SuperMOS –PDFN3*3-8L 30V $BV_{DSS,}$ 7.5mΩ $R_{DS(on)}$, 33A I_D, N-channel MOSFET

1. Description

The ESN4838 is N-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 ESN4838 is Pb-free.

2. Features

- 30V, $R_{DS(ON)}$=7.5mΩ(Typ.), V_{GS}=10V
  $R_{DS(ON)}$=12.0mΩ(Typ.), V_{GS}=4.5V
- Use trench MOSFET technology
- 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	Packing	Quantity per reel	Flammability Rating	Reel Size
ESN4838	PDFN3*3-8L	ESN4838/LOT	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

Table-1 Ordering information

5. Pin Configuration and Functions

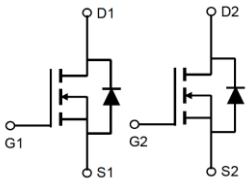
Pin	Function	Outline	Circuit Diagram
2	Gate2		
1	Source2		
7/8	Drain2		
4	Gate1		
3	Source1		
5/6	Drain1		

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_C=25°C	I_D	33	A
	T_C=75°C		25	
Maximum Power Dissipation	T_C=25°C	P_D	21	W
	T_C=75°C		1.88	
Pulsed Drain Current		I_{DM}	132	A
Operating Junction Temperature		T_J	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	t ≤ 10 s	$R_{\theta JA}$	32	40	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	4.2	6	

Electrical Characteristics

At TA = 25℃ 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			1.0	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	1.4	1.8	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A		7.5	12	mΩ
		V_{GS}=4.5V, I_D=10A		12	18	
Forward Trans conductance	g_{FS}	V_{DS}=5.0V, I_D=20A			100	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, f=1MHz, V_{DS}=15V		1080		pF
Output Capacitance	C_{OSS}			180		
Reverse Transfer Capacitance	C_{RSS}			110		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=10V, V_{DS}=15V, I_D=20A		18		nC
Gate-to-Source Charge	Q_{GS}			3.5		
Gate-to-Drain Charge	Q_{GD}			3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=10V, V_{DS}=15V, R_L=1.35Ω, R_G=6Ω		6		ns
Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(OFF)}$			22		
Fall Time	t_f			5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=20A	0.45		1.5	V

