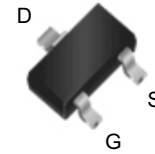


WPM2019
Single P-Channel, -20V, -0.73A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

V_{DS} (V)	$R_{ds(on)}$ (Ω)
-20	0.480@ $V_{GS} = -4.5V$
	0.620@ $V_{GS} = -2.5V$
	0.780@ $V_{GS} = -1.8V$


SOT-523
Descriptions

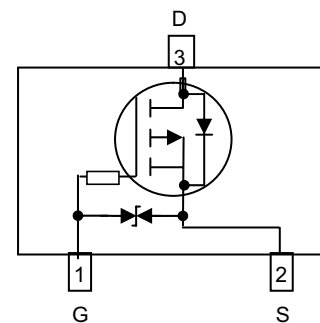
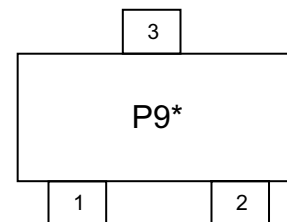
The WPM2019 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2019 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-523

Applications

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


Pin configuration (Top view)


P9 =Device Code
* = Month(A~Z)

Marking
Order information

Device	Package	Shipping
WPM2019-3/TR	SOT-523	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	-20		V
Gate-Source Voltage		V_{GS}	±5		
Continuous Drain Current ^a	$T_A=25^{\circ}C$	I_D	-0.73	-0.62	A
	$T_A=70^{\circ}C$		-0.58	-0.50	
Maximum Power Dissipation ^a	$T_A=25^{\circ}C$	P_D	0.38	0.28	W
	$T_A=70^{\circ}C$		0.24	0.18	
Continuous Drain Current ^b	$T_A=25^{\circ}C$	I_D	-0.61	-0.55	A
	$T_A=70^{\circ}C$		-0.49	-0.44	
Maximum Power Dissipation ^b	$T_A=25^{\circ}C$	P_D	0.27	0.22	W
	$T_A=70^{\circ}C$		0.17	0.14	
Pulsed Drain Current ^c		I_{DM}	-1.2		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	$t \leq 10$ s	$R_{\theta JA}$	285	325	°C/W
	Steady State		355	440	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10$ s	$R_{\theta JA}$	395	460	
	Steady State		465	560	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	280	320	

