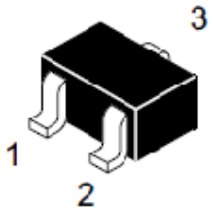
WPM1488

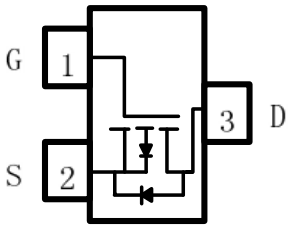
Single P-Channel, -12V, -1.4A, Power MOSFET

www.sh-willsemi.com

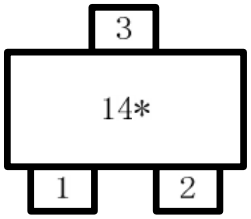
V_{DS} (V)	Typical Rds(on) (Ω)	I_D (A)
-12	0.080@ V_{GS}= – 4.5V	-1.2
	0.086@ V_{GS}= – 3.6V	-1.0
	0.105@ V_{GS}= – 2.5V	-1.0



SOT-323



Pin configuration (Top view)



14 = Specific Device Code
* = Date Code

Marking

Descriptions

The WPM1488 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 WPM1488 is Pb-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-323

Applications

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

Order information

Device	Package	Shipping
WPM1488-3/TR	SOT-323	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	-12		V
Gate-Source Voltage		V_{GS}	±8		
Continuous Drain Current [a d]	T_A=25°C	I_D	-1.5	-1.4	A
	T_A=70°C		-1.2	-1.1	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	0.44	0.38	W
	T_A=70°C		0.28	0.25	
Continuous Drain Current [b d]	T_A=25°C	I_D	-1.4	-1.3	A
	T_A=70°C		-1.1	-1.1	
Maximum Power Dissipation [b d]	T_A=25°C	P_D	0.39	0.34	W
	T_A=70°C		0.25	0.22	
Pulsed Drain Current [c]		I_{DM}	-10		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	$R_{\theta JA}$	284	335	°C/W
	Steady State		321	385	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	315	338	
	Steady State		358	415	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	110	165	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR-4 board using minimum pad size, 1oz copper

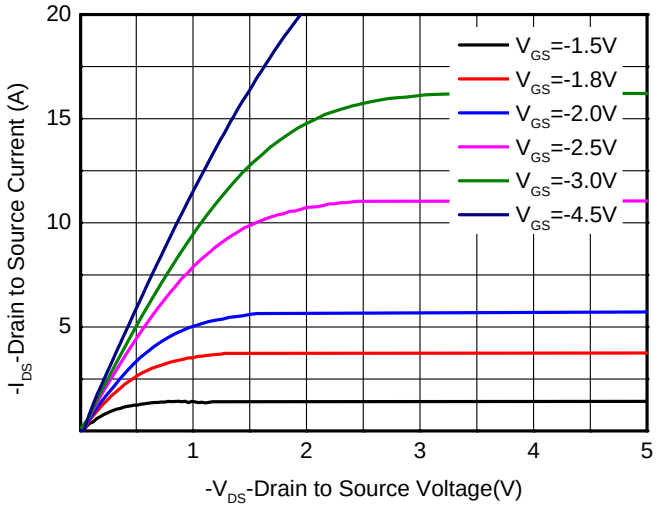
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

