

SuperMOS – SOT-23 -30V BV_{DSS} , 40m Ω $R_{DS(on)}$, P-channel MOSFET

1. Description

The ES3407 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 ES3407 is Pb-free.

2. Features

- -30V, $R_{DS(on)}$ =40m Ω (TYP.) @ V_{GS} =-10V
 $R_{DS(on)}$ =56m Ω (TYP.) @ V_{GS} =-4.5V
- 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	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Sizes
ES3407	SOT-23	R7	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

5. Pin Configuration and Functions

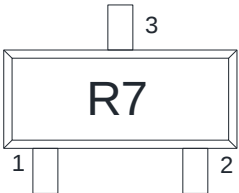
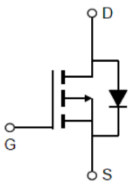
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

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	$T_A=25^{\circ}\text{C}$	I_D	-3.8	A
	$T_A=75^{\circ}\text{C}$		-3	
Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	1.4	W
	$T_A=75^{\circ}\text{C}$		0.9	
Pulsed Drain Current		I_{DM}	-15	A
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{stg}	-55 to +150	°C

Thermal resistance ratings

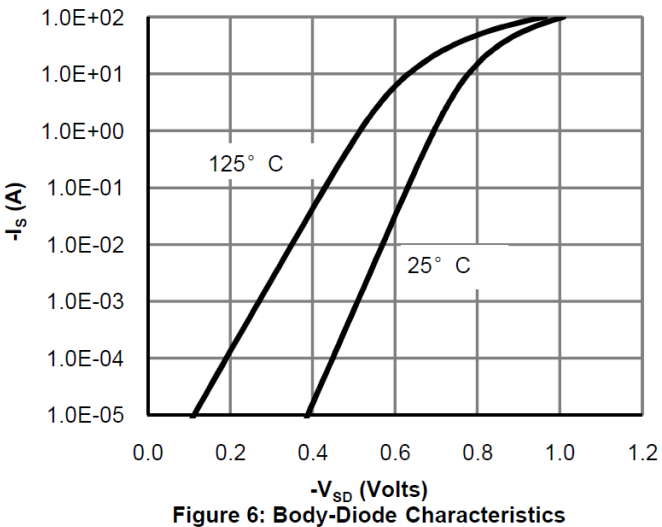
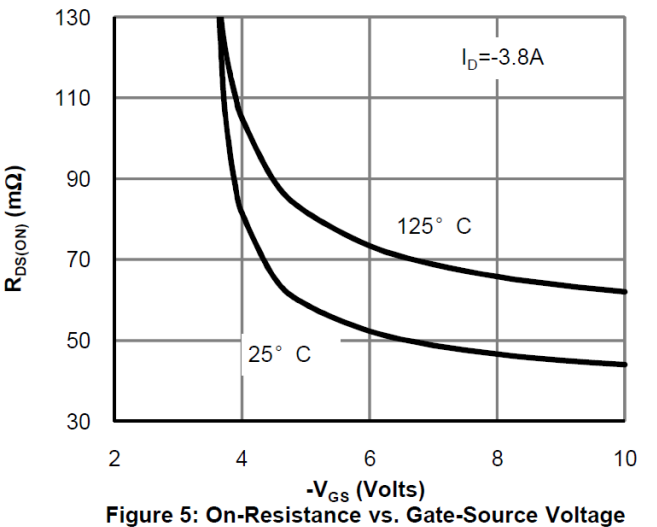
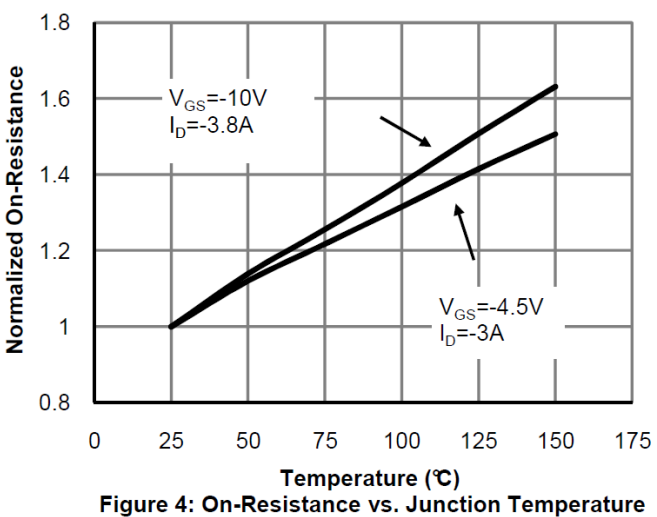
