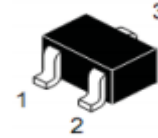
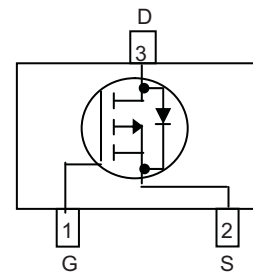
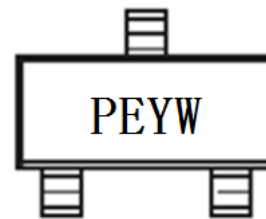


WPM2087
Single P-Channel, -20V, -4.3A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

V_{DS} (V)	Typical $R_{DS(on)}$ (m Ω)
-20	34 @ $V_{GS}=-4.5V$
	39 @ $V_{GS}=-3.1V$
	45 @ $V_{GS}=-2.5V$


SOT-23

Descriptions

The WPM2087 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 WPM2087 is Pb-free.

Pin configuration (Top view)

Features

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

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

Applications

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

Marking
Order information

Device	Package	Shipping
WPM2087-3/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}	± 12			
Continuous Drain Current ^{a d}	I_D	$T_A=25^\circ\text{C}$	-4.3	-3.6	A
		$T_A=70^\circ\text{C}$	-3.4	-2.9	
Maximum Power Dissipation ^{a d}	P_D	$T_A=25^\circ\text{C}$	1.2	0.9	W
		$T_A=70^\circ\text{C}$	0.8	0.6	
Continuous Drain Current ^{b d}	I_D	$T_A=25^\circ\text{C}$	-3.4	-3.1	A
		$T_A=70^\circ\text{C}$	-2.7	-2.5	
Maximum Power Dissipation ^{b d}	P_D	$T_A=25^\circ\text{C}$	0.8	0.7	W
		$T_A=70^\circ\text{C}$	0.5	0.4	
Pulsed Drain Current ^c	I_{DM}	-18		A	
Operating Junction Temperature	T_J	-55 to 150		$^\circ\text{C}$	
Lead Temperature	T_L	260		$^\circ\text{C}$	
Storage Temperature Range	T_{stg}	-55 to 150		$^\circ\text{C}$	

