

WPM2083
Single P-Channel, -20V, -2.4A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

V_{DS} (V)	Typical $R_{DS(on)}$ (m Ω)
-20	81 @ $V_{GS}=-4.5V$
	110 @ $V_{GS}=-2.5V$

Descriptions

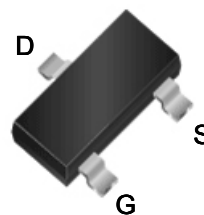
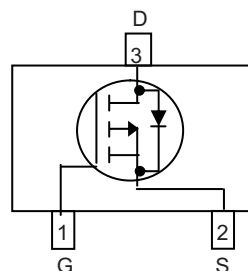
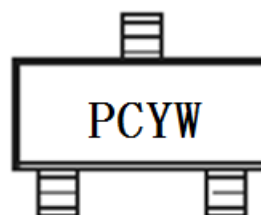
The WPM2083 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2083 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-23

Applications

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


SOT-23

Pin configuration (Top view)


PC = Device Code
Y = Year
W = Week(A~z)

Marking
Order information

Device	Package	Shipping
WPM2083-3/TR	SOT-23	3000/Tape&Reel

Absolute Maximum ratings

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	-20		V
Gate-Source Voltage		V _{GS}	±8		
Continuous Drain Current ^{a d}	T _A =25°C	I _D	-2.4	-2.2	A
	T _A =70°C		-1.9	-1.8	
Maximum Power Dissipation ^{a d}	T _A =25°C	P _D	0.9	0.8	W
	T _A =70°C		0.6	0.5	
Continuous Drain Current ^{b d}	T _A =25°C	I _D	-2.2	-2.0	A
	T _A =70°C		-1.7	-1.6	
Maximum Power Dissipation ^{b d}	T _A =25°C	P _D	0.8	0.6	W
	T _A =70°C		0.5	0.4	
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

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	105	135	$^{\circ}\text{C/W}$
	Steady State		120	155	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10 \text{ s}$	$R_{\theta JA}$	130	160	
	Steady State		145	190	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	60	75	

