

SuperMOS - SOP8 -60V BV_{DSS} , $19m\Omega$ $R_{DS(on)}$, -9.4A I_D P-channel MOSFET

1. Description

The ES3907 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 ES3907 is Pb-free.

2. Features

- 60V, $R_{DS(on)}=19m\Omega$ (Typ), $V_{GS}=-10V$
 $R_{DS(on)}=23m\Omega$ (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

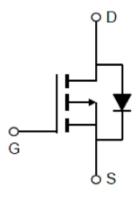
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED!

4. Ordering Information

Part Number	Package	Marking	Material	Quantity per reel	Flammability Rating
ES3907	SOP8	ES3907/LOT	Halogen free	3,000 PCS	UL 94V-0

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
4	Gate		
1/2/3	Source		
5/6/7/8	Drain		

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}	-60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	-9.4	A
	$T_A=75^{\circ}\text{C}$		-7.3	
Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	3.2	W
	$T_A=75^{\circ}\text{C}$		1.9	
Pulsed Drain Current ^a		I_{DM}	-37.6	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	Max	Unit
Junction-to-Ambient Thermal Resistance	$t \leq 10 \text{ s}$	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$

Note:

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

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	-60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} =0V, V _{DS} =-60V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-1.1	-1.6	-2.1	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-8A		19	23	mΩ
		V _{GS} =-4.5V, I _D =-7A		23	28	
CHARGES AND CAPACITANCES						
Input Capacitance	C _{ISS}	V _{GS} =0V V _{DS} =-30V f=1MHz		4965		pF
Output Capacitance	C _{OSS}			232		
Reverse Transfer Capacitance	C _{RSS}			175		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =-10V V _{DS} =-30V I _D =-8A		96		nC
Gate-to-Source Charge	Q _{GS}			18		
Gate-to-Drain Charge	Q _{GD}			16		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-10V V _{DS} =-30V R _L =1.5Ω R _G =3Ω		12		ns
Rise Time	t _r			60		
Turn-Off Delay Time	t _{d(OFF)}			160		
Fall Time	t _f			137		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =-1A			-1.0	V

