WPM2048

Single P-Channel, -20V, -2.2A, Power MOSFET

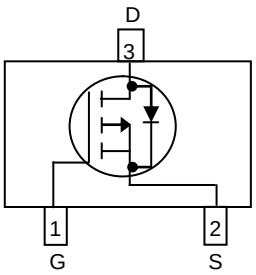
www.sh-willsemi.com

V_{DS} (V)	Rds(on) (mΩ)
-20	96@ V_{GS}=−4.5V
	135@ V_{GS}=−2.5V

SOT-23

Descriptions

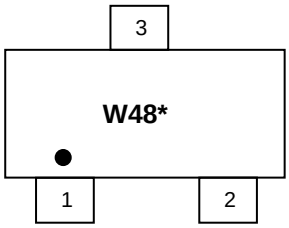
The WPM2048 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2048 is Pb-free and Halogen-free.



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-23



W48= 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
WPM2048-3/TR	SOT-23	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}	±12		
Continuous Drain Current [a]	T_A=25°C	I_D	-2.4	-2.2	A
	T_A=70°C		-1.9	-1.8	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.8	0.7	W
	T_A=70°C		0.5	0.4	
Continuous Drain Current [b]	T_A=25°C	I_D	-2.2	-2.0	A
	T_A=70°C		-1.7	-1.6	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.7	0.6	W
	T_A=70°C		0.4	0.3	
Pulsed Drain Current [c]		I_{DM}	-8		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	$R_{\theta JA}$	120	145	°C/W
	Steady State		132	170	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	145	174	
	Steady State		158	202	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	60	75	

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

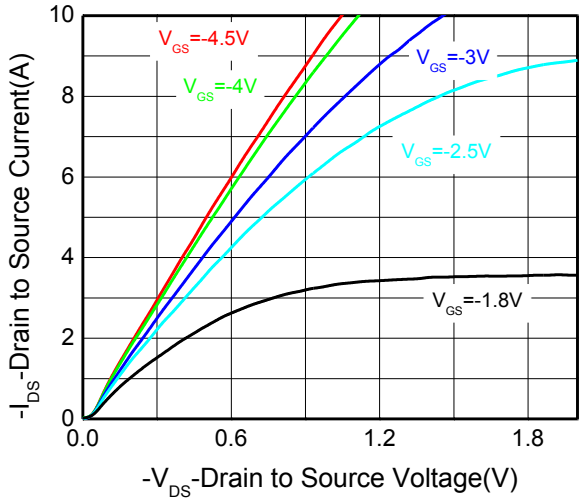
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

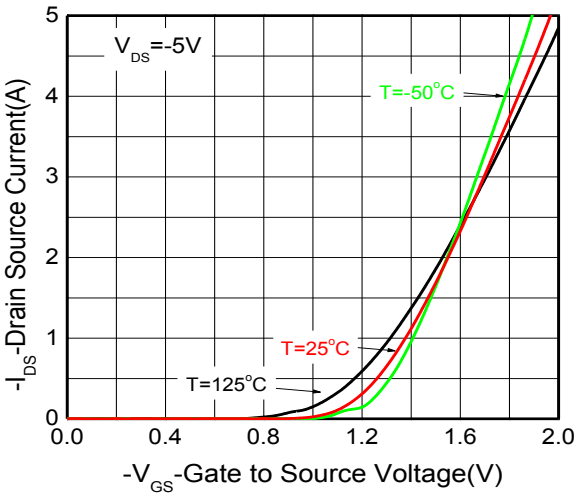
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = -250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -16V, V_{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = -250uA	-0.40	-0.77	-1	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -2.7A		96	135	mΩ
		V_{GS} = -2.5V, I_D = -2.2A		135	182	
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -1.0A		-0.79	-1.5	V
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V,		331		pF
Output Capacitance	C_{OSS}	f = 1.0 MHz,		56.6		
Reverse Transfer Capacitance	C_{RSS}	V_{DS} = -10V		48.4		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -2.7A		5.59		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.66		
Gate-to-Source Charge	Q_{GS}			1.31		
Gate-to-Drain Charge	Q_{GD}			1.35		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = -4.5 V, V_{DS} = -10 V, I_D=-1.2A, R_G=6Ω		19		ns
Rise Time	tr			14.4		
Turn-Off Delay Time	td(OFF)			48		
Fall Time	tf			13		