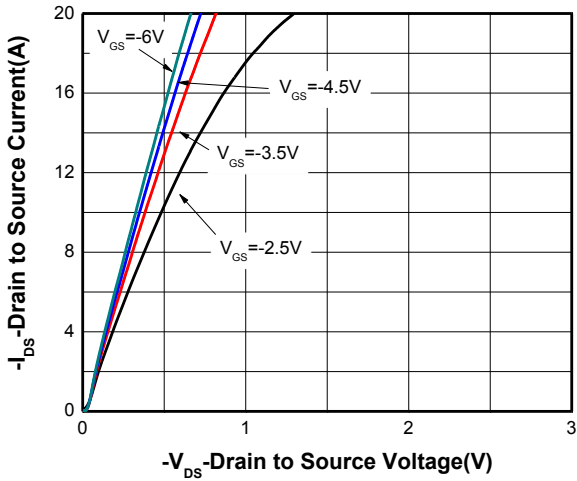
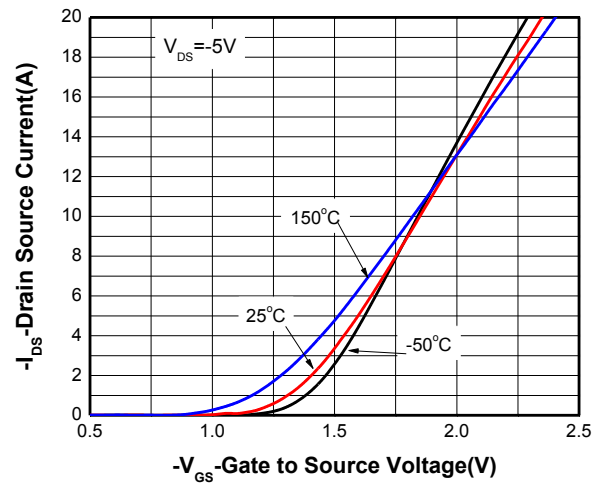
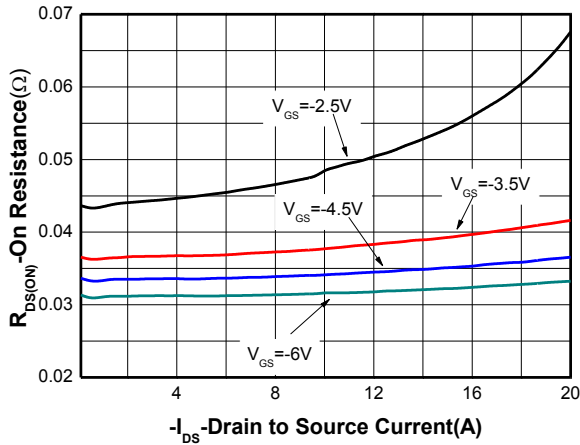
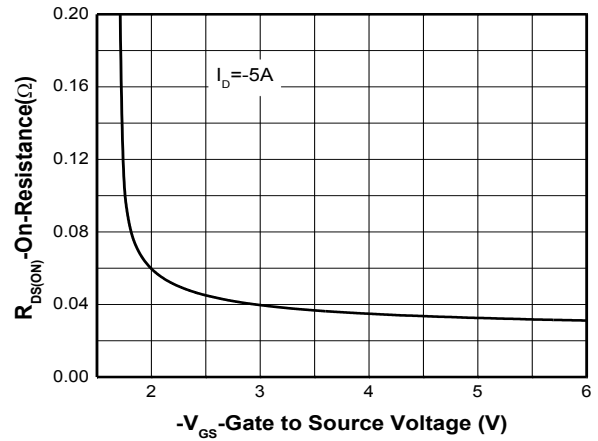
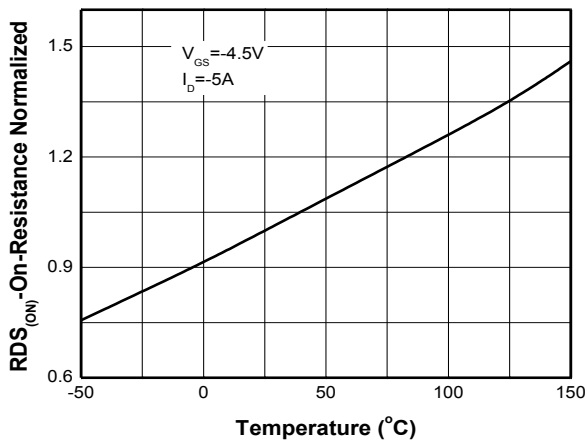
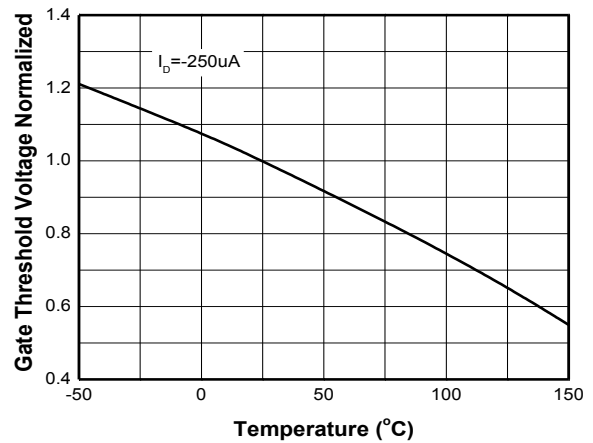
Thermal resistance ratings

