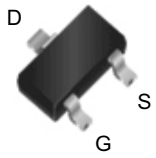
WPM2019

Single P-Channel, -20V, -0.73A, Power MOSFET

Http://www.sh-willsemi.com

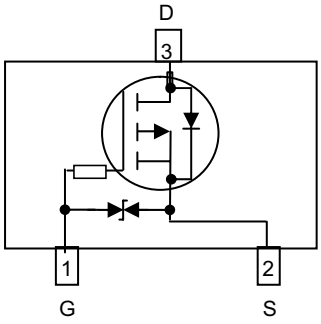
V_{DS} (V)	Rds(on) (Ω)
-20	0.480@ V_{GS}= – 4.5V
	0.620@ V_{GS}= – 2.5V
	0.780@ V_{GS}= – 1.8V



SOT-523

Descriptions

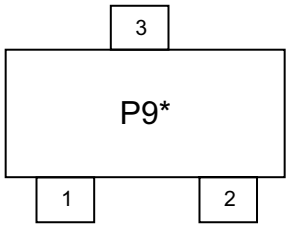
The WPM2019 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2019 is Pb-free and Halogen-free.



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-523



P9 =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
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°C	I_D	-0.73	-0.62	A
	T_A=70°C		-0.58	-0.50	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.38	0.28	W
	T_A=70°C		0.24	0.18	
Continuous Drain Current [b]	T_A=25°C	I_D	-0.61	-0.55	A
	T_A=70°C		-0.49	-0.44	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.27	0.22	W
	T_A=70°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 ≤ 10 s	$R_{\theta JA}$	285	325	°C/W
	Steady State		355	440	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	395	460	
	Steady State		465	560	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	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

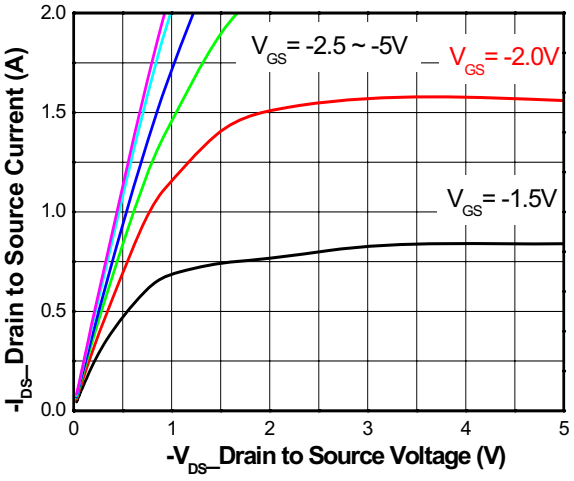
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

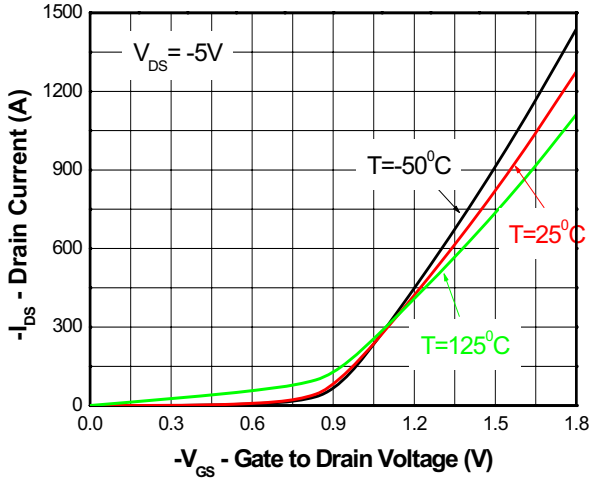
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = -250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =-16 V, V_{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±5V			-5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = -250uA	-0.40	-0.65	-0.90	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -0.45A		480	810	mΩ
		V_{GS} = -2.5V, I_D = -0.35A		620	1050	
		V_{GS} = -1.8V, I_D = -0.25A		780	1300	
Forward Transconductance	g_{FS}	V_{DS} = -5 V, I_D =-0.45A		1.25		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 100KHz, V_{DS} = -10 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 V, V_{DS} = -10 V, I_D = -0.45A		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	td(ON)	V_{GS} = -4.5 V, V_{DS} = -10 V, I_D=-0.45A, R_G=6 Ω		45		ns
Rise Time	tr			140		
Turn-Off Delay Time	td(OFF)			1500		
Fall Time	tf			2100		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -0.15A	-0.50	-0.65	-1.50	V

