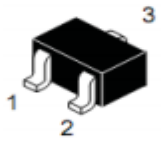
WPM3023

Single P-Channel, -30V, -3.9A, Power MOSFET

Http://www.sh-willsemi.com

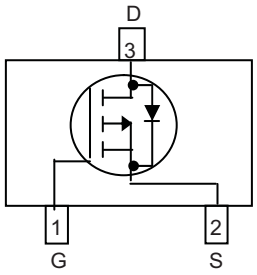
V_{DS} (V)	Typical $R_{DS(on)}$ (mΩ)
-30	37 @ V_{GS}=-10V
	50 @ V_{GS}=-4.5V



SOT-23

Descriptions

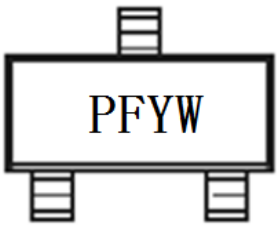
The WPM3023 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM3023 is Pb-free.



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)

Marking

Applications

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

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 [a d]	T_A=25°C	I_D	-3.9	-3.3	A
	T_A=70°C		-3.1	-2.6	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	1.2	0.9	W
	T_A=70°C		0.8	0.6	
Continuous Drain Current [b d]	T_A=25°C	I_D	-3.1	-2.8	A
	T_A=70°C		-2.5	-2.3	
Maximum Power Dissipation [b d]	T_A=25°C	P_D	0.8	0.7	W
	T_A=70°C		0.5	0.4	
Pulsed Drain Current [c]		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 [a]	t ≤ 10 s	$R_{\theta JA}$	84	102	°C/W
	Steady State		120	145	
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 FR4 Board using 1 in sq pad size, 1oz Cu.

b. Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.

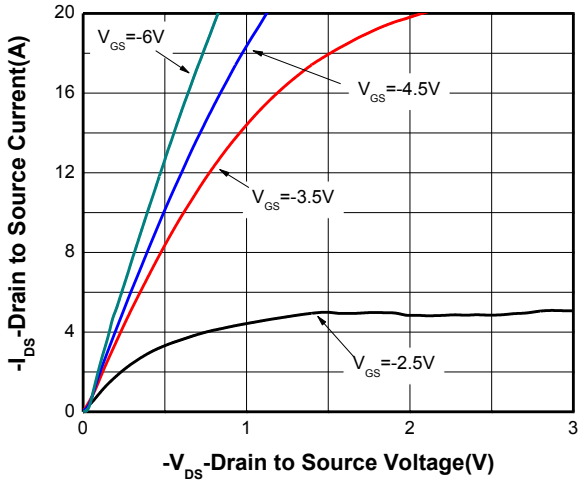
c. Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%.

d. Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C.

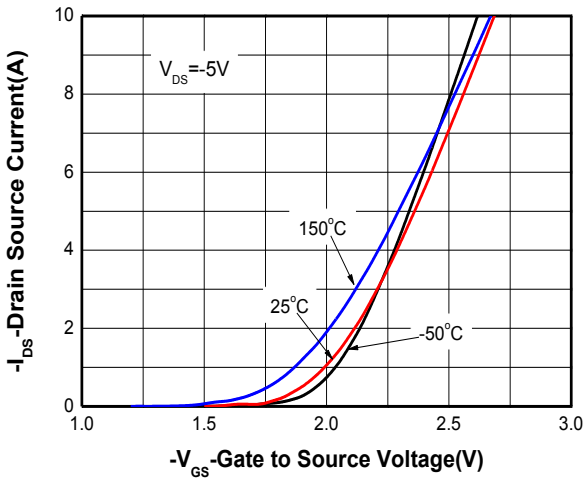
Electronics Characteristics (Ta=25°C, unless otherwise noted)