7. Typical Characteristic

Figure 1. On-Regin Characteristics

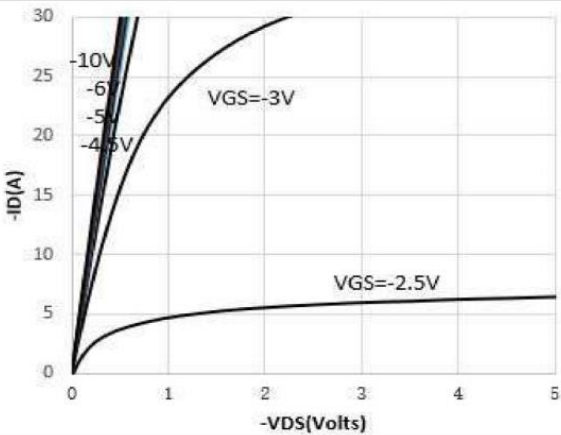


Figure 2. Transfer Characteristics

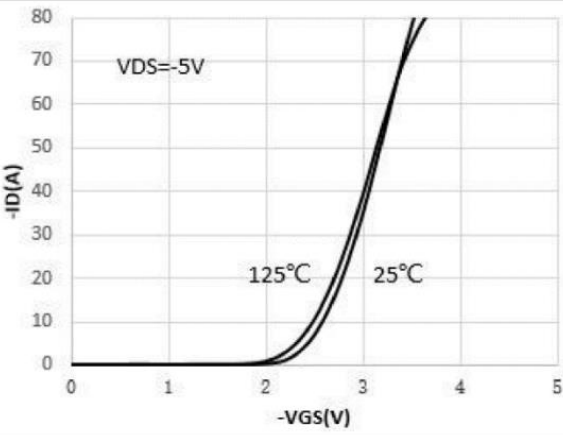


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

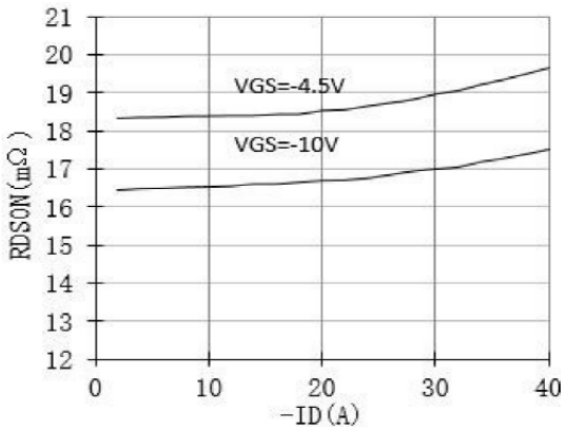


Figure 4. On-Resistance vs. Junction Temperature

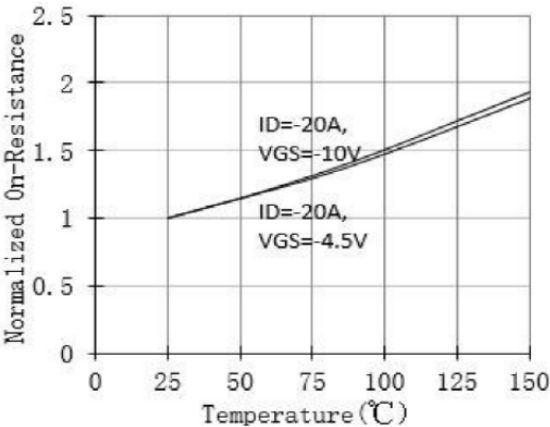


Figure 5. On-Resistance vs. Gate-Source Voltage

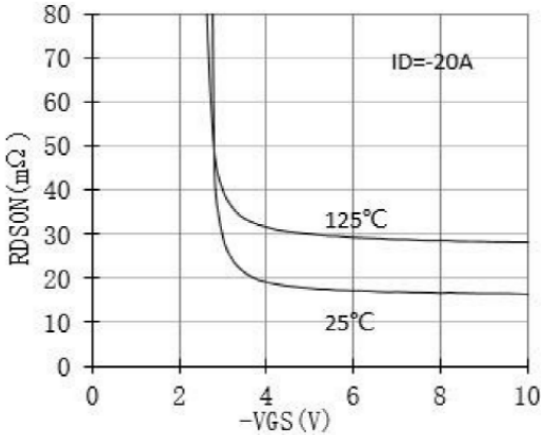


Figure 6. Body-Diode Characteristics

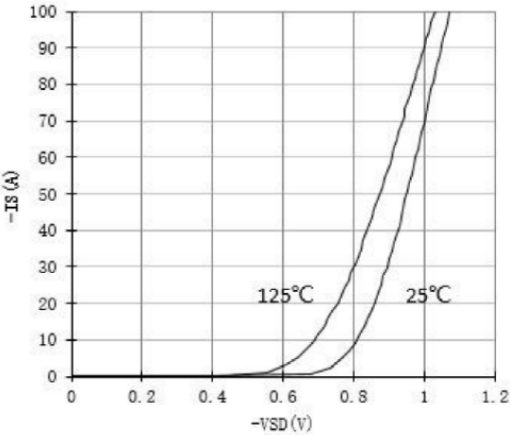