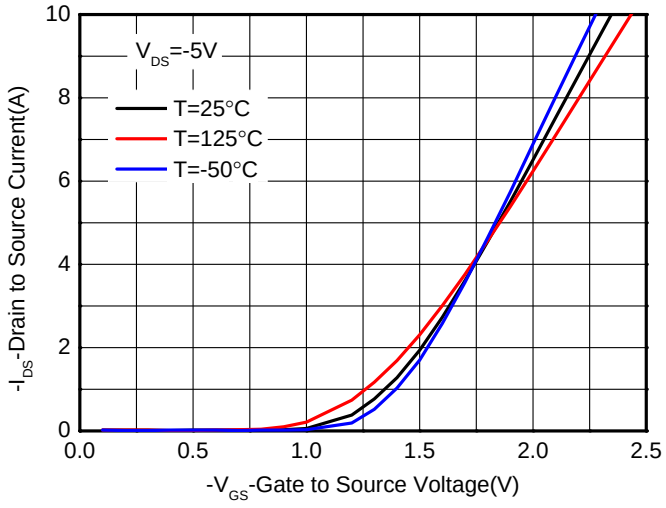
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = -250uA	-12			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -10V, V_{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8V			±1	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = -250uA	-0.45	-0.65	-0.85	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -1.2A		80	120	mΩ
		V_{GS} = -3.6V, I_D = -1.0A		86	140	
		V_{GS} = -2.5V, I_D = -1.0A		105	160	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-1.2A		9		S
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DD} = -10 V		607		pF
Output Capacitance	C_{OSS}			130		
Reverse Transfer Capacitance	C_{RSS}			120		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = -4.5 V, V_{DD} = -10 V, I_D = -1.2A		7.85		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.85		
Gate-to-Source Charge	Q_{GS}			1.9		
Gate-to-Drain Charge	Q_{GD}			2.1		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(on)	V_{GS} = -4.5 V, V_{DD} = -10V, I_D=-1.2A, R_G=6 Ω		30		ns
Rise Time	tr			32		
Turn-Off Delay Time	td(off)			62		
Fall Time	tf			18		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = −1.0A		-0.8	-1.5	V

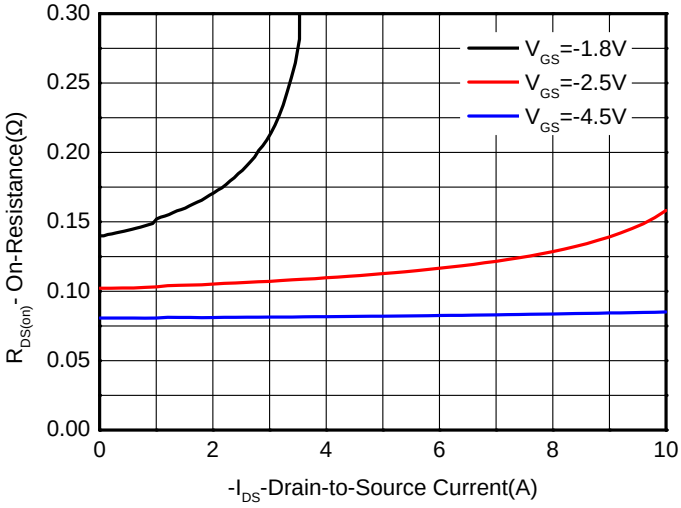
Typical Characteristics (Ta=25°C, unless otherwise noted)