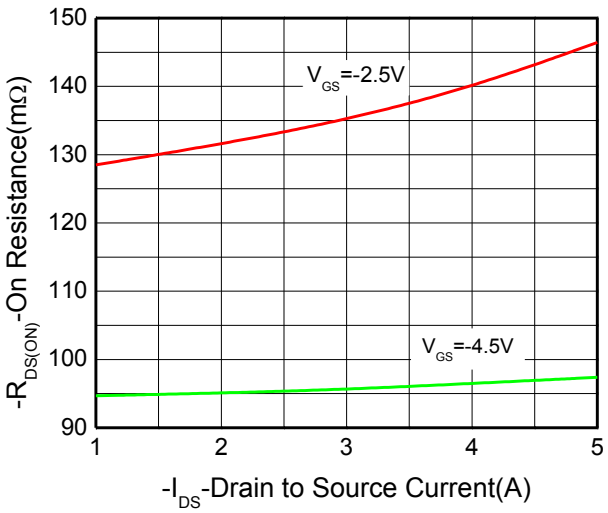
Typical Characteristics (Ta=25°C, unless otherwise noted)



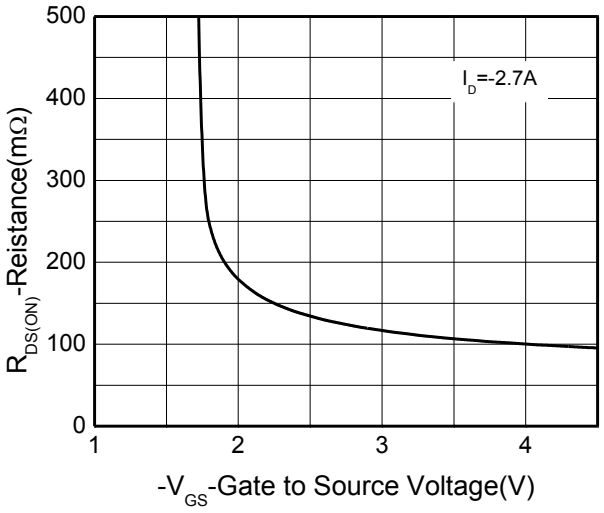
Output characteristics



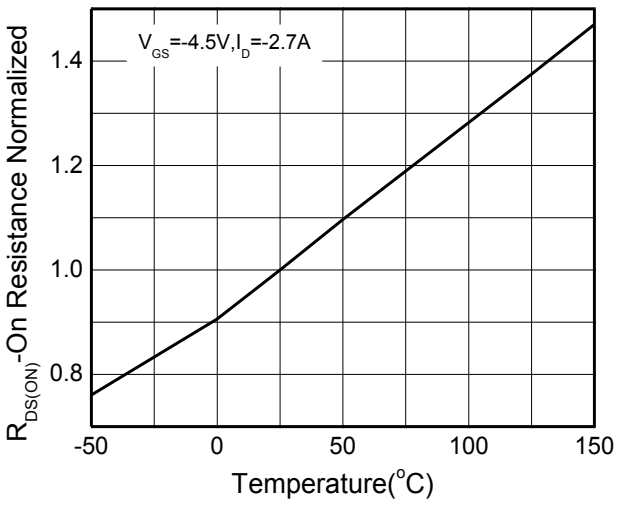
Transfer characteristics



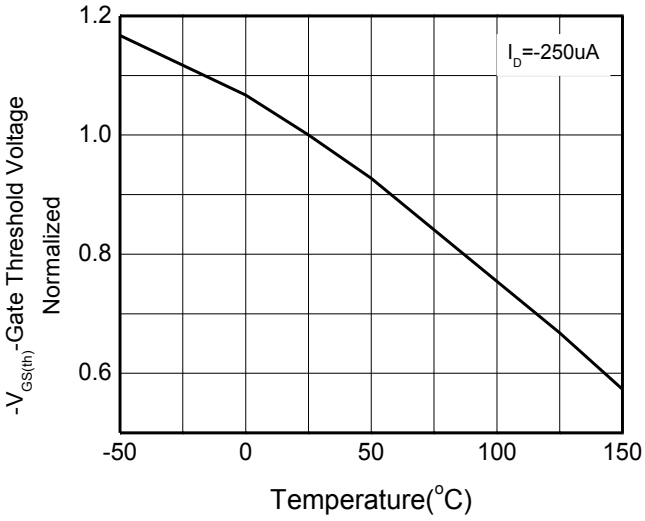
On-Resistance vs. Drain current



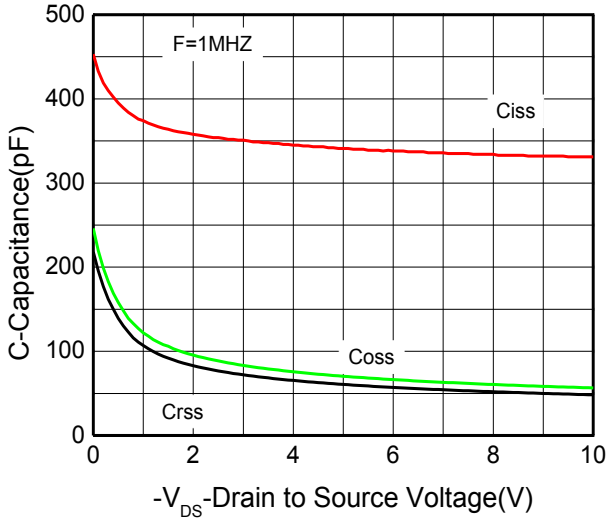
On-Resistance vs. Gate-to-Source voltage

