^{\circ}C$ .

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

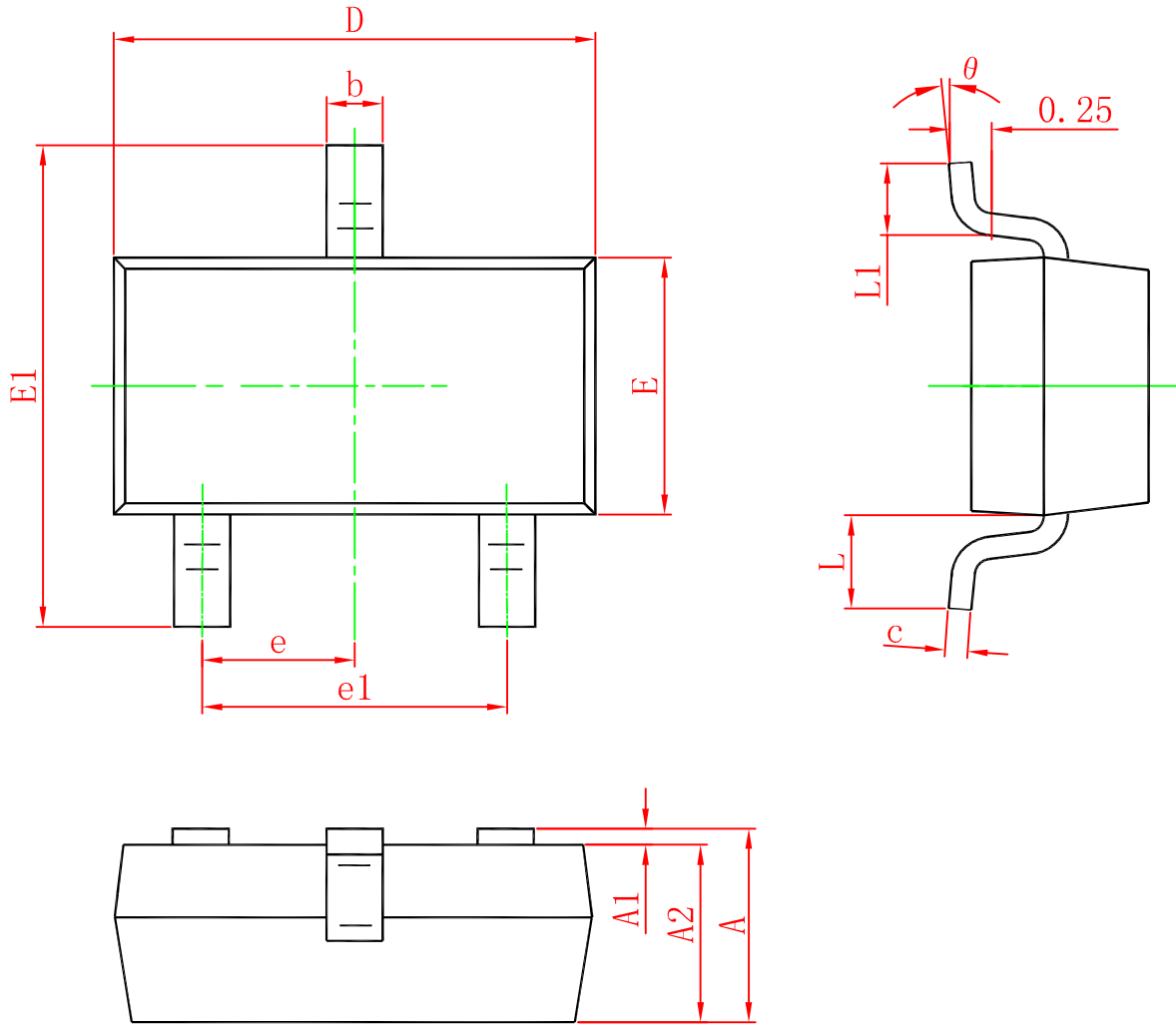
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$	-30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu\text{A}$	-1.0	-1.8	-3.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -4.5\text{ A}$		37	54	m $\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -4\text{ A}$		50	74	
Forward Transconductance	$g_{FS}$	$V_{DS} = -5\text{ V}, I_D = -3.3\text{ A}$		4	7	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = -15\text{ V}$		778		pF
Output Capacitance	$C_{OSS}$			85		
Reverse Transfer Capacitance	$C_{RSS}$			68		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -5.0\text{ A}$		6.8		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.55		
Gate-to-Source Charge	$Q_{GS}$			2.5		
Gate-to-Drain Charge	$Q_{GD}$			2.1		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = -10\text{ V}, V_{DD} = -15\text{ V}, I_D = -4\text{ A}, R_G = 6\Omega$		11.2		ns
Rise Time	$t_r$			4.7		
Turn-Off Delay Time	$t_d(OFF)$			50		
Fall Time	$t_f$			8		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = -1\text{ A}$	-0.6	-0.75	-1.2	V

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



**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.	Max.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 (Typ.)	
e1	1.800	2.000
L	0.550 (Typ.)	
L1	0.300	0.500
$\theta$	0°	8°