

SuperMOS – SOT-23 -30V BV_{DSS} , $38m\Omega$ $R_{DS(on)}$, -4.5A I_D P-channel MOSFET

1. Description

The WPM3407-ES is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM3407-ES is Pb-free.

2. Features

- 30V, $R_{DS(ON)} < 38m\Omega$ @ $V_{GS} = -10V, I_D = -4.5A$
- $R_{DS(ON)} < 55m\Omega$ @ $V_{GS} = -4.5V, I_D = -3.0A$
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material : Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

Part Number	Package	Material	Quantity per reel	Flammability Rating
WPM3407-ES	SOT-23	Halogen free	3,000 PCS	UL 94V-0

Table-1 Ordering information

5. Pin Configuration and Functions

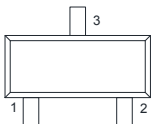
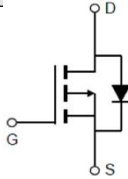
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

Table-2 Pin configuration

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	BV_{DSS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	-4.5
		$T_A=100^\circ\text{C}$	-3.5
Maximum Power Dissipation	P_D	$T_A=25^\circ\text{C}$	1.5
		$T_A=100^\circ\text{C}$	0.8
Pulsed Drain Current	I_{DM}	-18	A
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$R_{\theta JA}$	105		$^\circ\text{C}/\text{W}$
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	63		

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$			-1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.9	-1.5	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4.5A$		38	48	m Ω
		$V_{GS}=-4.5V, I_D=-3.0A$		55	65	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V$		550		pF
Output Capacitance	C_{OSS}	$V_{DS}=-15V$		75		
Reverse Transfer Capacitance	C_{RSS}	$f=1MHz$		63		
Gate Resistance	R_g	$f=1MHz$		10.5		Ω
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V$		6.5		nC
Gate-to-Source Charge	Q_{GS}	$V_{DS}=-15V$		1.1		
Gate-to-Drain Charge	Q_{GD}	$I_D=-4.5A$		1.3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V$		14		ns
Rise Time	t_r	$V_{DS}=-15V$		60		
Turn-Off Delay Time	$t_{d(OFF)}$	$R_L=3.5\Omega$		19		
Fall Time	t_f	$R_G=3\Omega$		11		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-1.0A$		-0.7	-1	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_{SD}=-4.5A,$		13.0		ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100A/\mu s$		2.5		nC