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

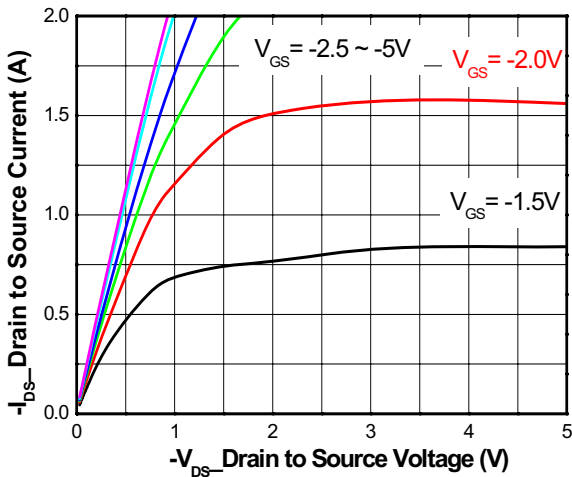
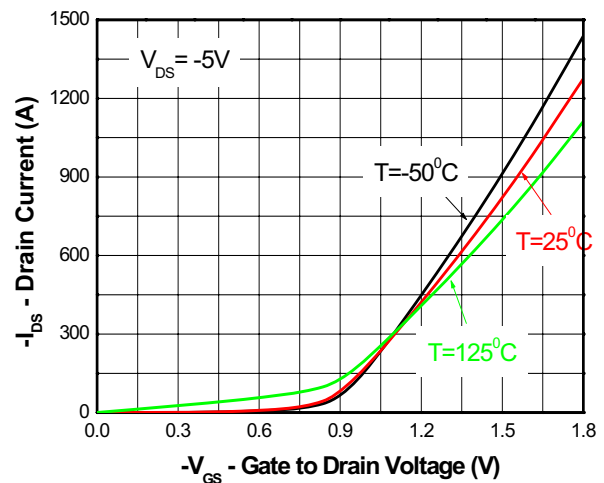
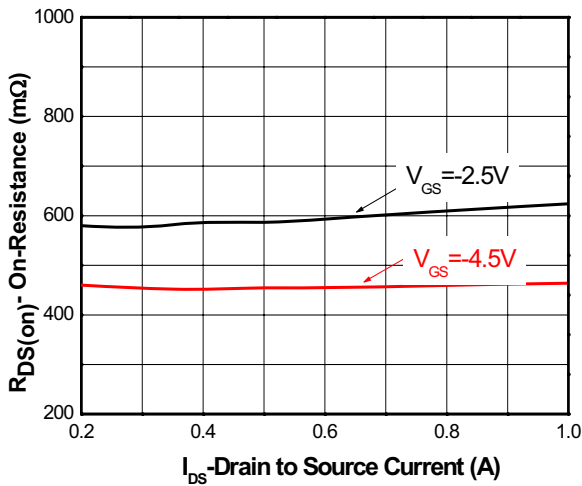
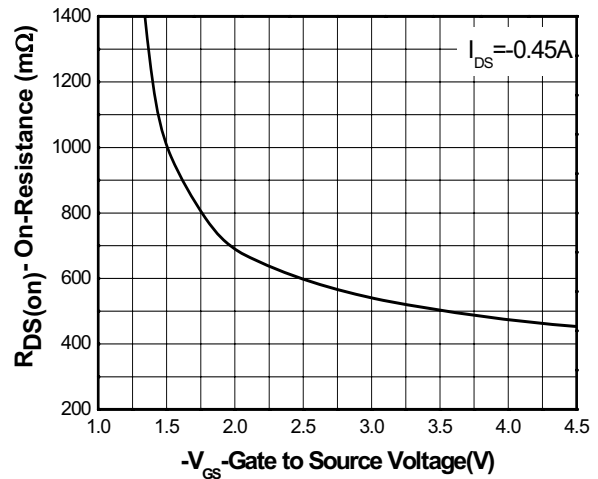
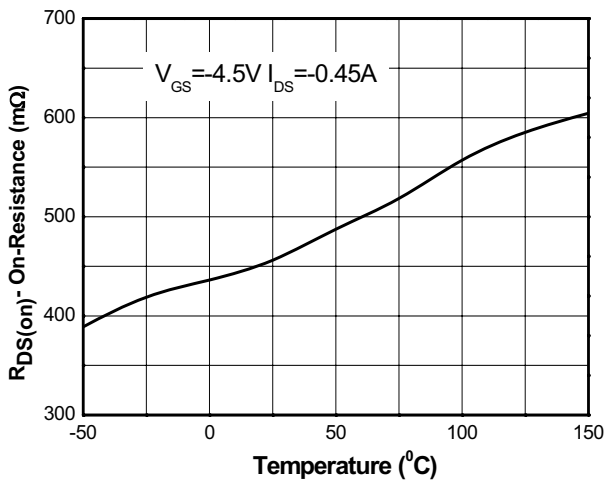
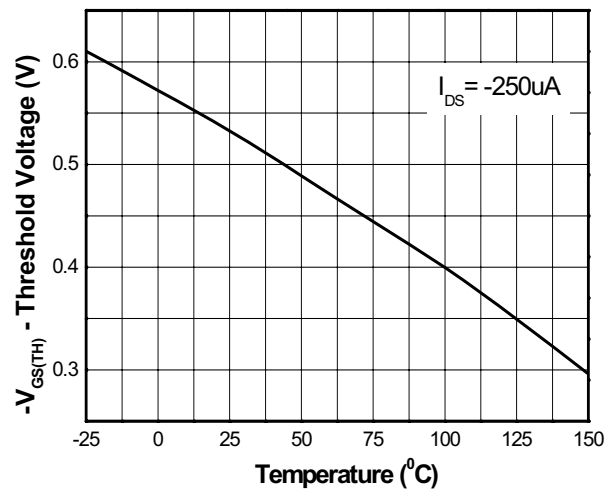
b Surface mounted on FR4 board using minimum pad size, 1oz copper