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

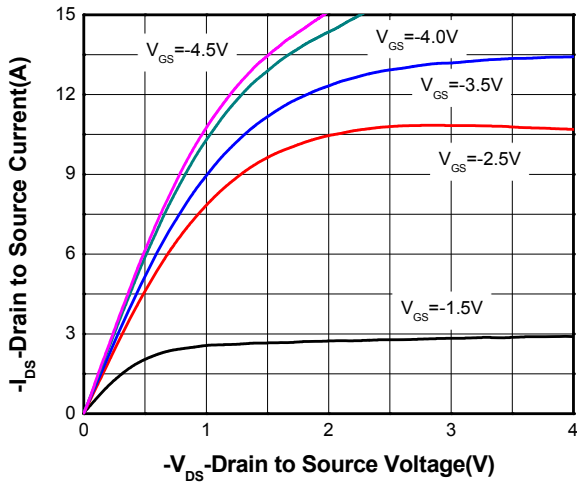
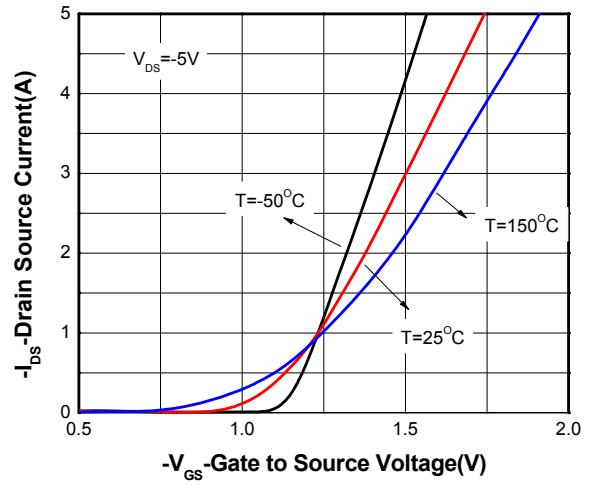
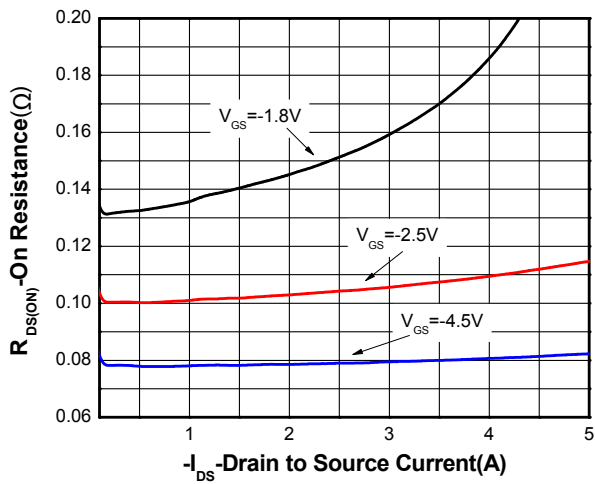
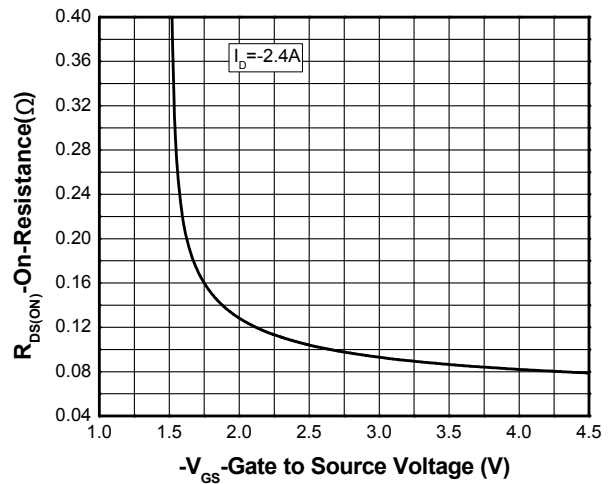
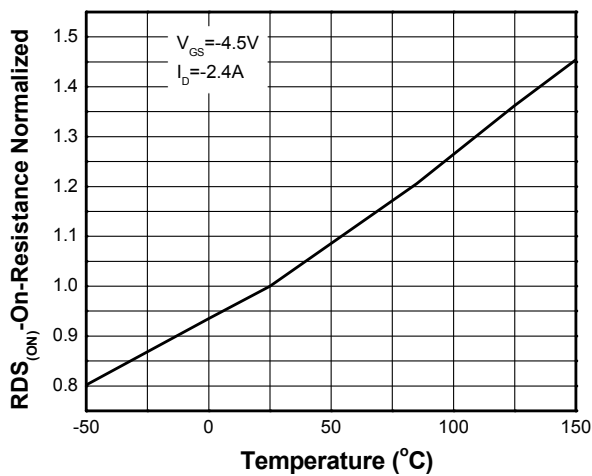
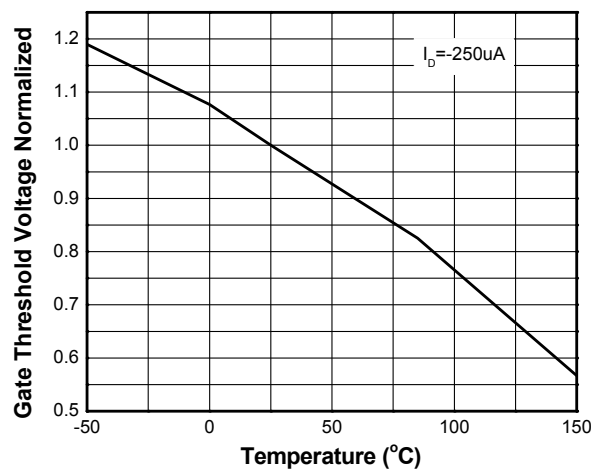
b Surface mounted on FR4 board using minimum pad size, 1oz copper