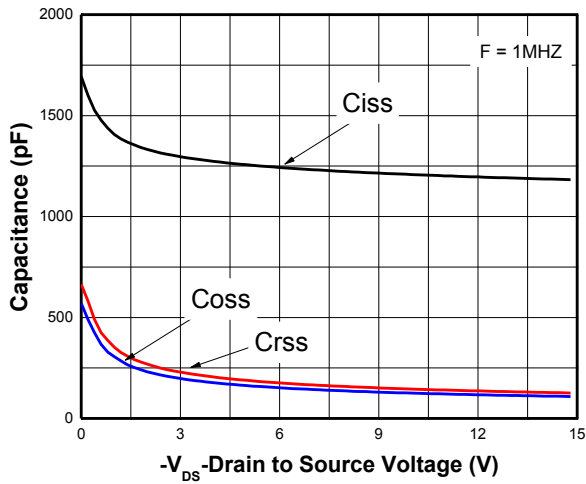
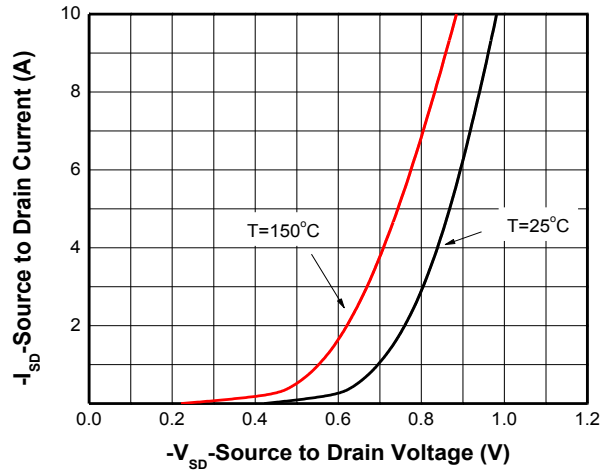
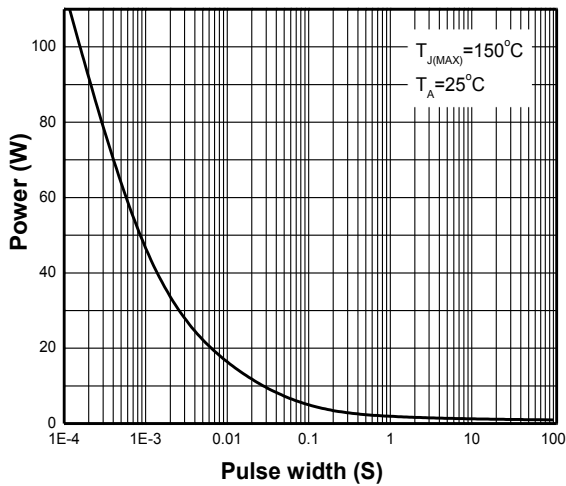
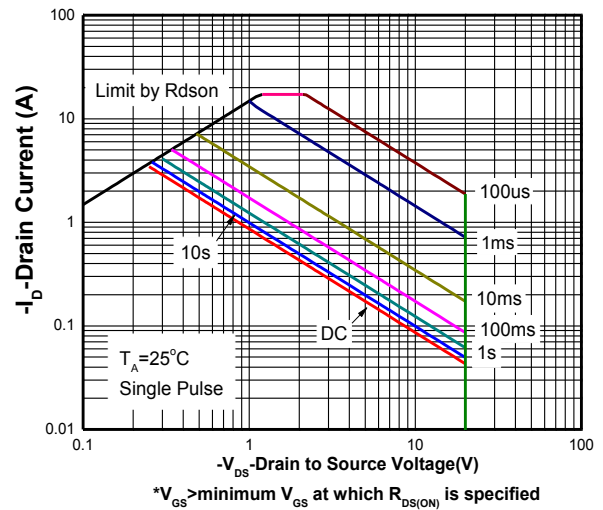
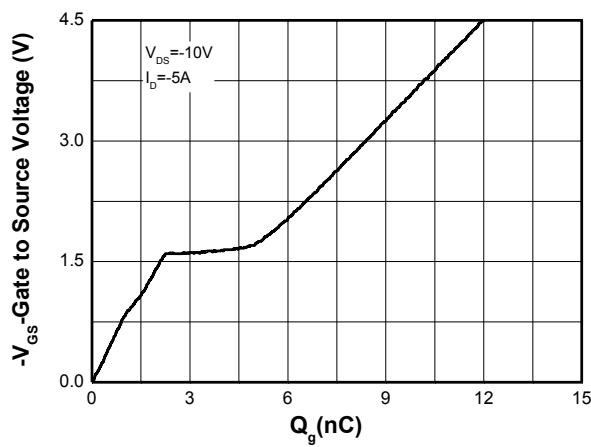
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient Thermal Resistance ^a	$R_{\theta JA}$	$t \leq 10 \text{ s}$	84	102	$^\circ\text{C/W}$
		Steady State	120	145	
Junction-to-Ambient Thermal Resistance ^b	$R_{\theta JA}$	$t \leq 10 \text{ s}$	130	160	
		Steady State	145	190	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	60	75		