7. Typical Characteristic

Figure 1. On-Regin Characteristics

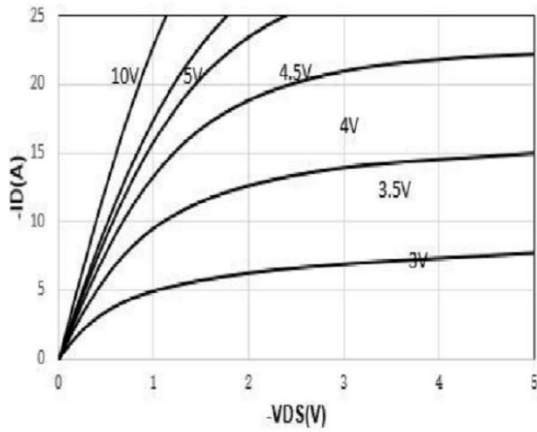


Figure 2. Transfer Characteristics

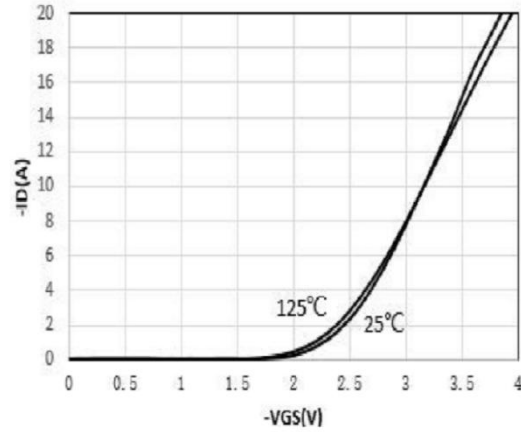


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

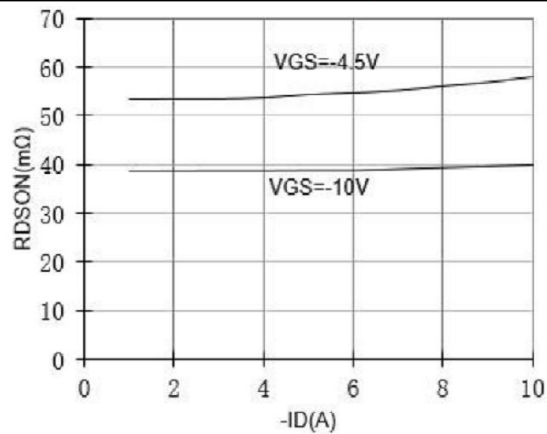


Figure 4. On-Resistance vs. Junction Temperature

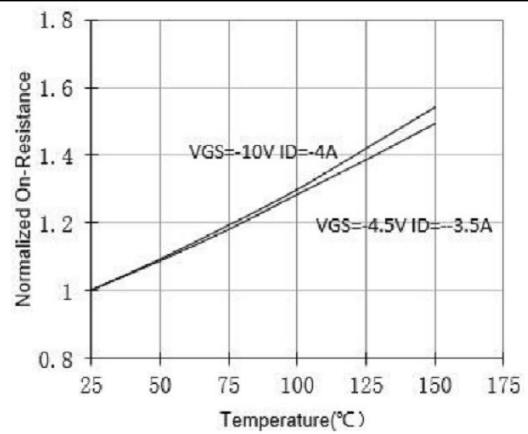


Figure 5. On-Resistance vs. Gate-Source Voltage

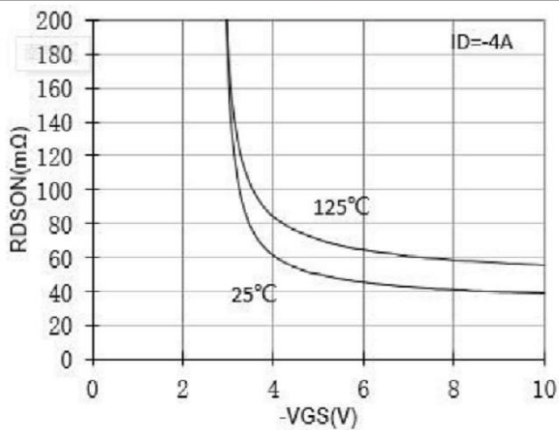
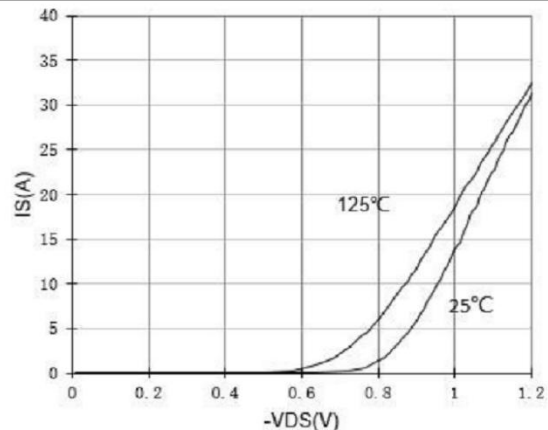