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	-1.0	-1.8	-3.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -4.5A		37	54	mΩ
		V_{GS} =-4.5V, I_D = -4A		50	74	
Forward Transconductance	g_{FS}	V_{DS} = -5 V, I_D = -3.3A		4	7	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0MHz, V_{DS} = -15 V		778		pF
Output Capacitance	C_{OSS}			85		
Reverse Transfer Capacitance	C_{RSS}			68		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = -4.5 V, V_{DS} = -10 V, I_D =-5.0 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		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = -10 V, V_{DD} =-15 V, I_D=-4A, R_G=6Ω		11.2		ns
Rise Time	tr			4.7		
Turn-Off Delay Time	td(OFF)			50		
Fall Time	tf			8		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -1A	-0.6	-0.75	-1.2	V

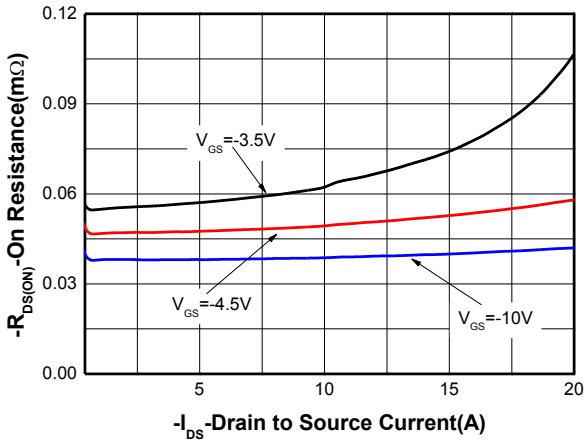
Typical Characteristics (Ta=25°C, unless otherwise noted)



