WPM2083

Single P-Channel, -20V, -2.4A, Power MOSFET

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

SOT-23

Pin configuration (Top view)
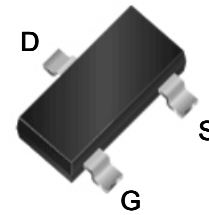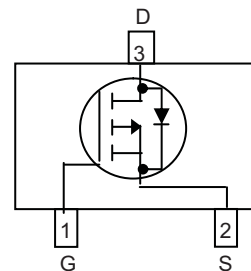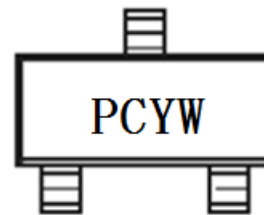
Descriptions

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

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

Marking

Order information

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

Applications

- DC/DC converters

- Power supply converters circuit

- Load/Power Switching for portable device

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 ≤ 10 s	$R_{\theta JA}$	105	135	°C/W
	Steady State		120	155	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	130	160	
	Steady State		145	190	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	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=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}	$V_{DS} = -16V$, $V_{GS} = 0V$			-1	uA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm8V$			±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, $I_D = -1A$, $R_G = 6\Omega$		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)
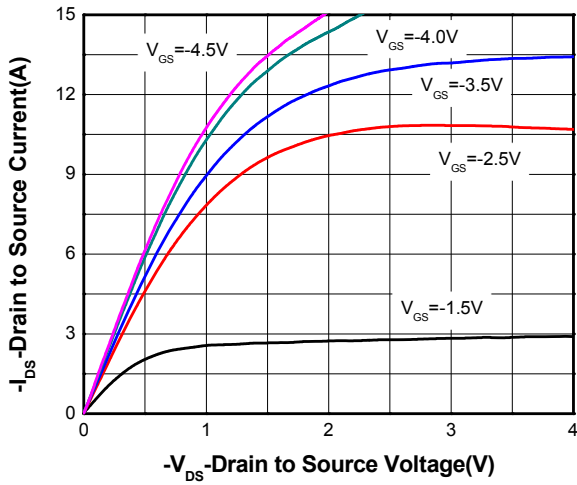
Output characteristics
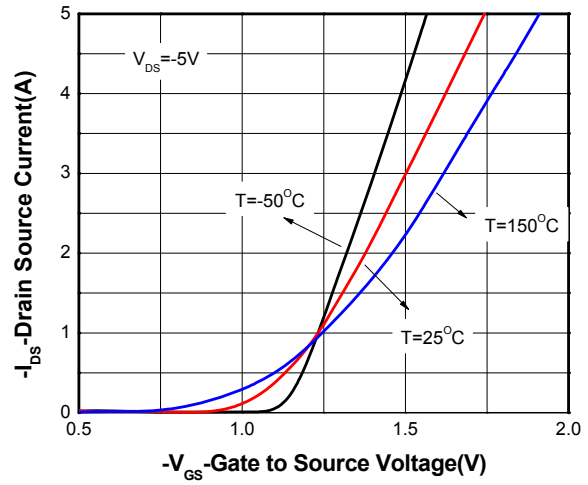
Transfer characteristics
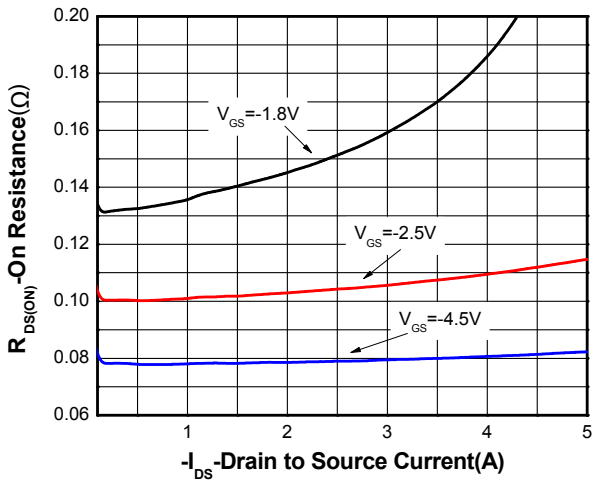
On-Resistance vs. Drain current
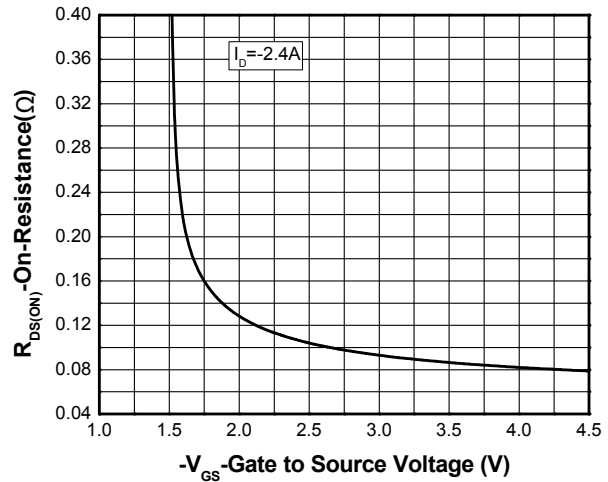
On-Resistance vs. Gate-to-source voltage
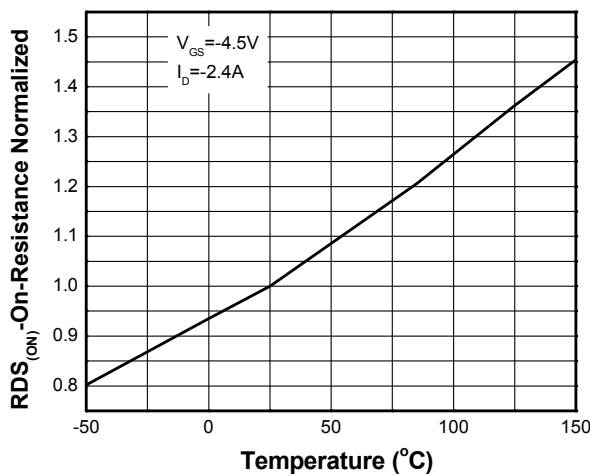
On-Resistance vs. Junction temperature
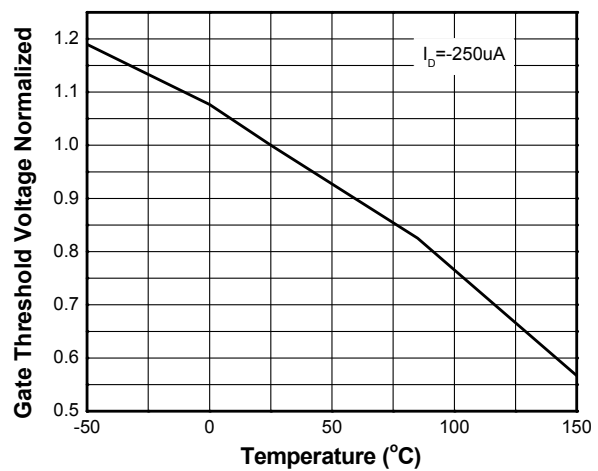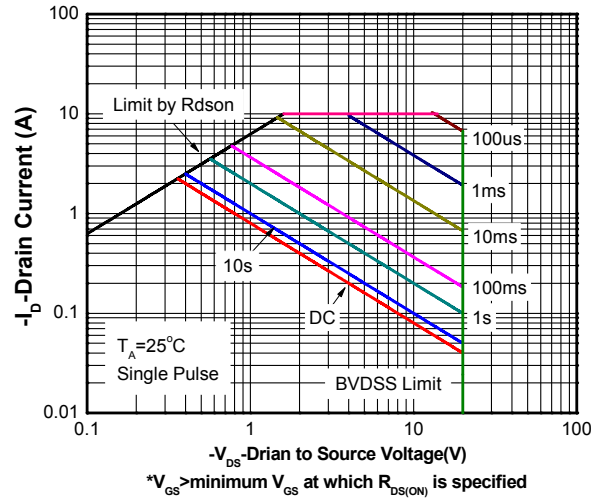