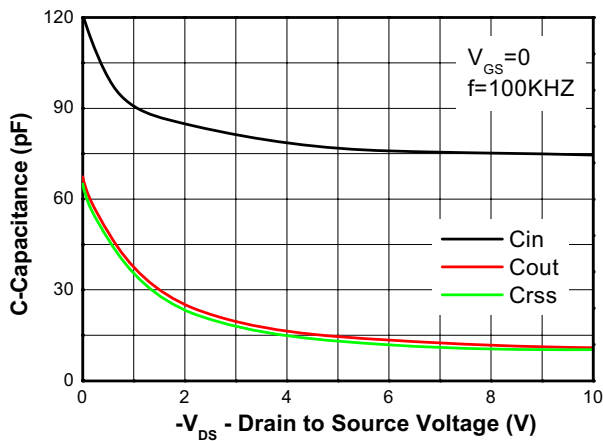
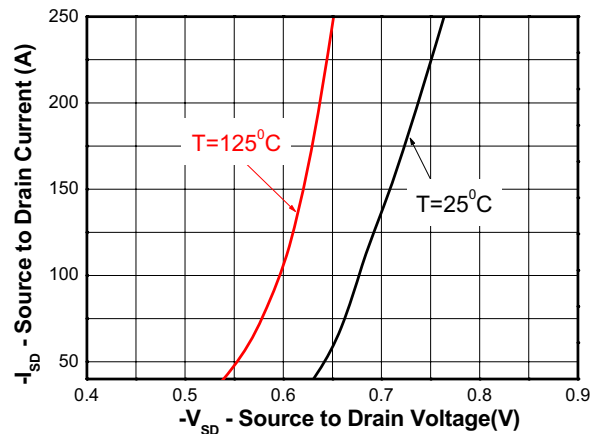
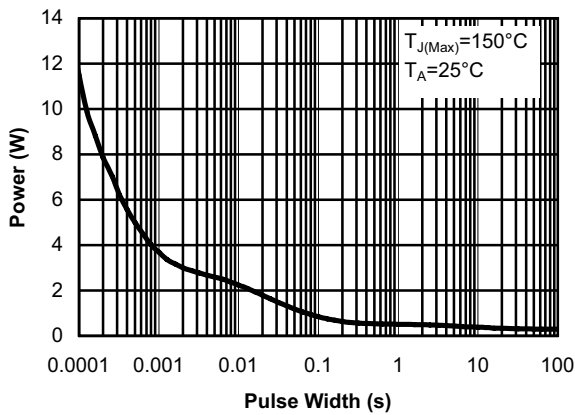
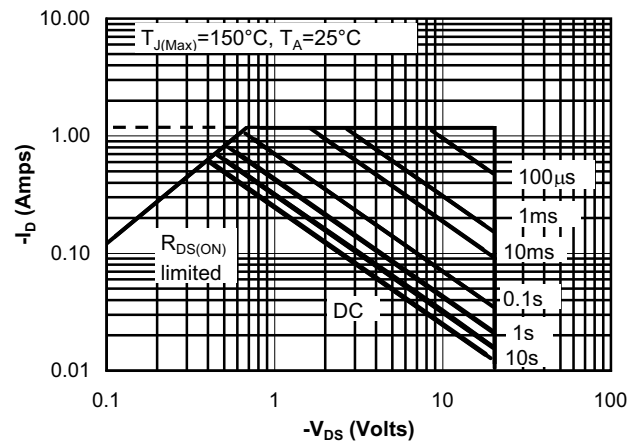
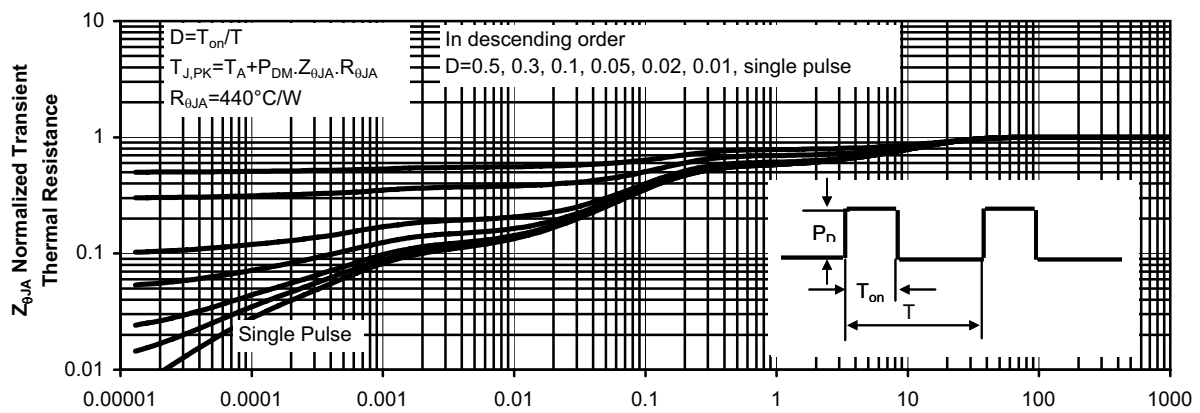
c Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu s$, Duty Cycle=1%