Figure 7. Gate-Charge Characteristics

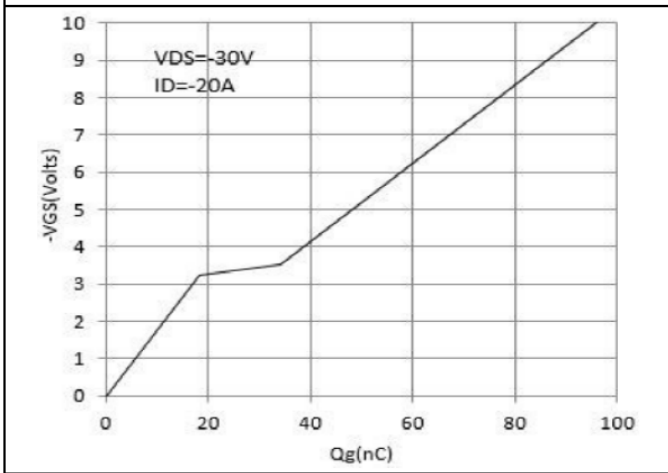


Figure 8. Capacitance Characteristics

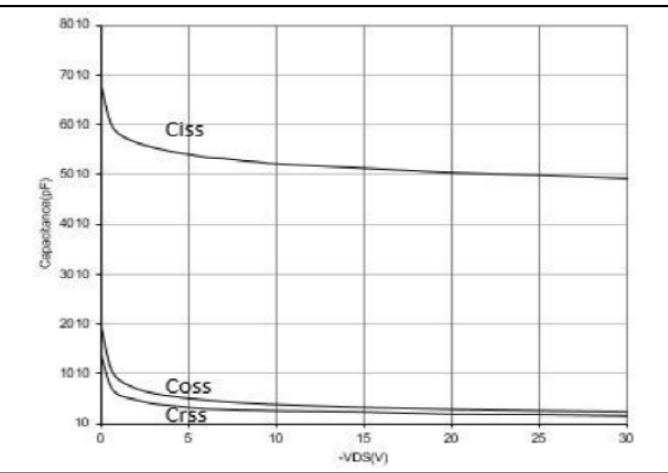


Figure 9. Maximum Forward Biased Safe Operating Area

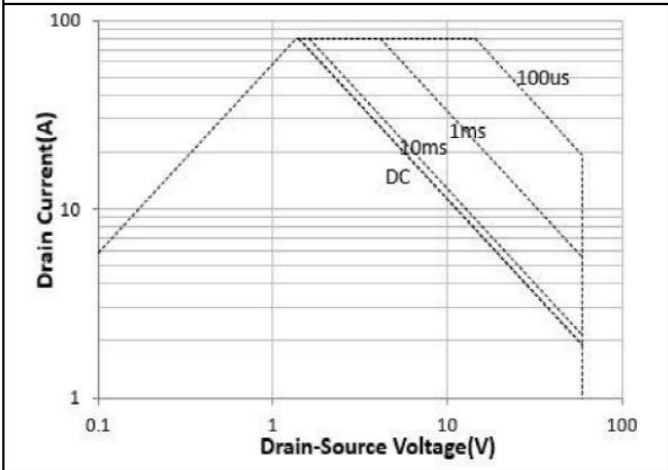


Figure 10. Single Pulse Power Rating Junction-to-Ambient

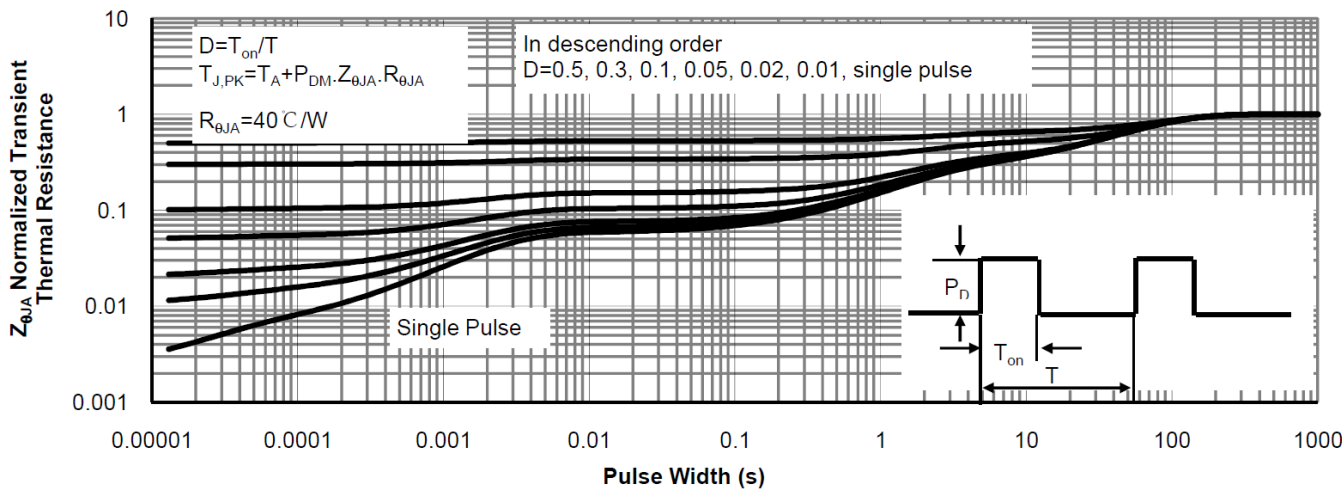
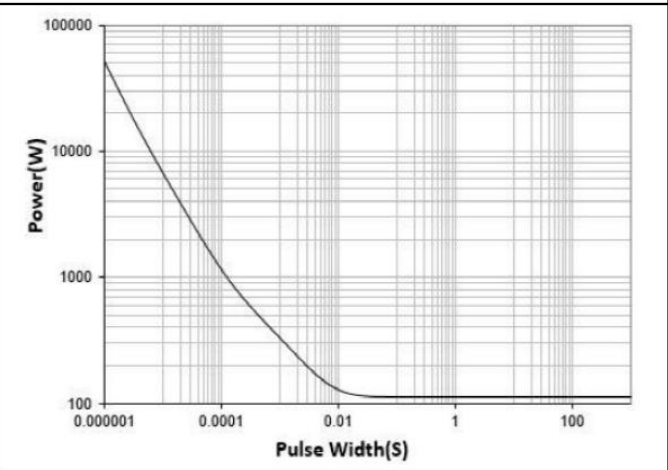
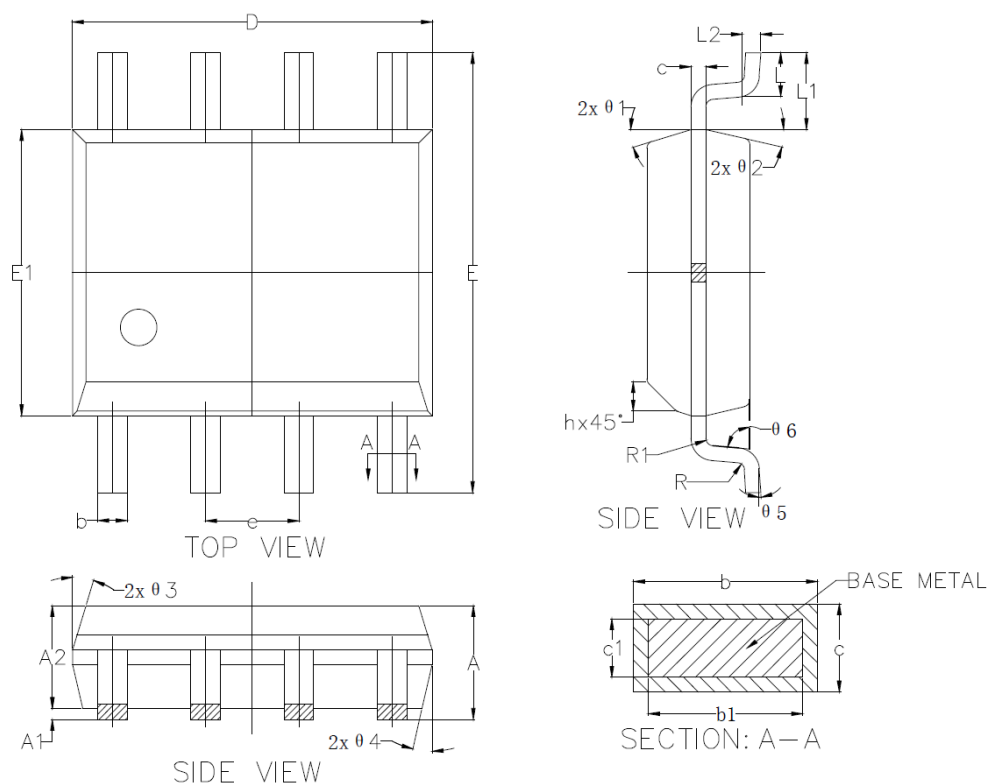


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

8. Dimension (SOP8)



Unit: mm

COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions			Symbol	Dimensions		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	1.40	1.55	1.70	L1	0.96	1.06	1.16
A1	0.05		0.25	L2	0.25 BSC		
A2	1.30	1.40	1.50	R	0.07		
b	0.37		0.47	R1	0.07		
b1	0.35		0.45	h	0.25	0.35	0.45
c	0.17		0.27	θ 1	15°	17°	19°
c1	0.15		0.25	θ 2	11°	13°	15°
D	4.80	4.90	5.00	θ 3	15°	17°	19°
E	5.85		6.15	θ 4	11°	13°	15°
E1	3.80	3.90	4.00	θ 5	0°	3°	6°
e	1.27 BSC			θ 6	55°		85°
L	0.57		0.87	Φ	0.40	0.50	0.60

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