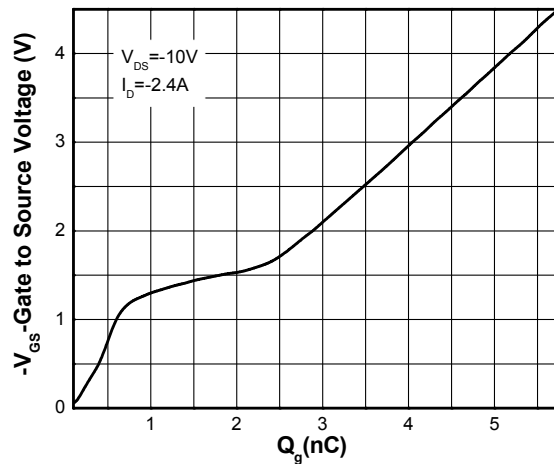**Threshold voltage vs. Temperature**
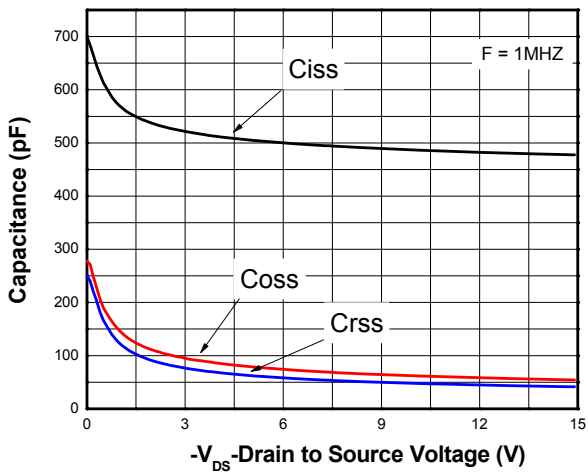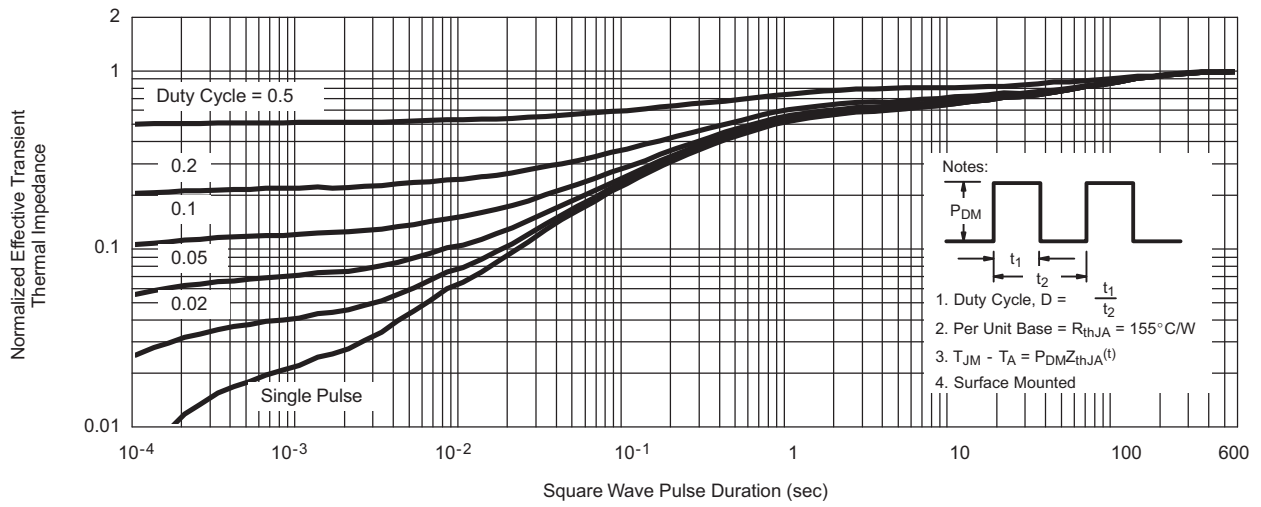