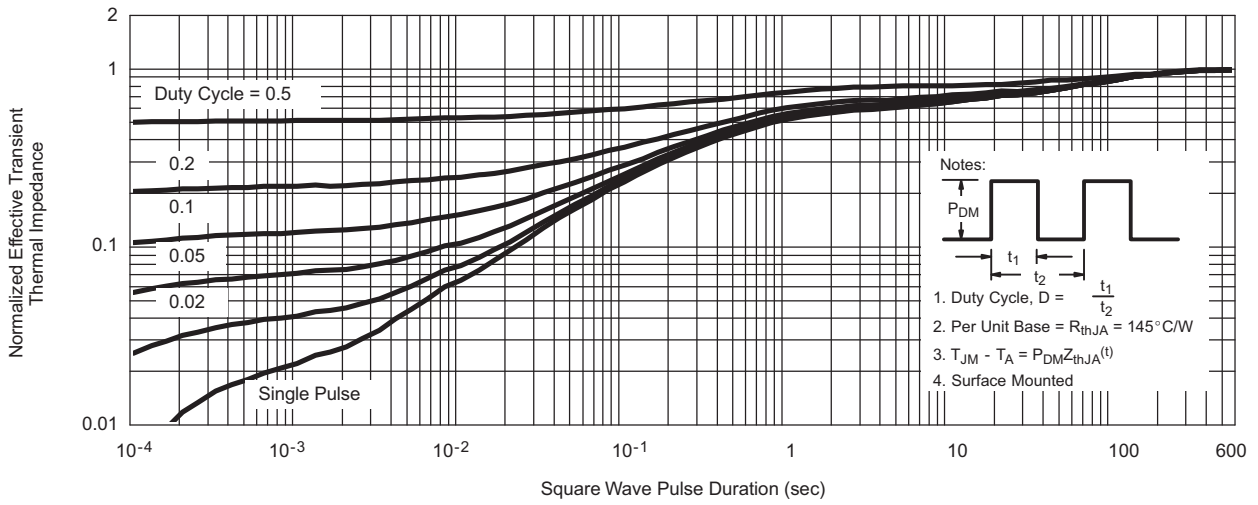
- Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.
- Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.
- Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%.
- Repetitive rating, pulse width limited by junction temperature $T_J(\text{MAX})=150^\circ\text{C}$.