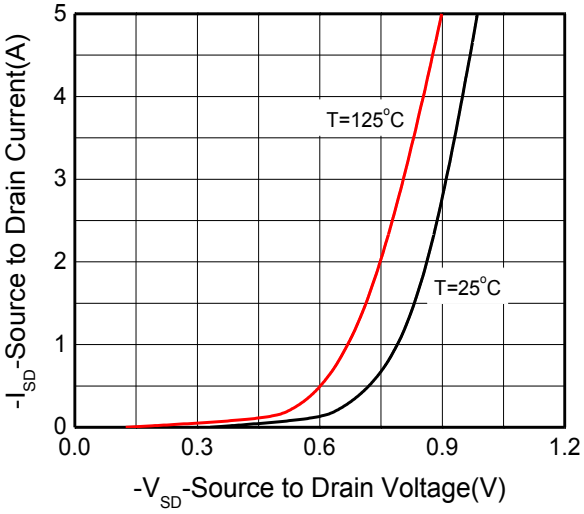


On-Resistance vs. Junction temperature



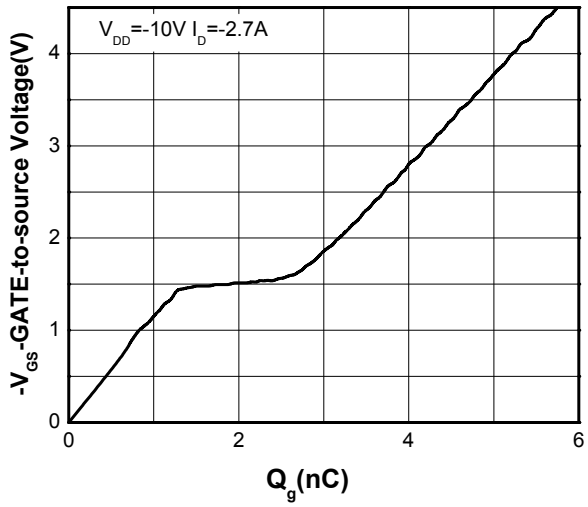
Threshold voltage vs. Temperature

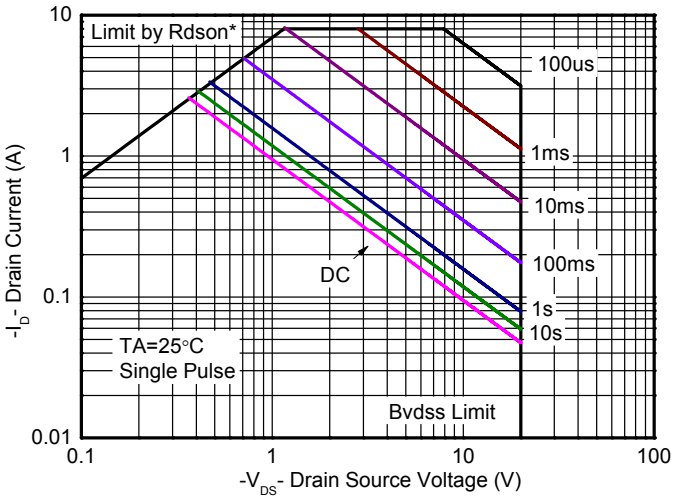




Capacitance

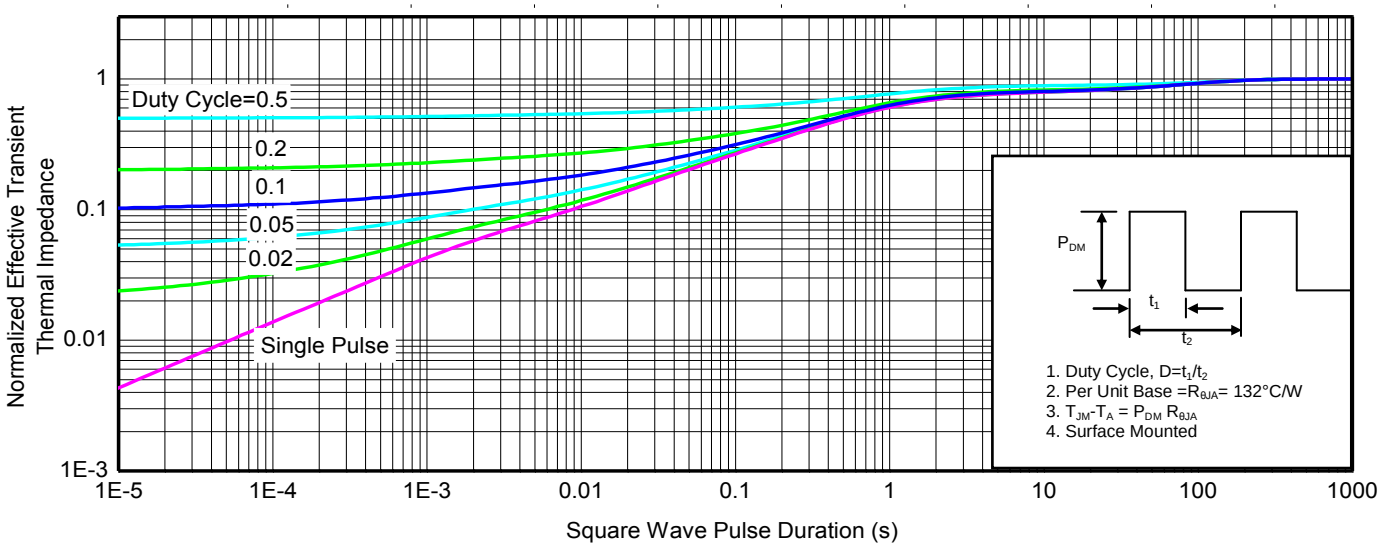