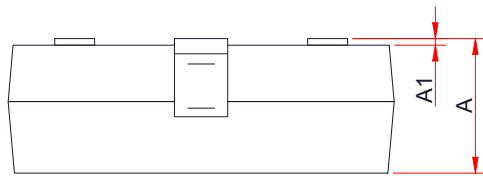
Capacitance
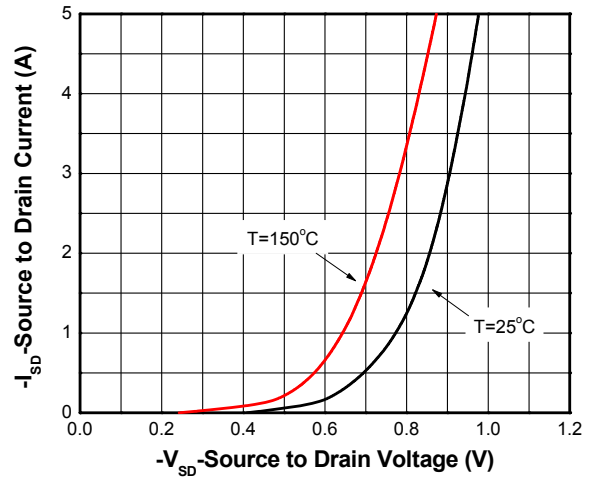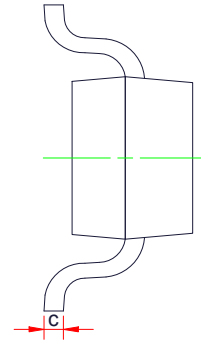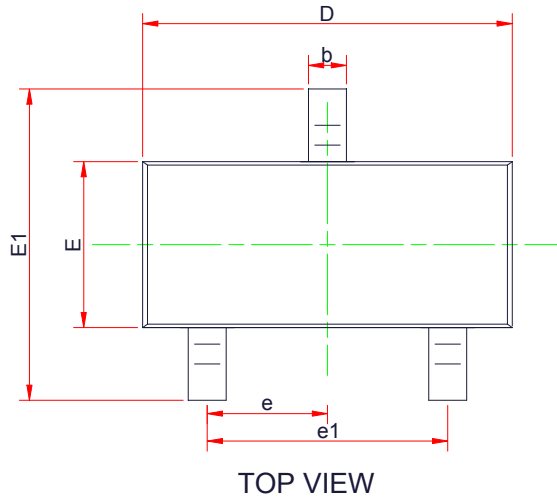