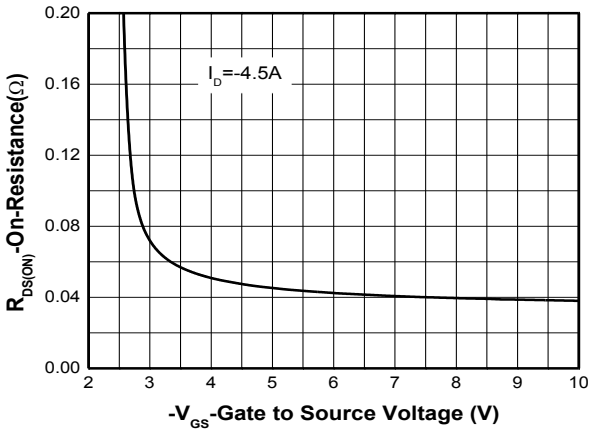
Output characteristics



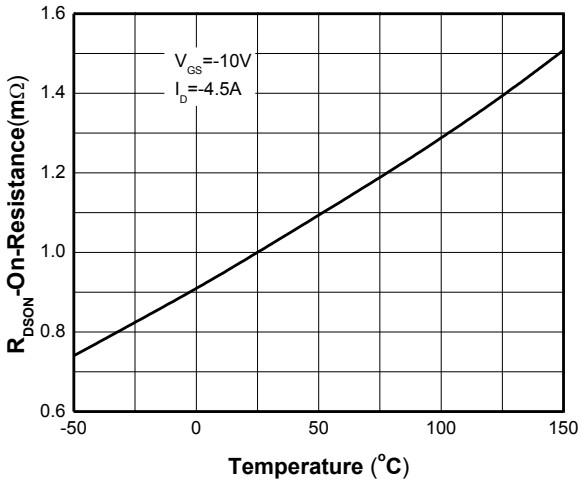
Transfer characteristics



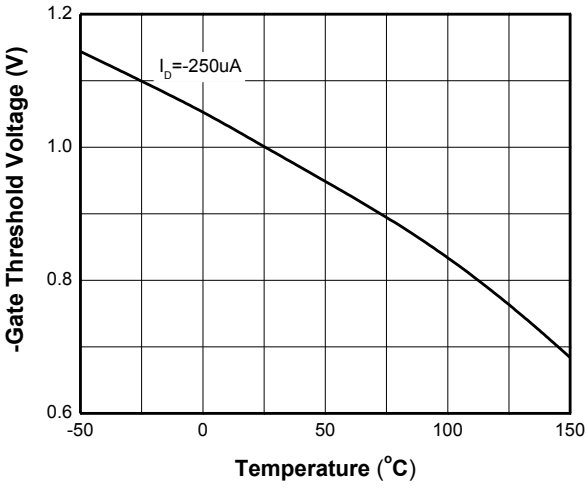
On-Resistance vs. Drain current



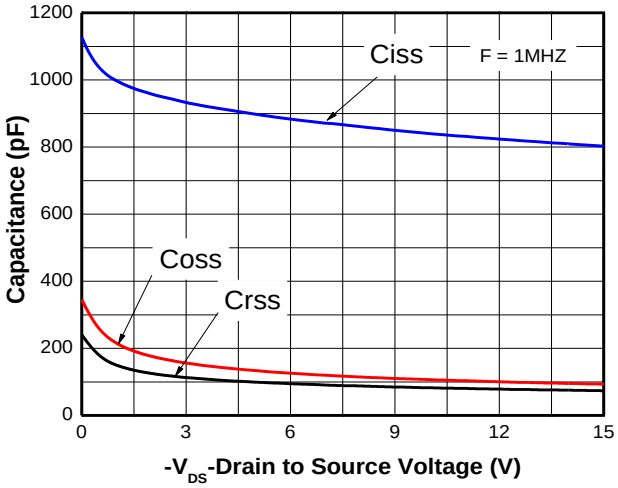
On-Resistance vs. Gate-to-source voltage