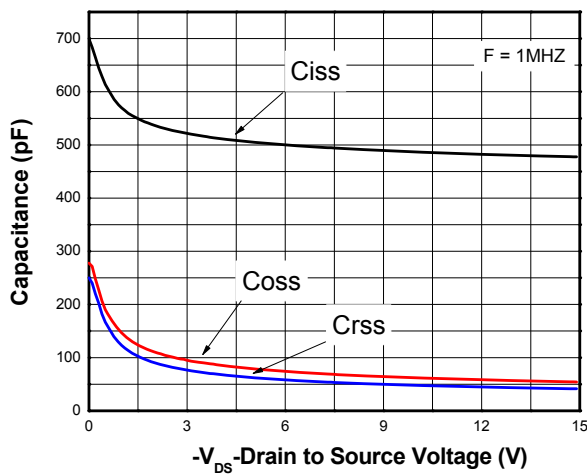
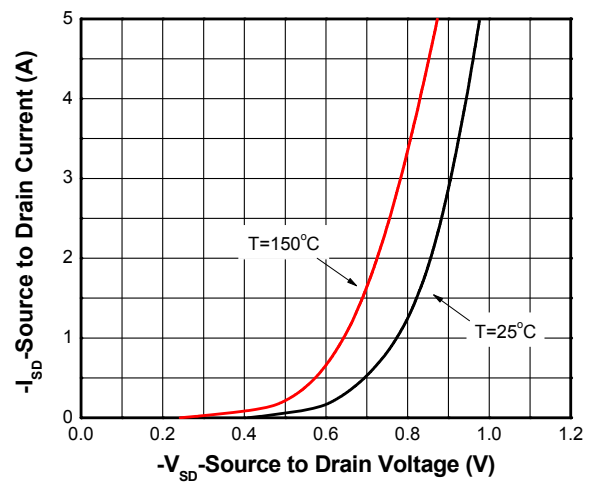
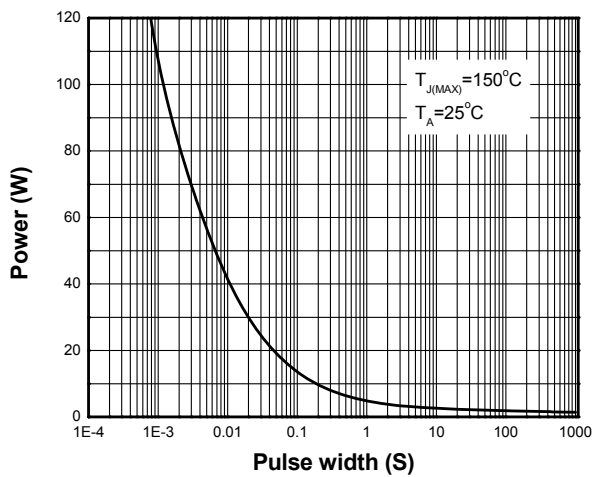
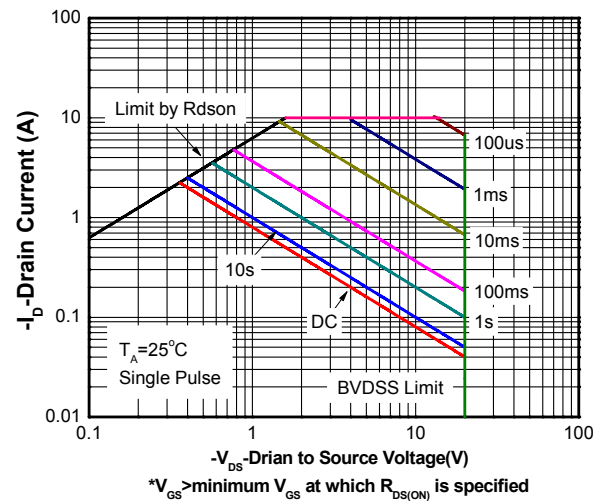
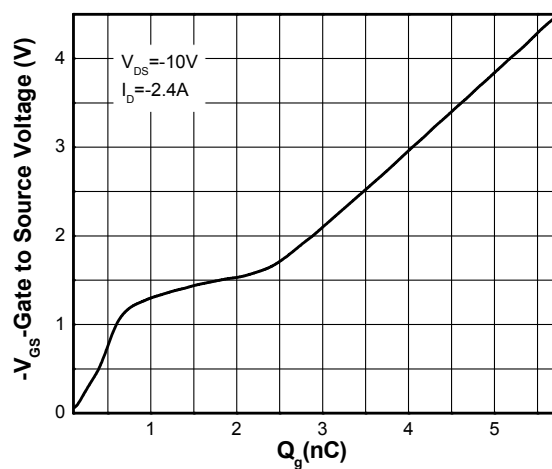
c Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%