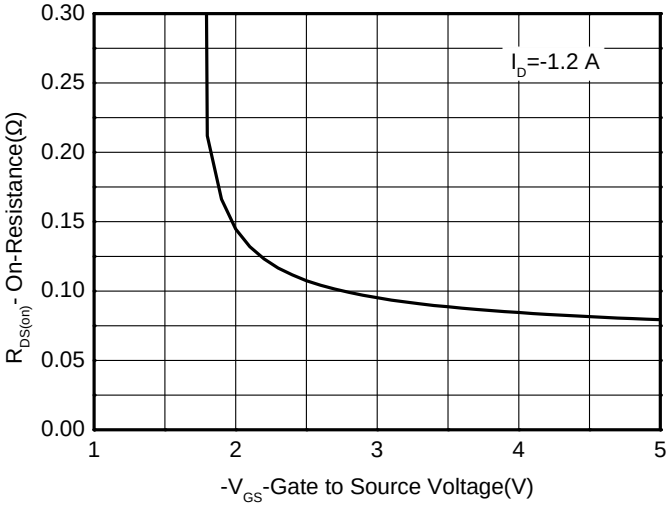
Output characteristics



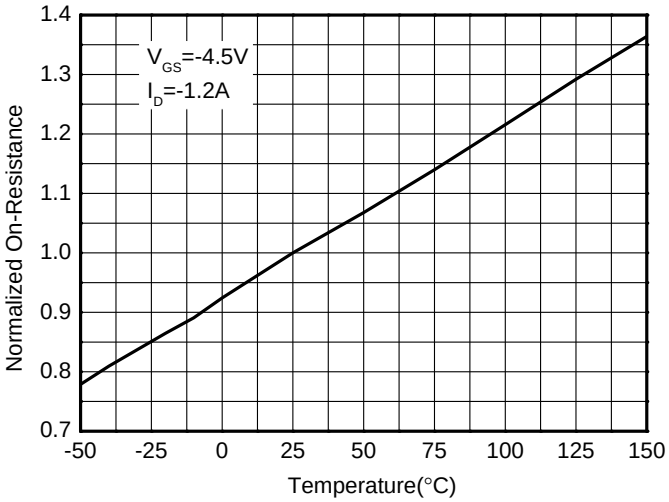
Transfer characteristics



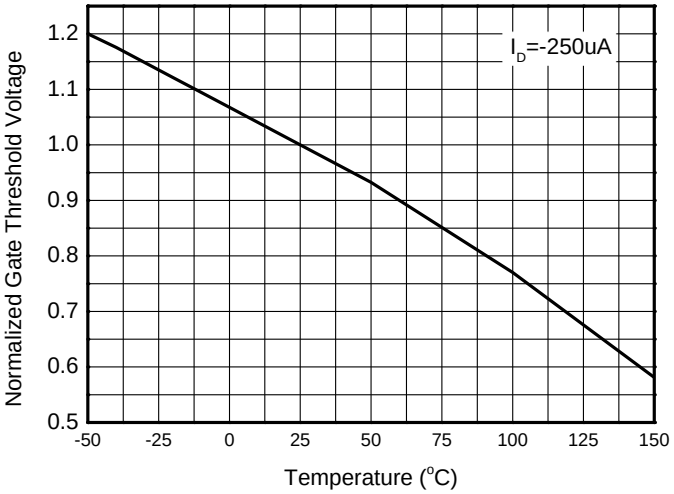
On-Resistance vs. Drain current



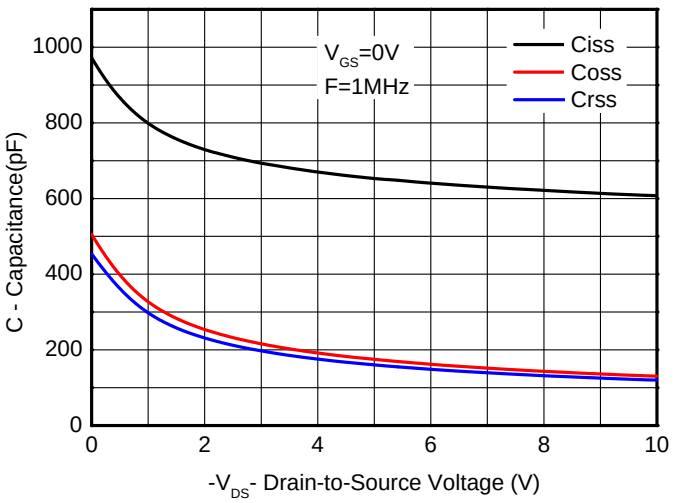
On-Resistance vs. Gate-to-Source voltage