Body diode forward voltage





Gate Charge Characteristics

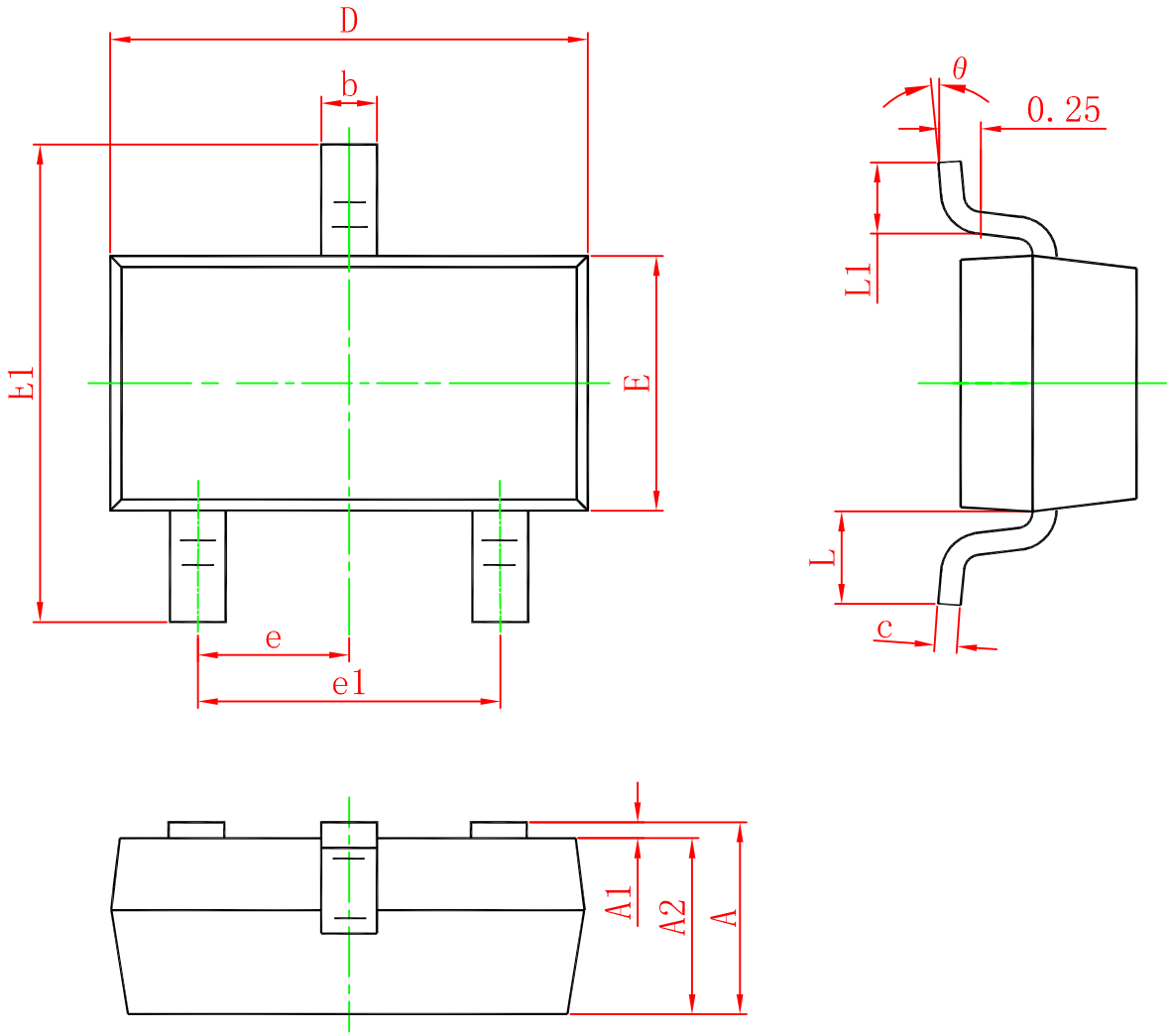
Safe operating power



Transient thermal response (Junction-to-Ambient)

Package outline dimensions

SOT-23



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.900	1.025	1.150
A1	0.000	0.050	0.100
A2	0.900	0.975	1.050
b	0.300	0.400	0.500
c	0.080	0.115	0.150
D	2.800	2.900	3.000
E	1.200	1.300	1.400
E1	2.250	2.400	2.550
e		0.950TYP	
e1	1.800	1.900	2.000
L		0.550REF	
L1	0.300		0.500
θ	0°		8°