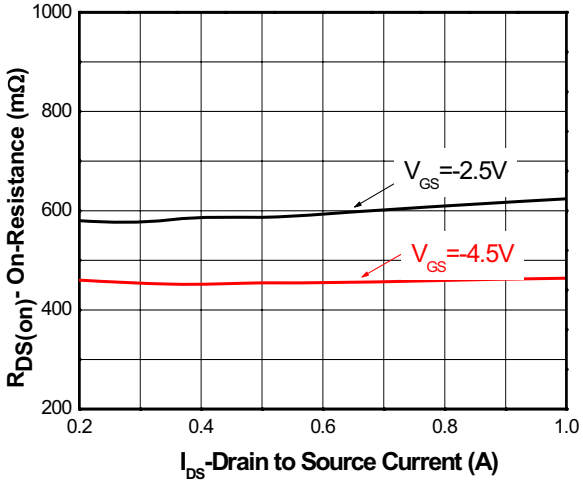
Typical Characteristics (Ta=25°C, unless otherwise noted)



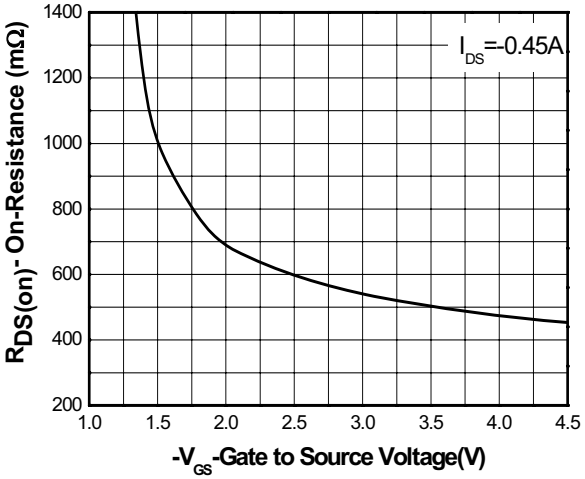
Output characteristics



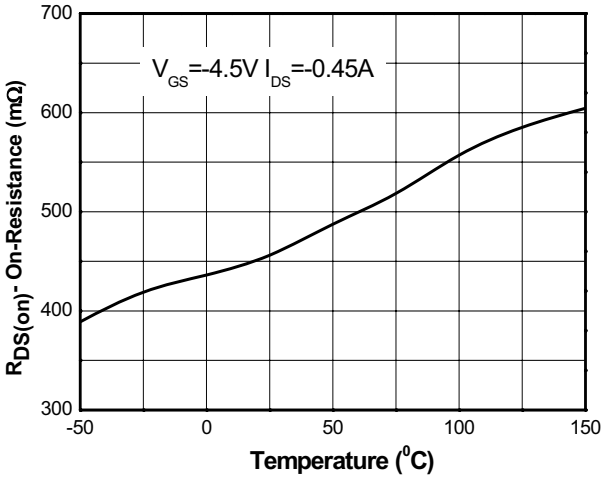
Transfer characteristics



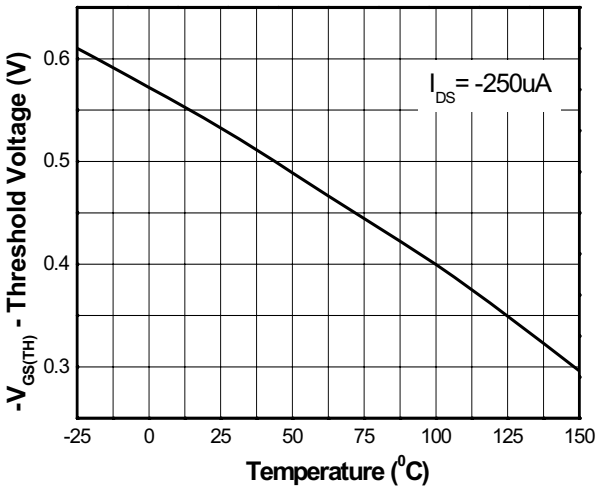
On-Resistance vs. Drain current



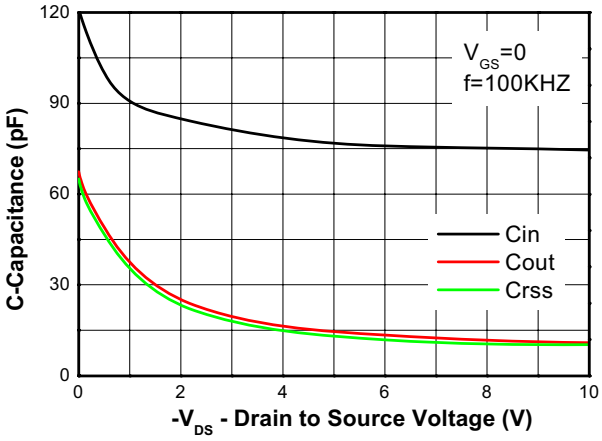
On-Resistance vs. Gate-to-Source voltage