7. Typical Characteristic

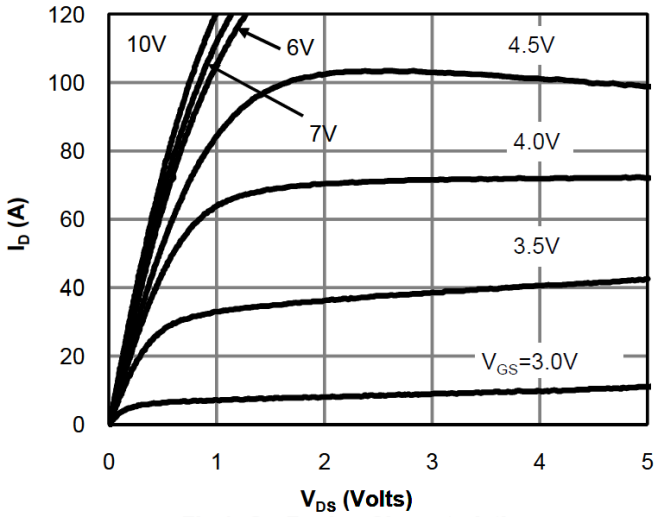


Fig 1: On-Region Characteristics

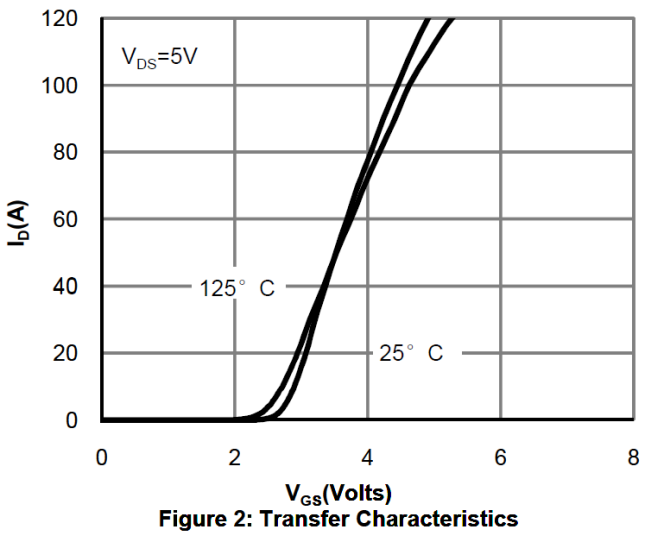


Figure 2: Transfer Characteristics

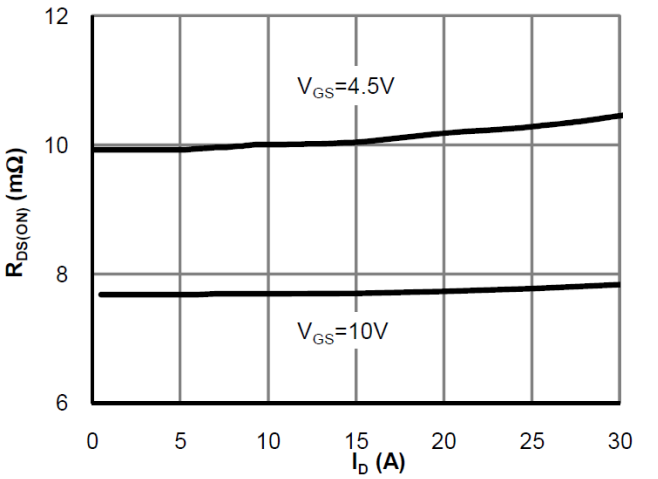


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

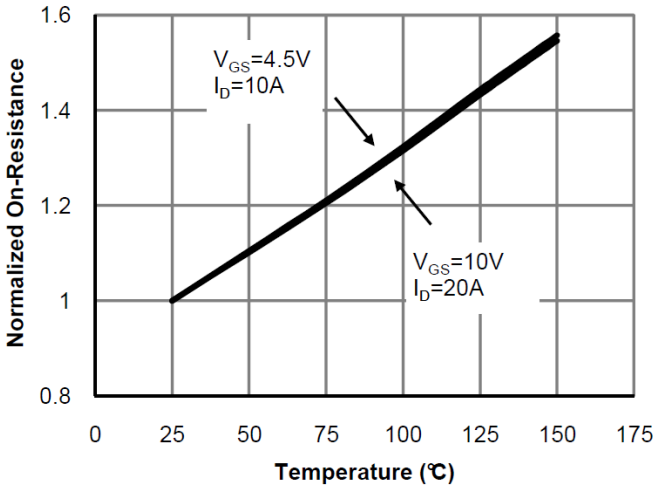


Figure 4: On-Resistance vs. Junction Temperature