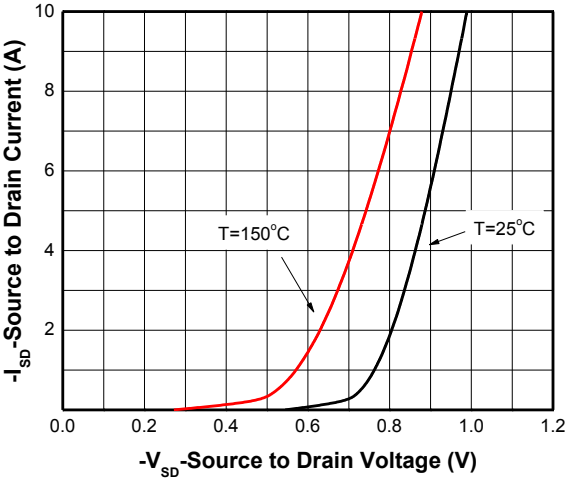
On-Resistance vs. Junction temperature



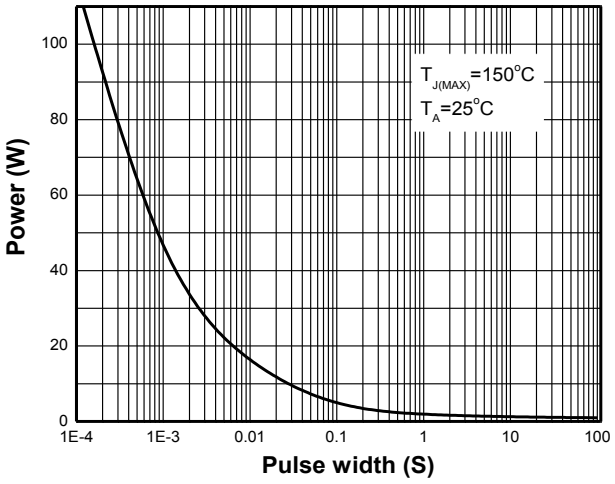
Threshold voltage vs. Temperature



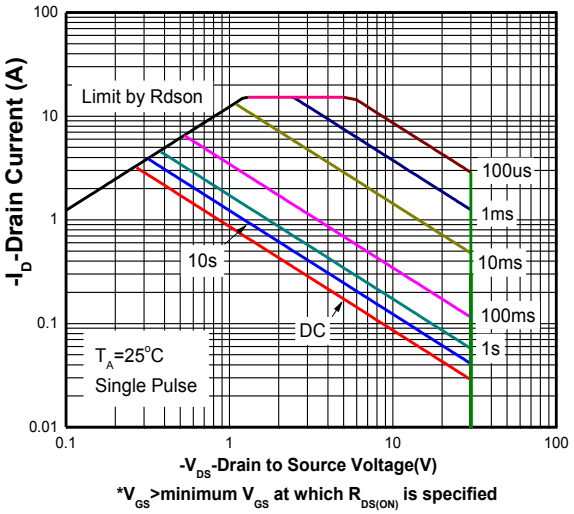
Capacitance



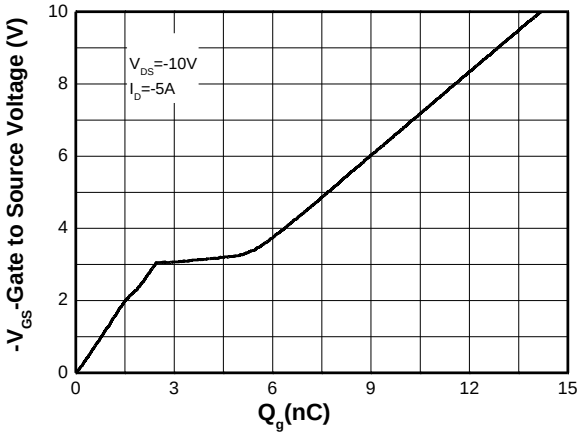
Body diode forward voltage