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

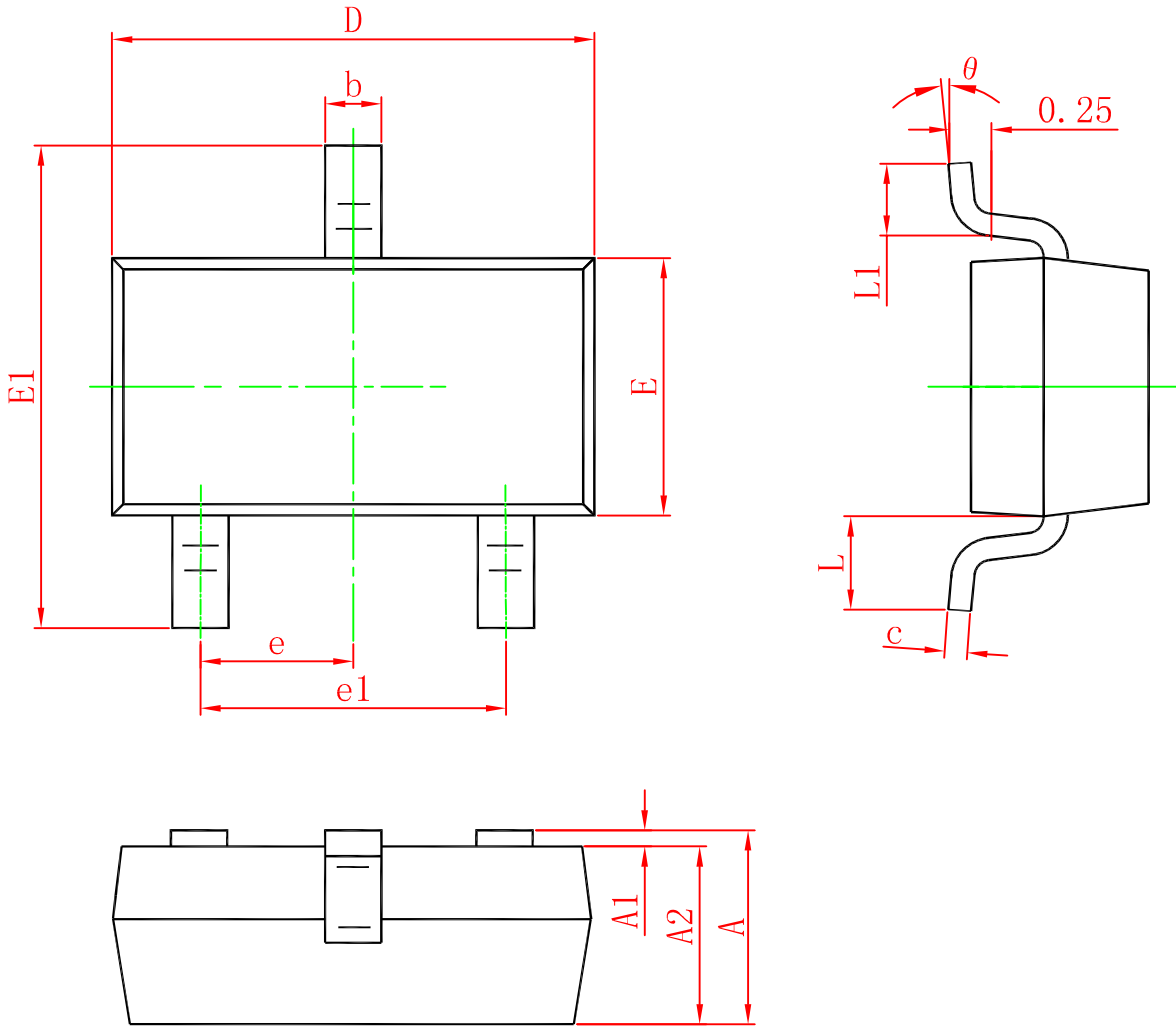
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = -250uA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -16V, V _{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250uA	-0.4	-0.75	-1.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -5A		34	45	mΩ
		V _{GS} = -3.1V, I _D = -2.5A		39	55	
		V _{GS} = -2.5V, I _D = -2.0A		45	59	
Forward Transconductance	g _{FS}	V _{DS} = -5 V, I _D = -3.0A		4	9	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0MHz, V _{DS} = -10 V		1182		pF
Output Capacitance	C _{OSS}			126		
Reverse Transfer Capacitance	C _{RSS}			108		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V, V _{DS} = -10 V, I _D = -5.0 A		12		nC
Threshold Gate Charge	Q _{G(TH)}			0.85		
Gate-to-Source Charge	Q _{GS}			2.5		
Gate-to-Drain Charge	Q _{GD}			2.8		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} = -10 V, V _{DS} = -15 V, I _D = -5A, R _G = 6Ω		7.8		ns
Rise Time	t _r			6.4		
Turn-Off Delay Time	t _{d(OFF)}			80		
Fall Time	t _f			18		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = -1A	-0.6	-0.75	-1.2	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


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 (Typ.)	
e1	1.800	2.000
L	0.550 (Typ.)	
L1	0.300	0.500
θ	0°	8°

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