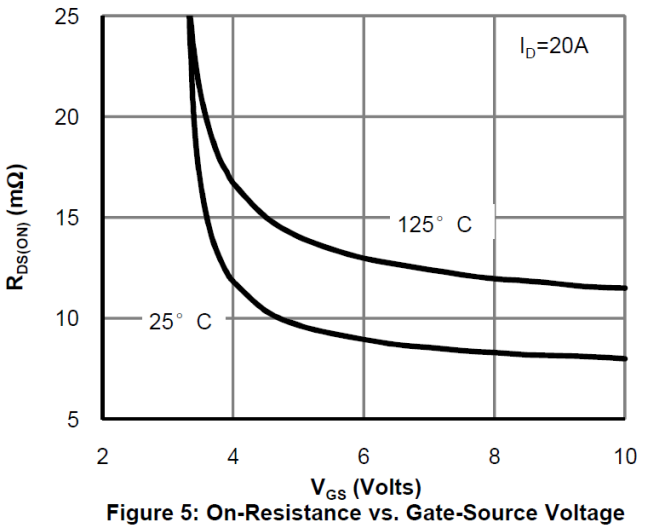


Figure 5: On-Resistance vs. Gate-Source Voltage

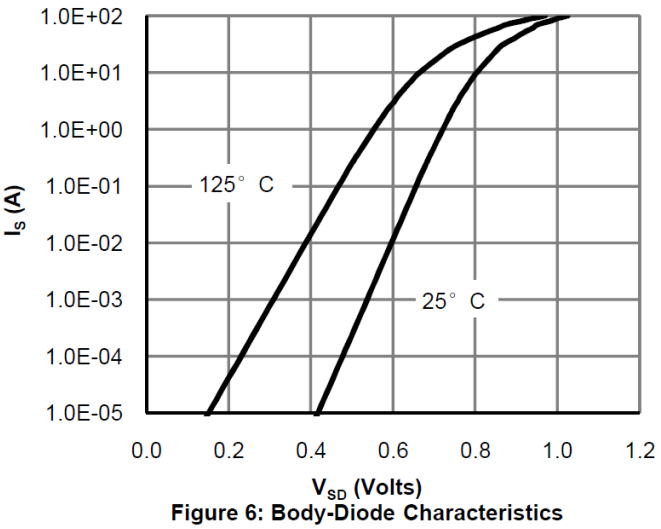


Figure 6: Body-Diode Characteristics

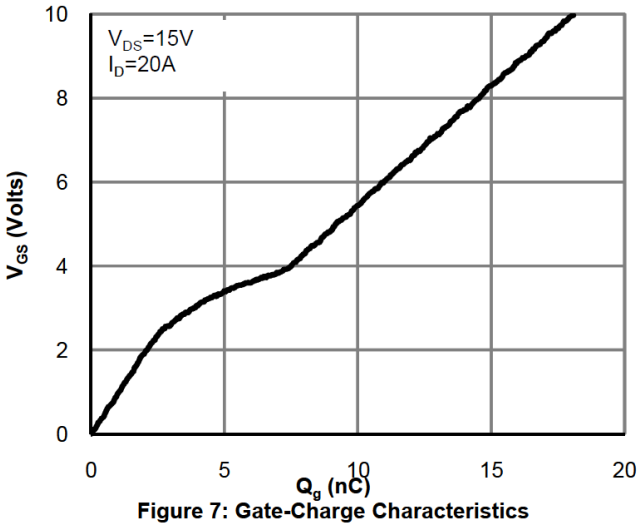


Figure 7: Gate-Charge Characteristics

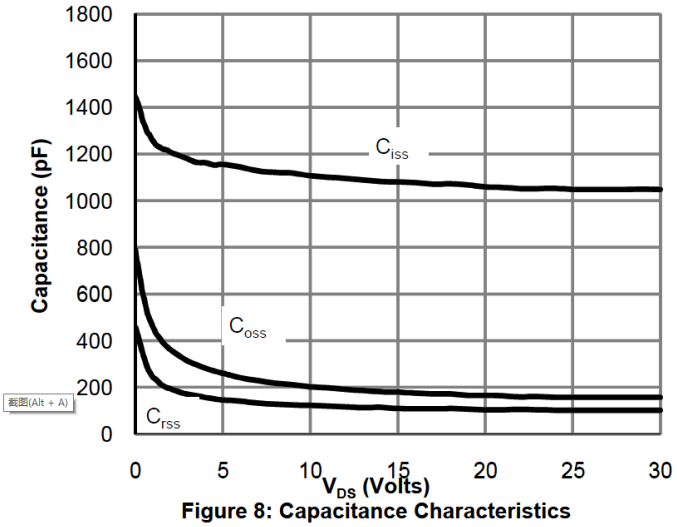


Figure 8: Capacitance Characteristics

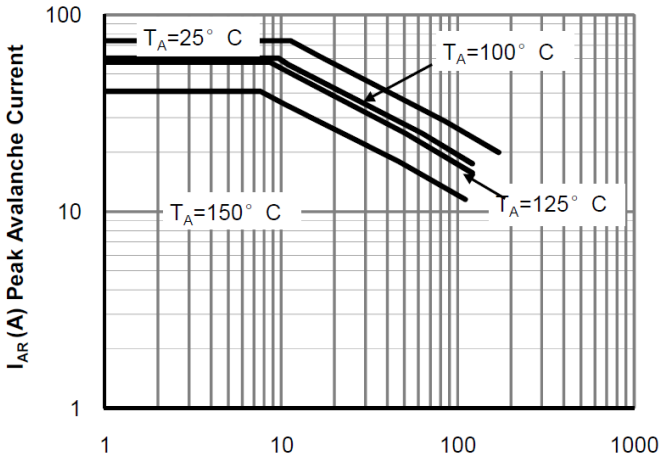