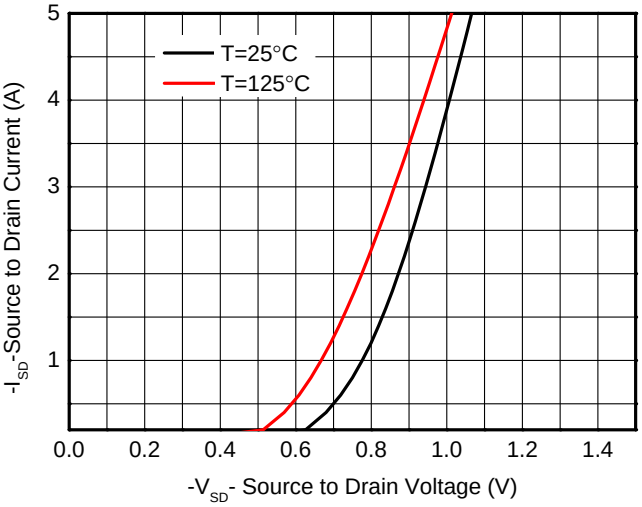
On-Resistance vs. Junction temperature



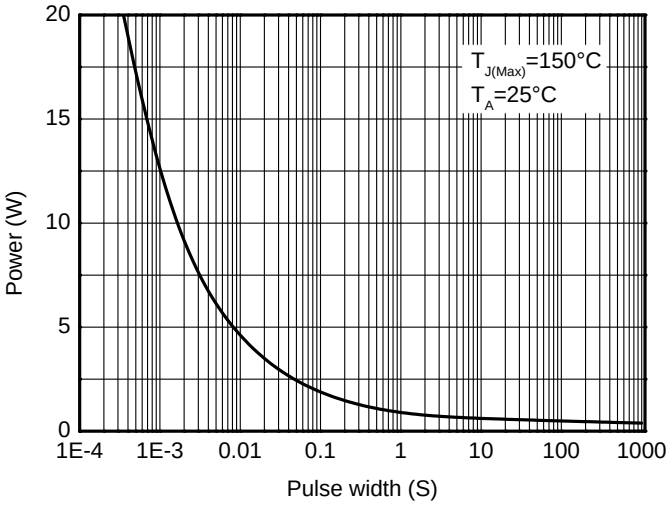
Threshold voltage vs. Temperature



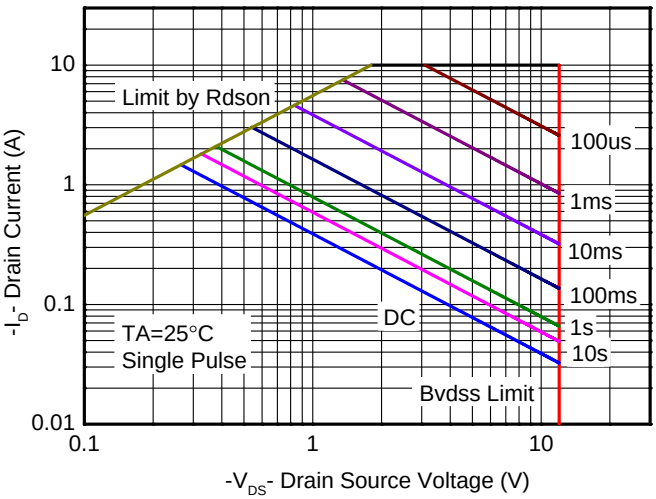
Capacitance



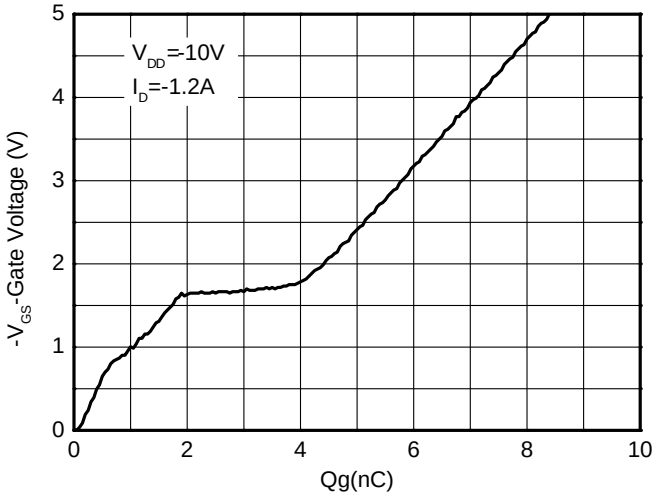
Body diode forward voltage



Single pulse power

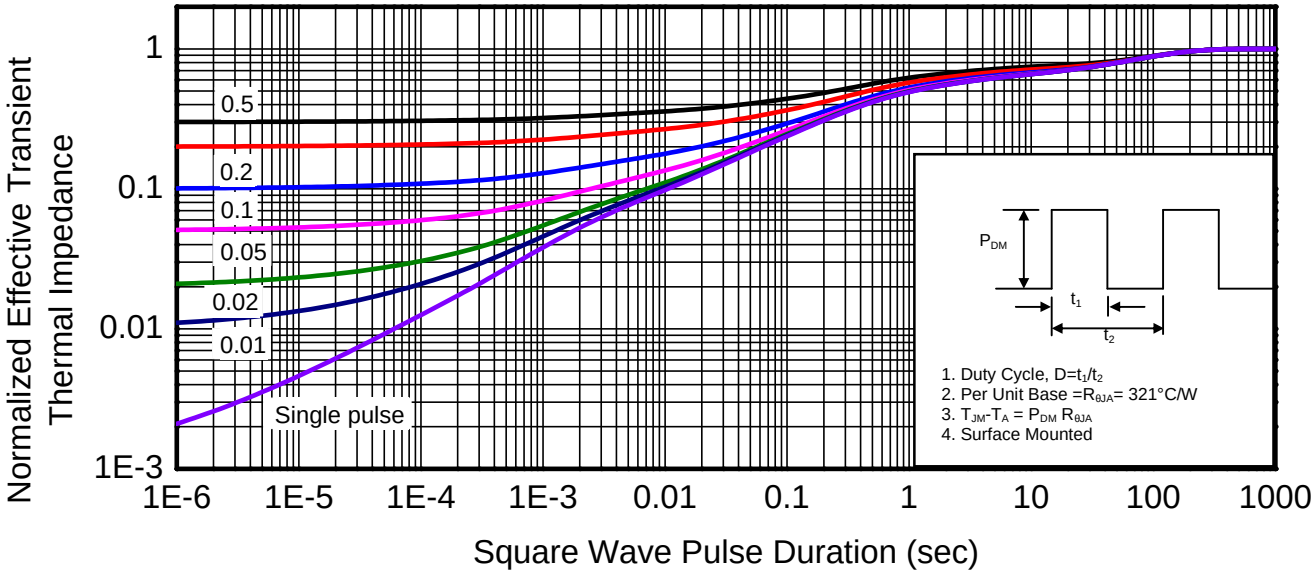