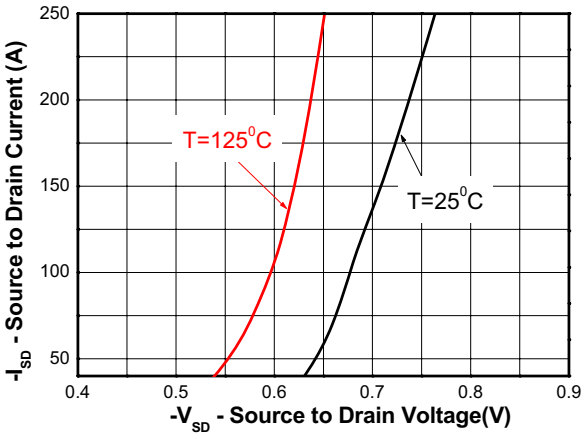
On-Resistance vs. Junction temperature



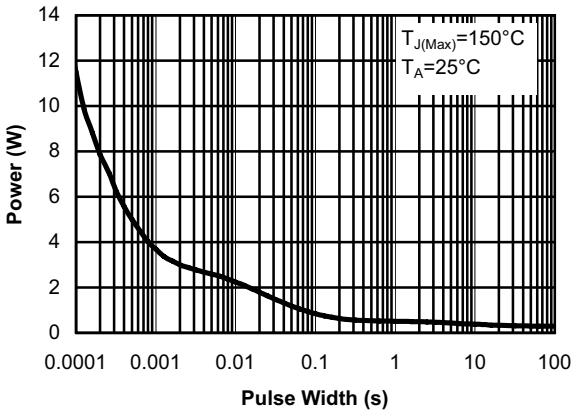
Threshold voltage vs. Temperature



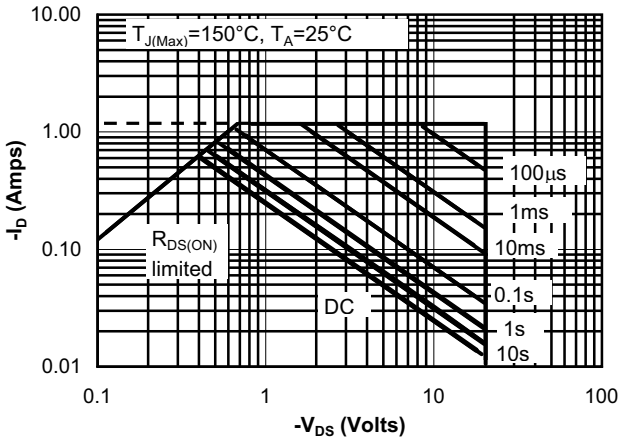
Capacitance