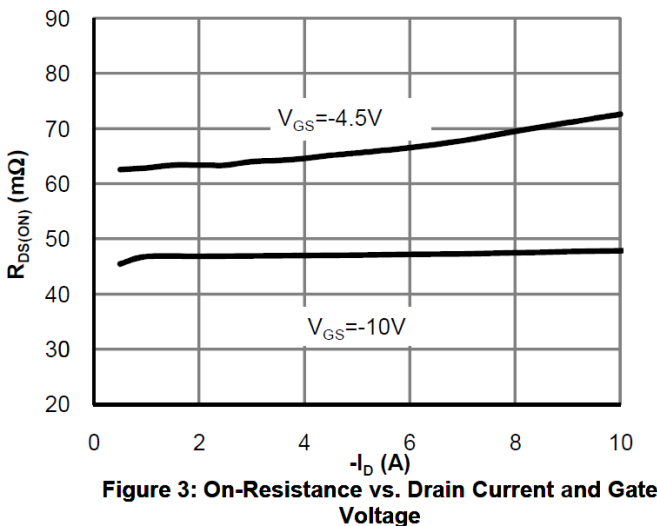
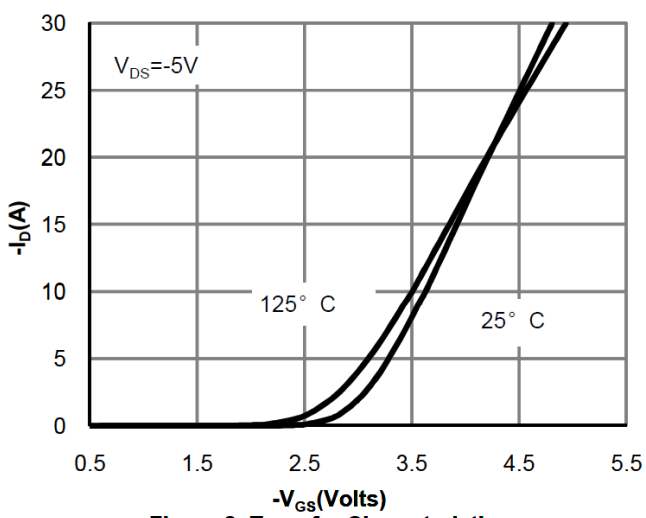
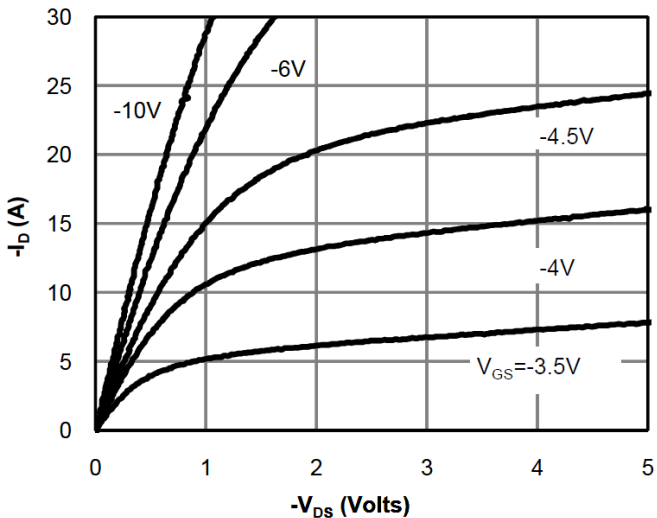
Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	70	90	°C/W
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	63	80	

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 =-250uA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.5	-2.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-3.8A		40	60	mΩ
		V _{GS} =-4.5V, I _D =-3 A		56	80	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V V _{DS} =-15V f=1MHz		520		pF
Output Capacitance	C _{OSS}			100		
Reverse Transfer Capacitance	C _{RSS}			65		
Gate Resistance	R _g	f=1MHZ		7.5		Ω
Total Gate Charge	Q _{G(TOT)}	V _{GS} =-10V V _{DS} =-15V I _D =-3.8A		9.2	11	nC
Gate-to-Source Charge	Q _{GS}			1.6		
Gate-to-Drain Charge	Q _{GD}			2.2		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-10V V _{DS} =-15V R _L =3.5Ω R _G =3Ω		7.5		ns
Rise Time	t _r			5.5		
Turn-Off Delay Time	t _{d(OFF)}			19		
Fall Time	t _f			7		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-1.0A		-0.7	-1.2	V