Safe operating power



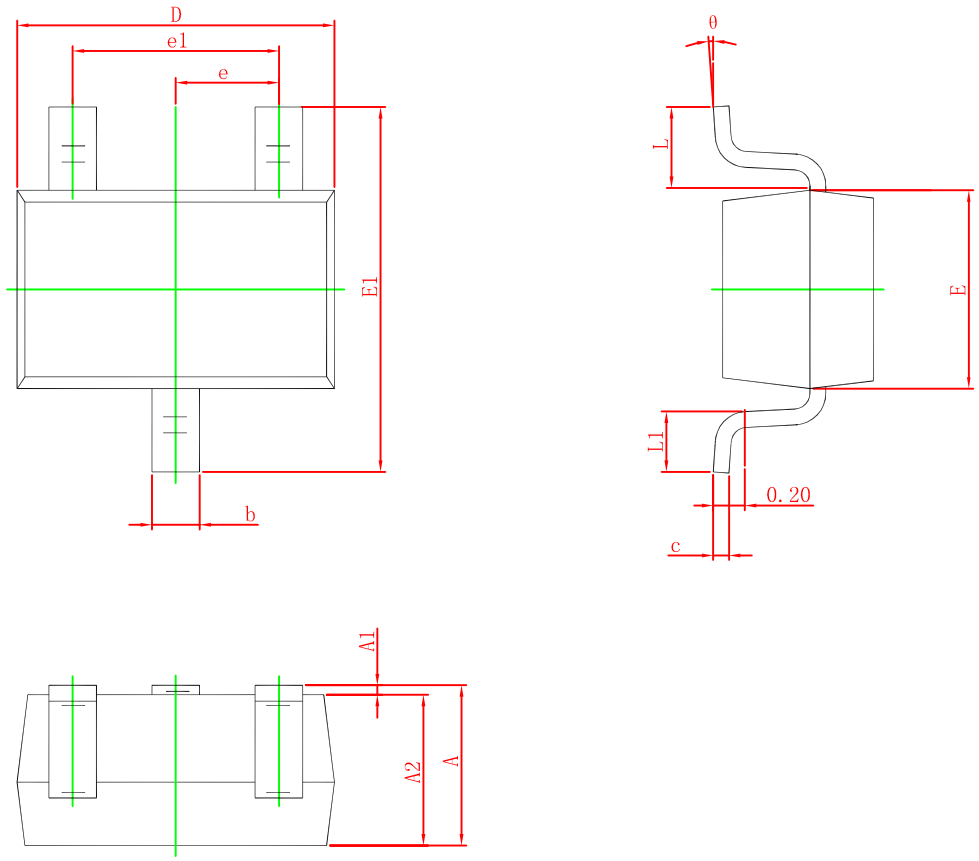
Gate charge Characteristics

Transient thermal response (Junction-to-Ambient)



Package outline dimensions

SOT-323



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.525 REF.		0.021 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°