Figure 6. Body-Diode Characteristics



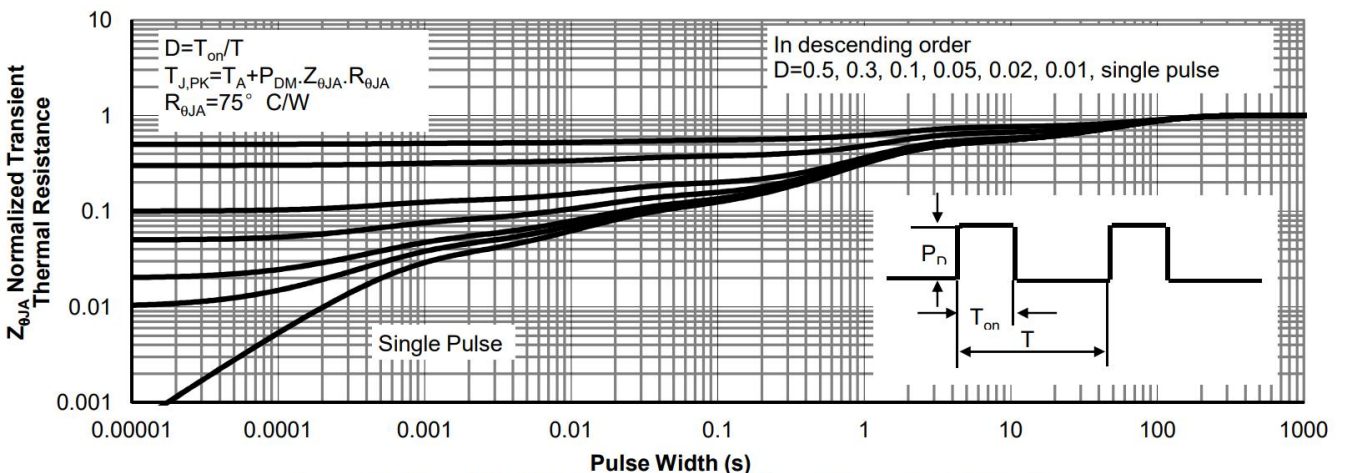
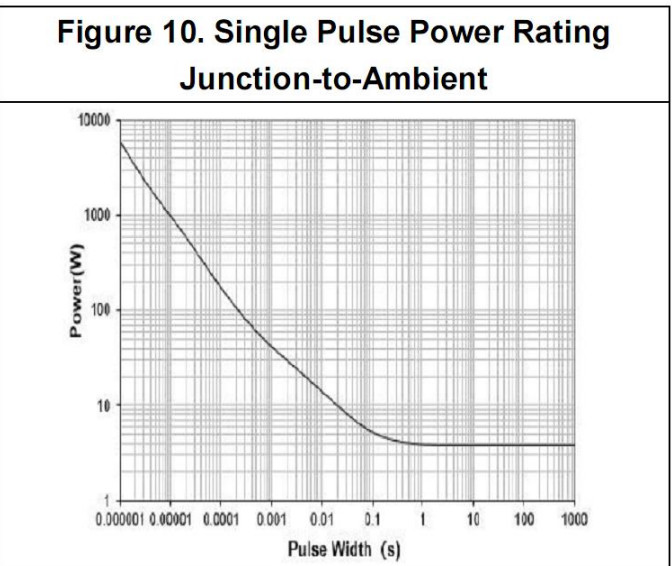
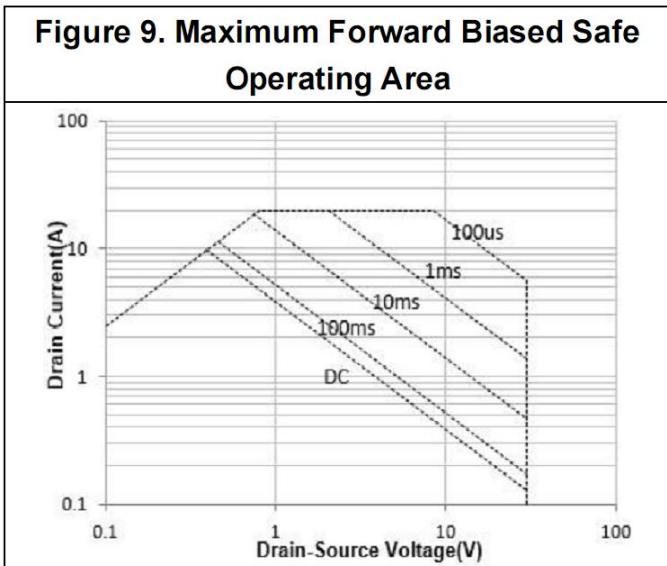
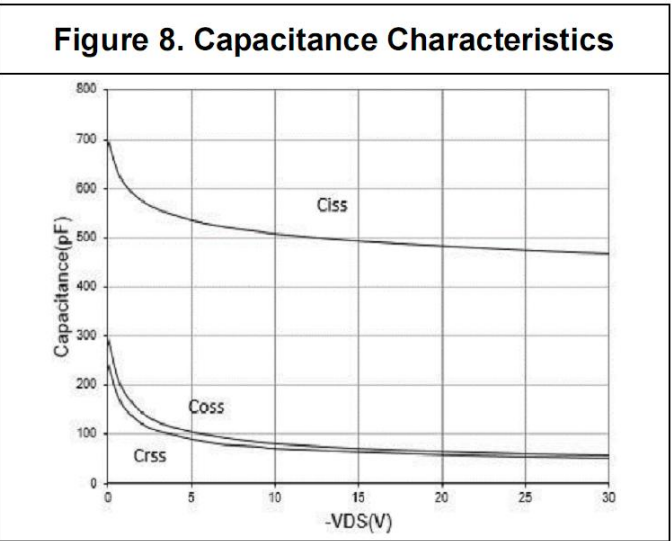
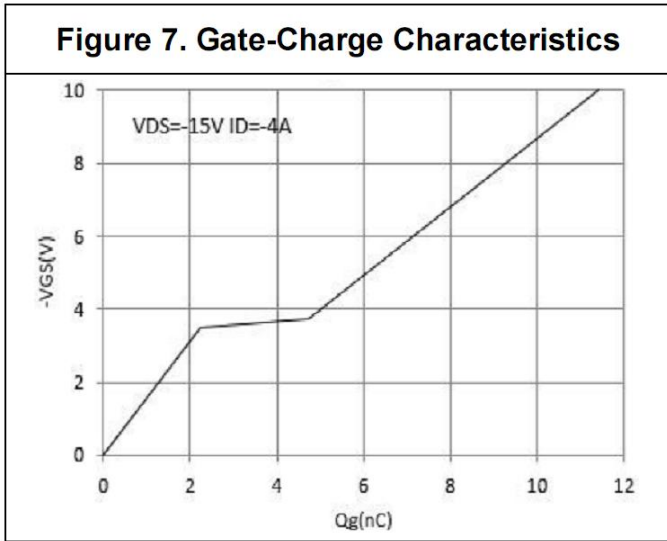
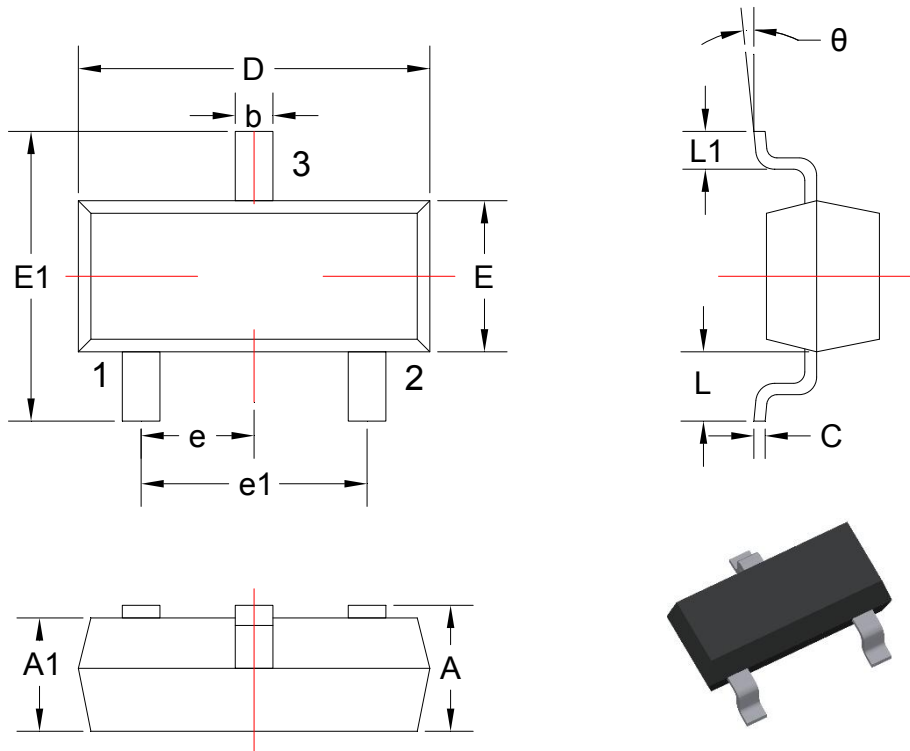


Figure 11: Normalized Maximum Transient Thermal Impedance(Note E)

8. Dimension and Patterns (SOT-23)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	0.900	1.150	E1	2.250	2.550
A1	0.900	1.050	e	0.950TYP	
b	0.300	0.500	e1	1.800	2.000
c	0.080	0.150	L	0.550REF	
D	2.800	3.00	L1	0.300	0.500
E	1.200	1.400	θ	0°	8°

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