7. Typical Characteristic



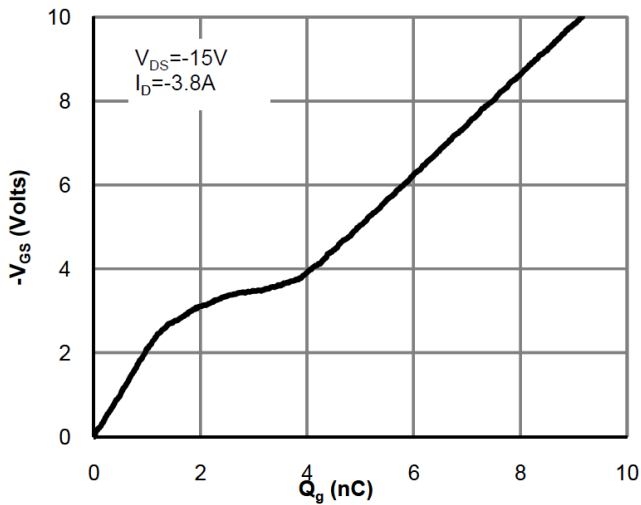


Figure 7: Gate-Charge Characteristics

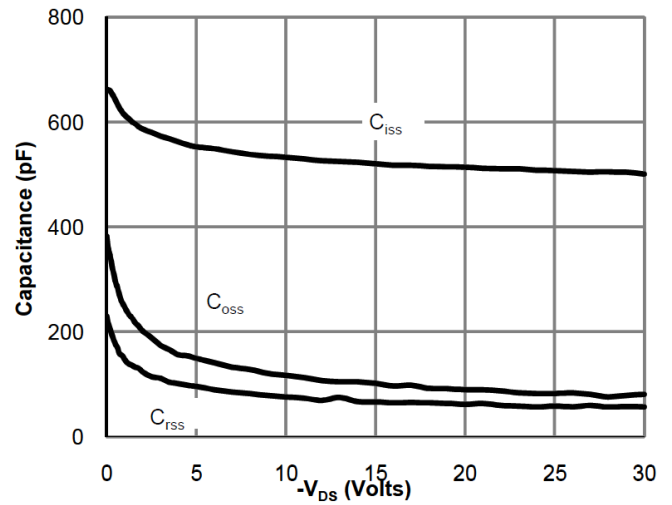


Figure 8: Capacitance Characteristics

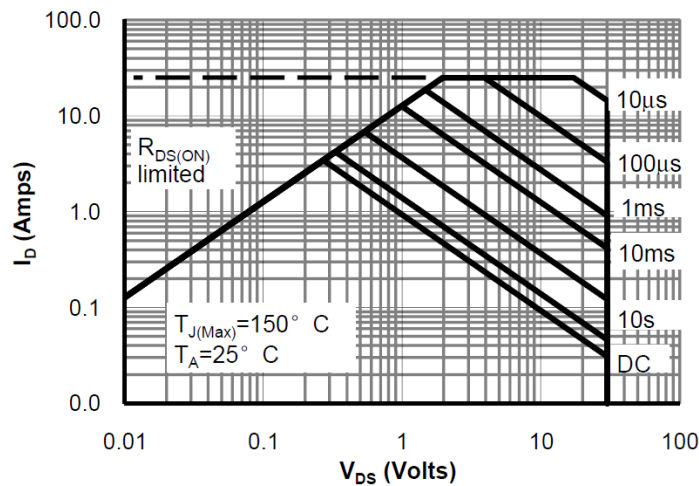


Figure 9: Maximum Forward Biased Safe Operating Area

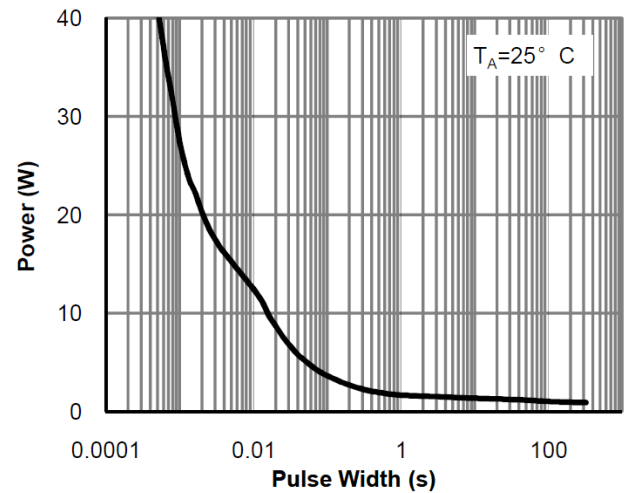