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

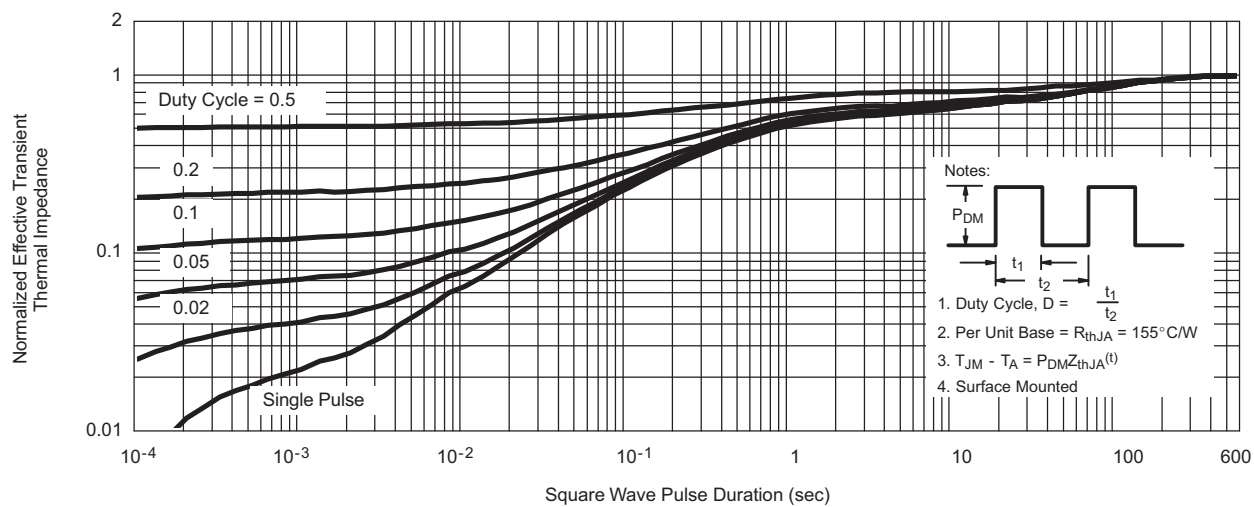
Electronics Characteristics (Ta=25°C, unless otherwise noted)

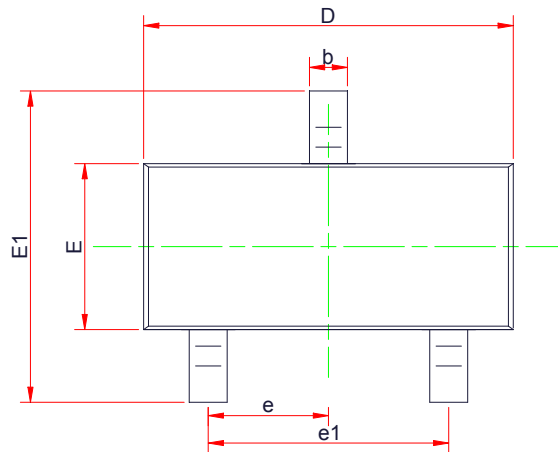
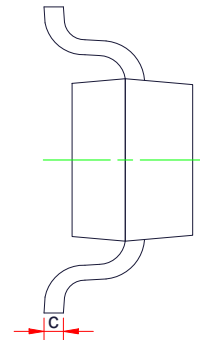
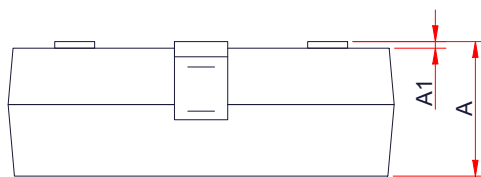
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = -250uA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-16V, V _{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250uA	-0.4	-0.65	-1	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =-4.5V, I _D = -2.4A		81	110	mΩ
		V _{GS} =-2.5V, I _D = -2.0A		103	150	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0MHz, V _{DS} = -10 V		486		pF
Output Capacitance	C _{OSS}			62		
Reverse Transfer Capacitance	C _{RSS}			48		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V, V _{DS} = -10 V, I _D =-2.4 A		5.8		nC
Threshold Gate Charge	Q _{G(TH)}			0.5		
Gate-to-Source Charge	Q _{GS}			0.7		
Gate-to-Drain Charge	Q _{GD}			1.6		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V _{GS} = -4.5 V, V _{DS} =-6 V, I _D =-1A, R _G =6Ω		9.8		ns
Rise Time	tr			4.4		
Turn-Off Delay Time	td(OFF)			35		
Fall Time	tf			7.4		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = -2.4A		-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