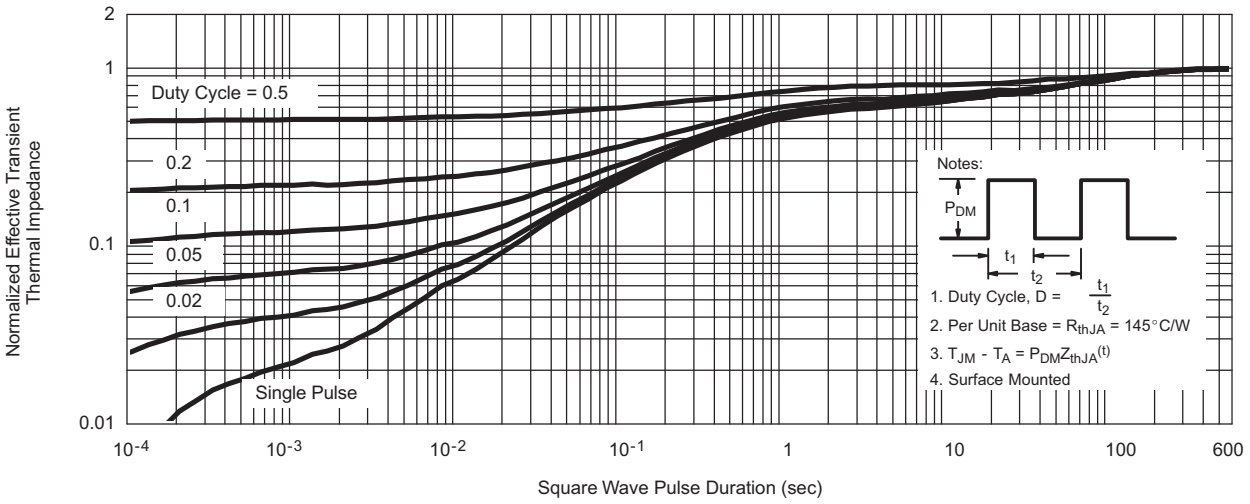
Single pulse power



Safe operating power



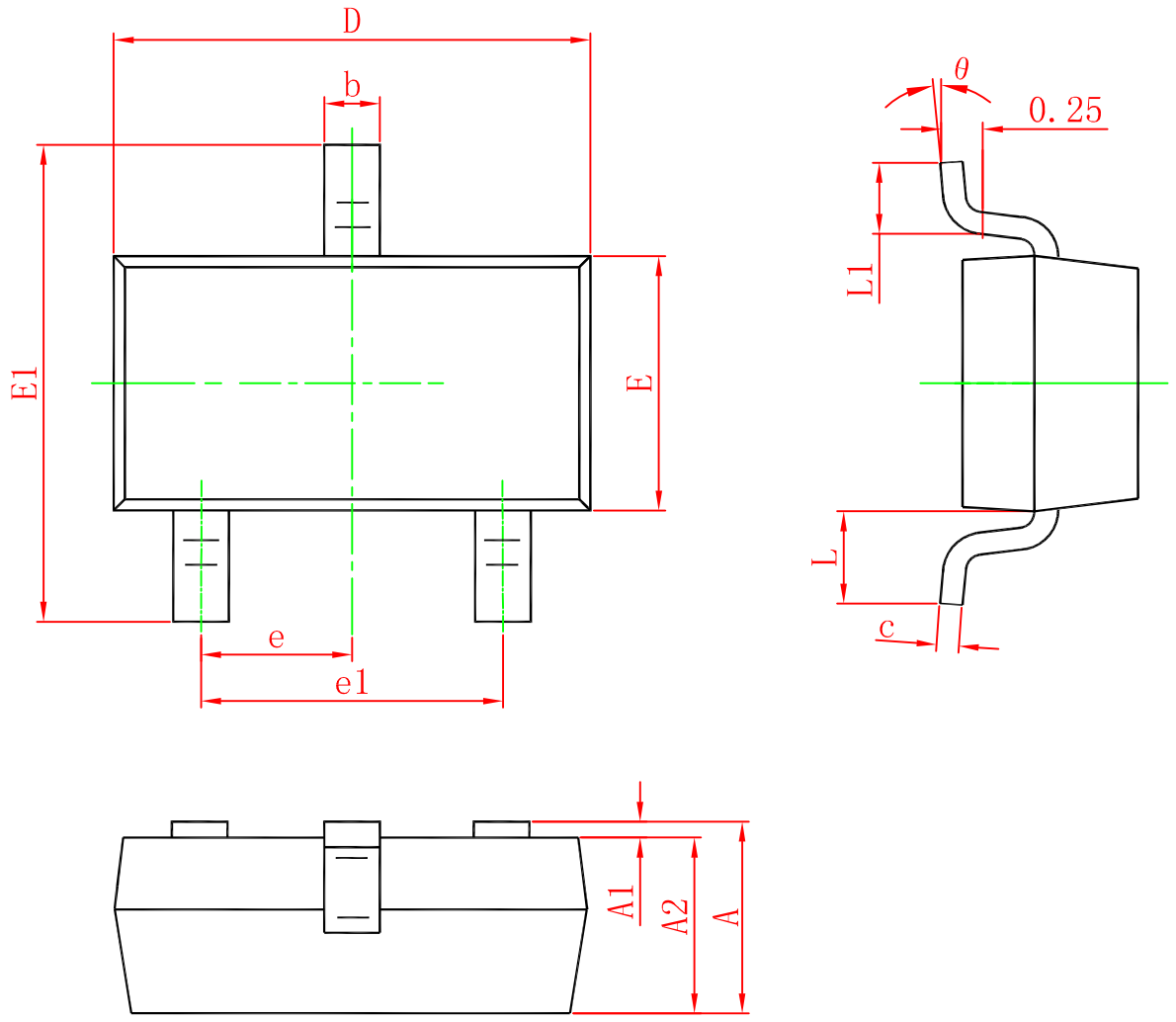
Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions

SOT-23



Symbol	Dimensions In Millimeters	
	Min.	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
θ	0°	8°