Figure 9: Single Pulse Avalanche capability

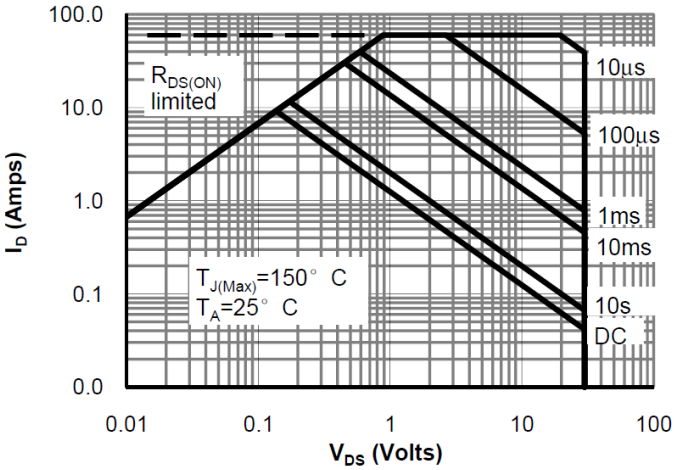


Figure 10: Maximum Forward Biased Safe Operating Area

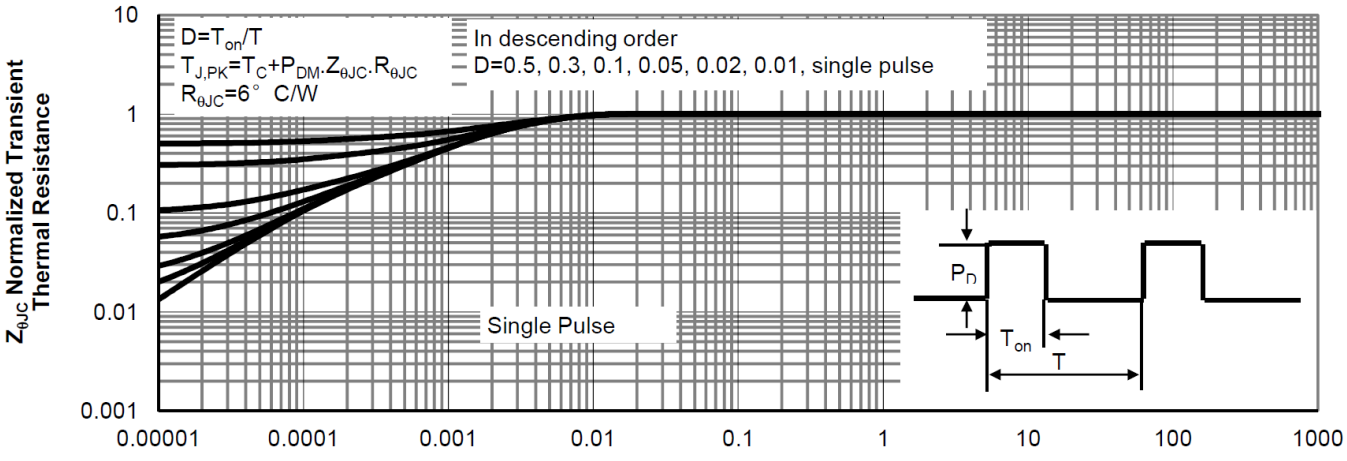
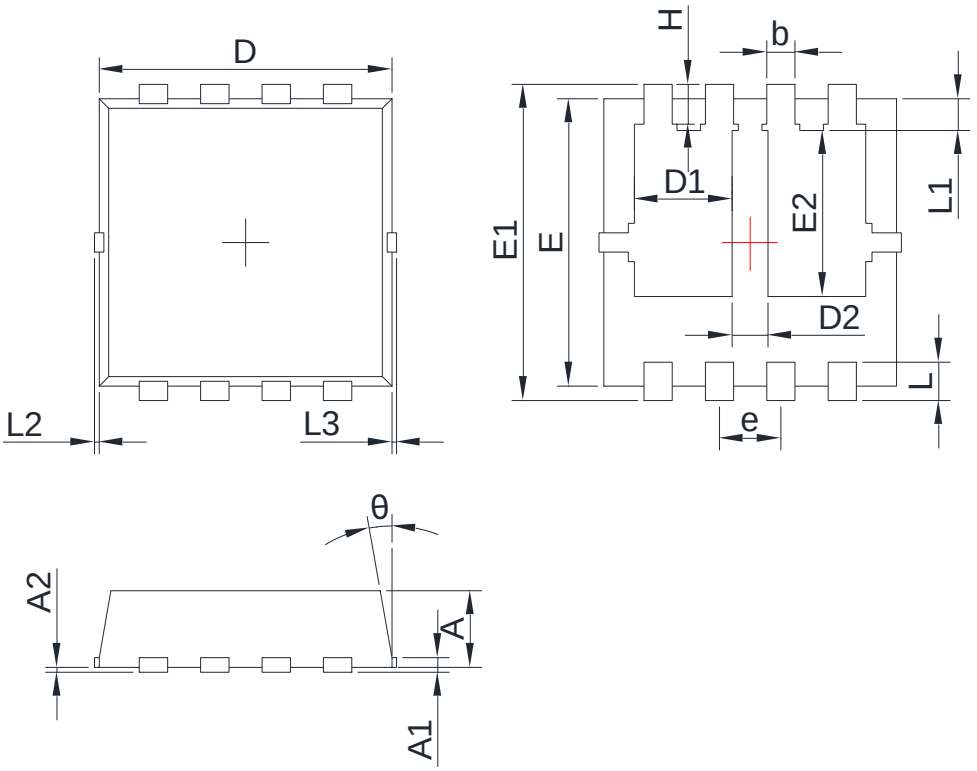


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (PDFN3*3-8L)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

SYMBOL	MILLIMETER			SYMBOL	MILLIMETER		
	MIN	Typ.	MAX		MIN	Typ.	MAX
A	0.700	0.800	0.900	b	0.200	0.300	0.400
A1	0.152 REF.			e	0.550	0.650	0.750
A2	0~0.05			L	0.300	0.400	0.500
D	3.000	3.100	3.200	L1	0.180	0.330	0.480
D1	0.935	1.035	1.135	L2	0~0.100		
D2	0.280	0.380	0.480	L3	0~0.100		
E	2.900	3.000	3.100	H	0.315	0.415	0.515
E1	3.150	3.300	3.450	θ	8°	10°	12°
E2	1.535	1.735	1.935				

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