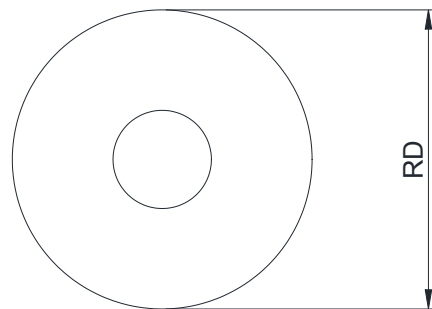
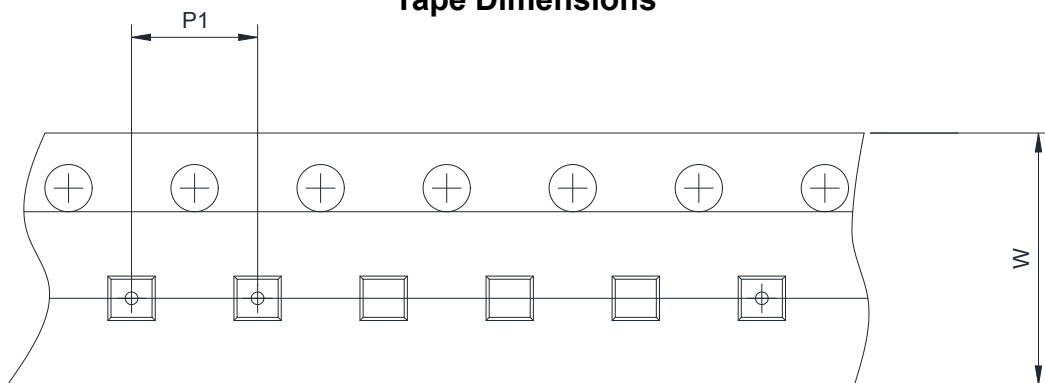
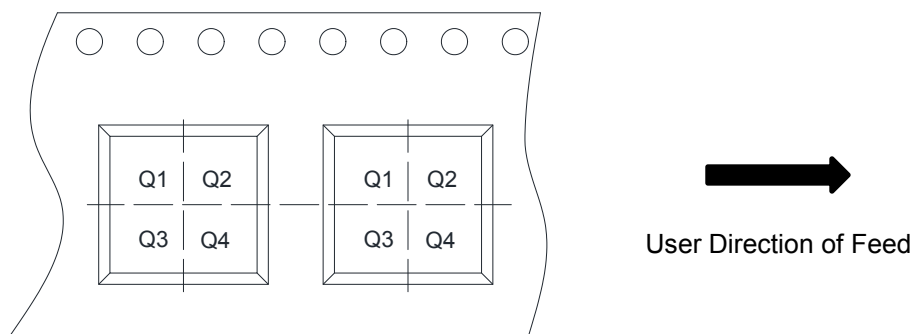

Capacitance

Body diode forward voltage

Single pulse power

Safe operating power

Gate Charge Characteristics

Transient thermal response (Junction-to-Ambient)



Package outline dimensions
SOT-23

TOP VIEW

SIDE VIEW

SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.89	1.10	1.30
A1	0.00	-	0.10
b	0.30	0.43	0.55
c	0.05	-	0.20
D	2.70	2.90	3.10
E	1.15	1.33	1.50
E1	2.10	2.40	2.70
e	0.95 Typ.		
e1	1.70	1.90	2.10

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape


RD	Reel Dimension	☒ 7inch	☐ 13inch
W	Overall width of the carrier tape	☒ 8mm	☐ 12mm ☐ 16mm
P1	Pitch between successive cavity centers	☐ 2mm	☒ 4mm ☐ 8mm
Pin1	Pin1 Quadrant	☐ Q1	☐ Q2 ☒ Q3 ☐ Q4