Body diode forward voltage
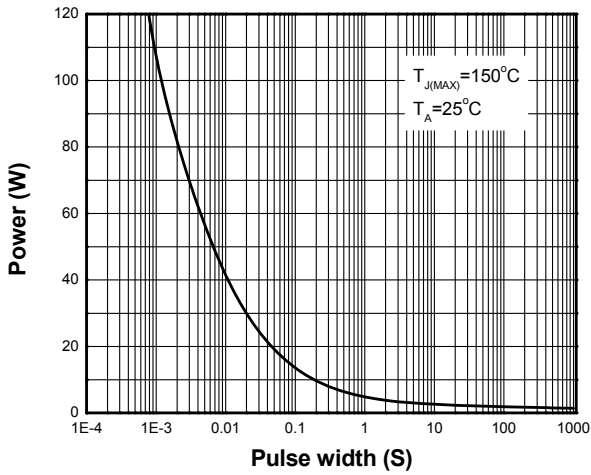
Single pulse power

Safe operating power

Gate Charge Characteristics

Transient thermal response (Junction-to-Ambient)

Notes:

1. Duty Cycle, D = $\dfrac{t_1}{t_2}$

2. Per Unit Base = R_{thJA} = 155°C/W

3. T_{JM} - T_A = $P_{DM}Z_{thJA}{}^{(t)}$

4. Surface Mounted

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
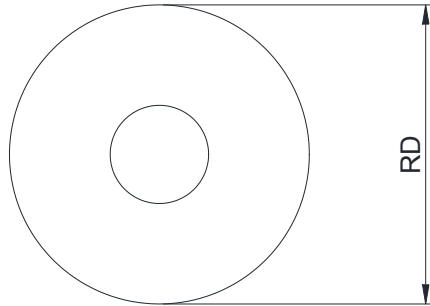
Tape Dimensions
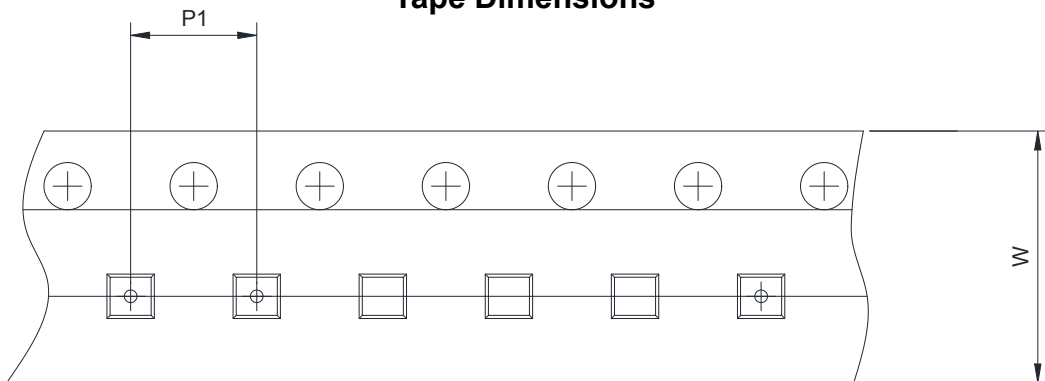
Quadrant Assignments For PIN1 Orientation In Tape

| Q1 | Q2 |
| Q3 | Q4 |

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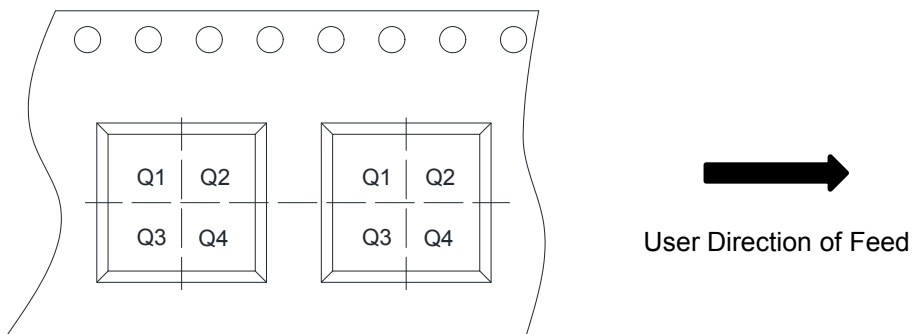
RD	Reel Dimension	☑ 7inch	☐ 13inch	
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm
P1	Pitch between successive cavity centers	☐ 2mm	☑ 4mm	☐ 8mm
Pin1	Pin1 Quadrant	☐ Q1	☐ Q2	☑ Q3 ☐ Q4

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