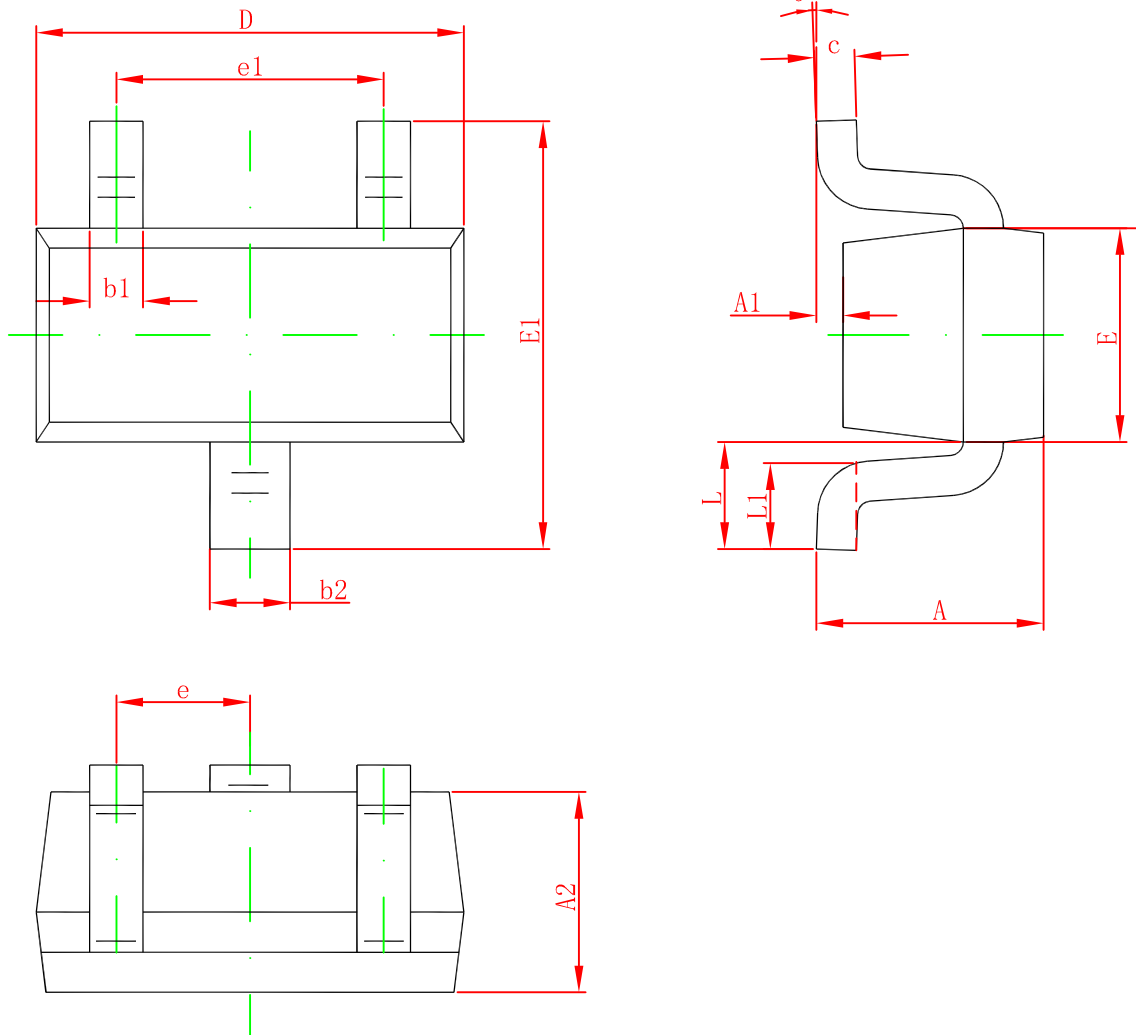
d Repetitive rating, pulse width limited by junction temperature $T_J=150^{\circ}C$.

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}	$V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			-5	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu\text{A}$	-0.40	-0.65	-0.90	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -0.45\text{ A}$		480	810	m Ω
		$V_{GS} = -2.5\text{ V}, I_D = -0.35\text{ A}$		620	1050	
		$V_{GS} = -1.8\text{ V}, I_D = -0.25\text{ A}$		780	1300	
Forward Transconductance	g_{FS}	$V_{DS} = -5\text{ V}, I_D = -0.45\text{ A}$		1.25		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 100\text{ KHz}, V_{DS} = -10\text{ V}$		74.5		pF
Output Capacitance	C_{OSS}			10.8		
Reverse Transfer Capacitance	C_{RSS}			10.2		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -0.45\text{ A}$		1.8		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.12		
Gate-to-Source Charge	Q_{GS}			0.18		
Gate-to-Drain Charge	Q_{GD}			0.74		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -0.45\text{ A}, R_G = 6\ \Omega$		45		ns
Rise Time	t_r			140		
Turn-Off Delay Time	$t_d(OFF)$			1500		
Fall Time	t_f			2100		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = -0.15\text{ A}$	-0.50	-0.65	-1.50	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

Transient thermal response (Junction-to-Ambient)

Package outline dimensions
SOT-523


Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.700	0.800	0.900
A1	0.000	0.050	0.100
A2	0.700	0.750	0.800
b1	0.150	0.200	0.250
b2	0.250	0.300	0.350
c	0.100	0.150	0.200
D	1.500	1.600	1.700
E	0.700	0.800	0.900
E1	1.450	1.600	1.750
e	0.500TYP		
e1	0.900	1.000	1.100
L	0.400REF		
L1	0.260		0.460
θ	0°		8°

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