Figure 10: Single Pulse Power Rating Junction-to-Ambient

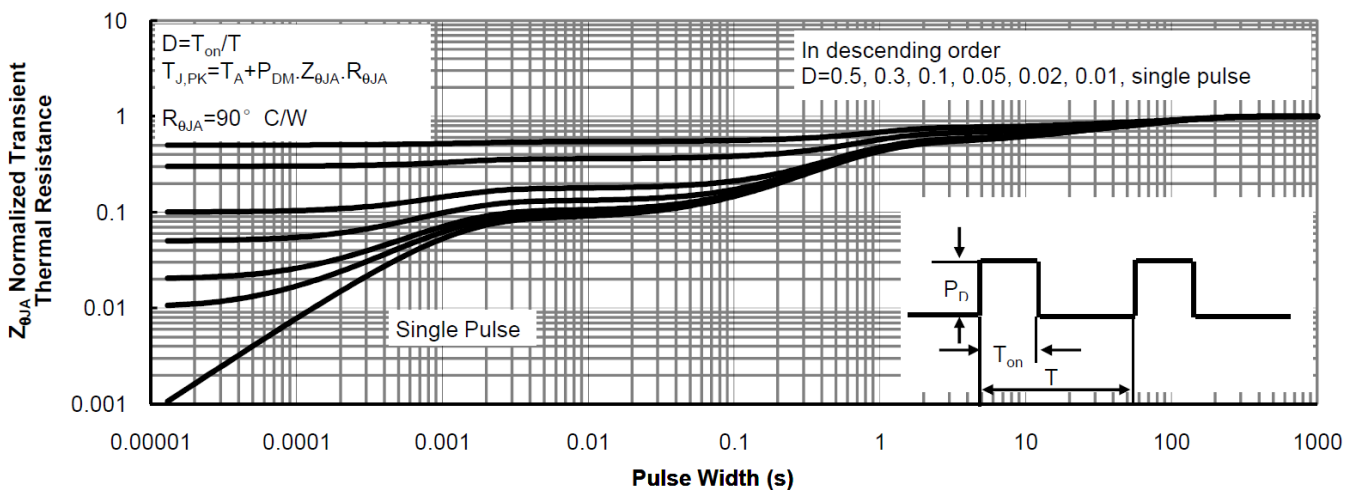
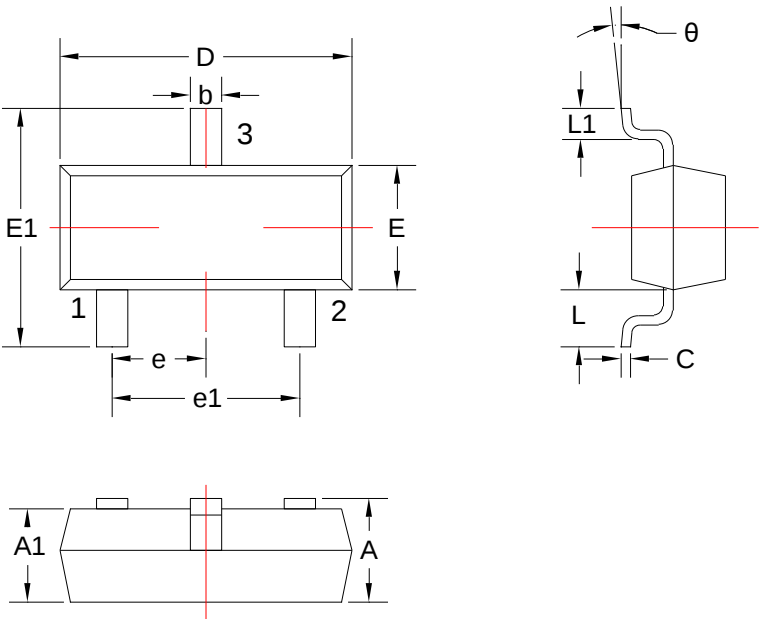


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (SOT-23)



Units: mm

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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