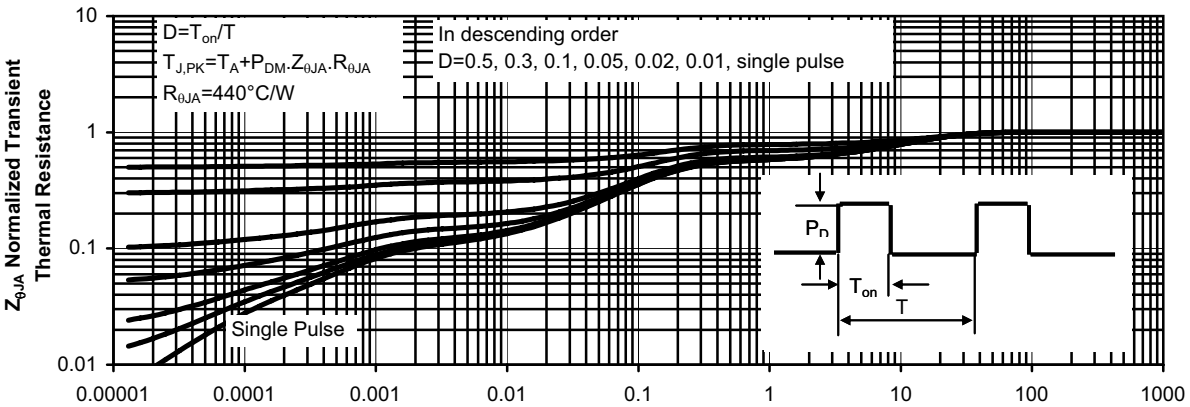
Body diode forward voltage



Single pulse power



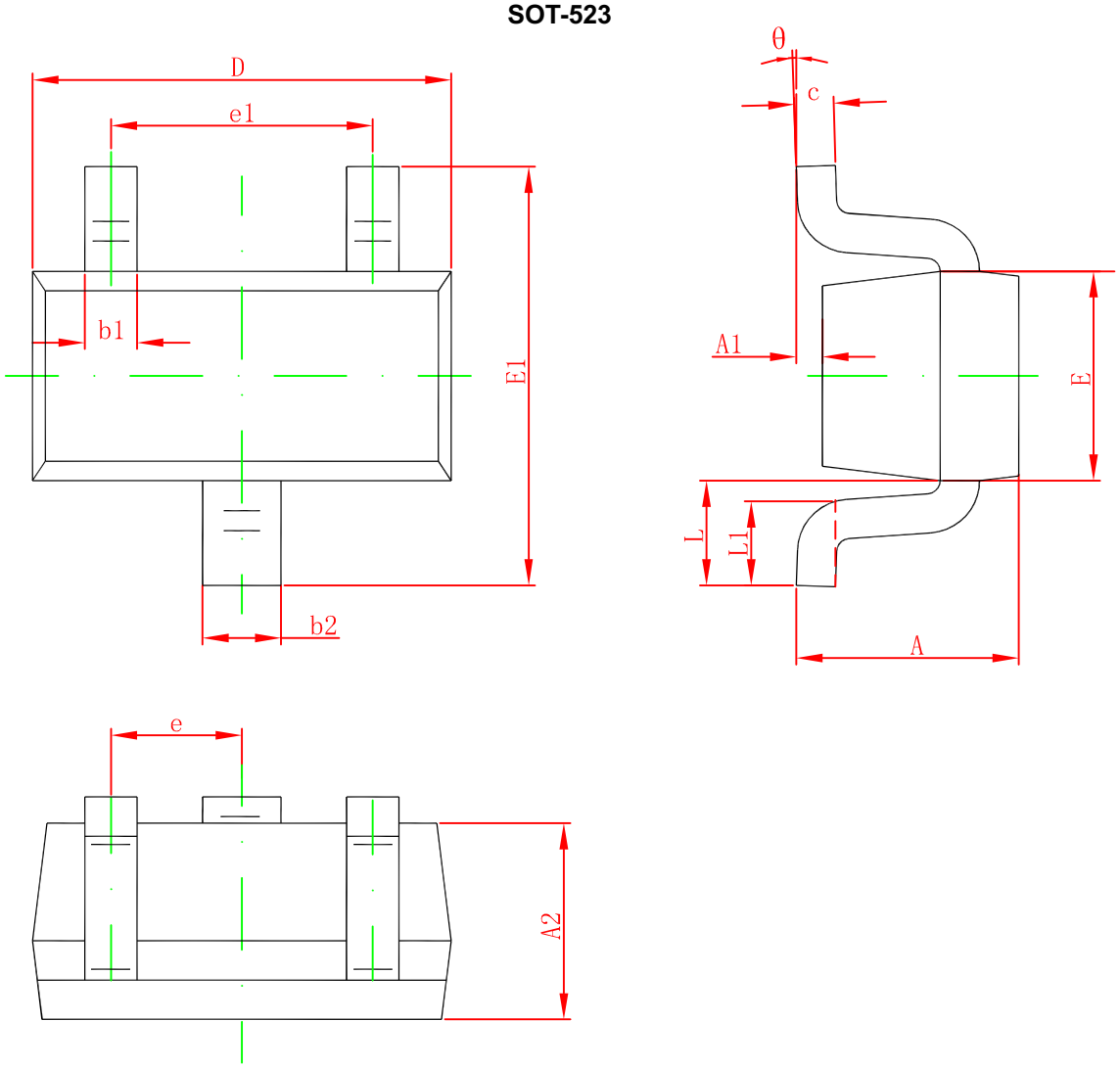
Safe operating power



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°