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

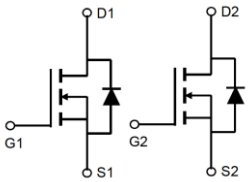
Pin	Function	Outline	Circuit Diagram
2	Gate2		
1	Source2		
7/8	Drain2		
4	Gate1		
3	Source1		
5/6	Drain1		

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

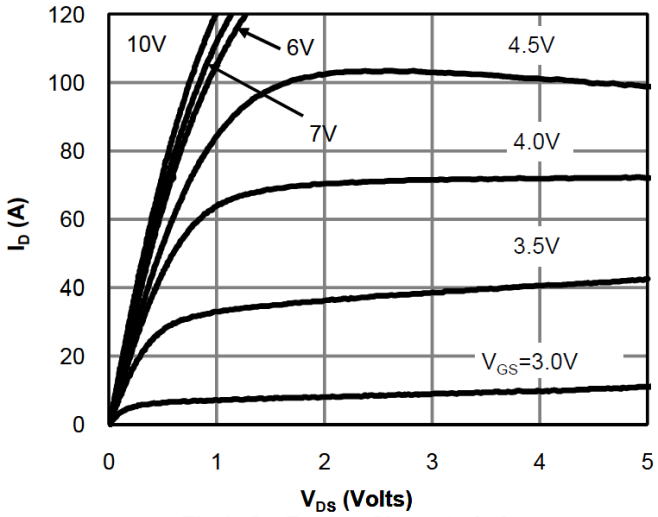


Fig 1: On-Region Characteristics

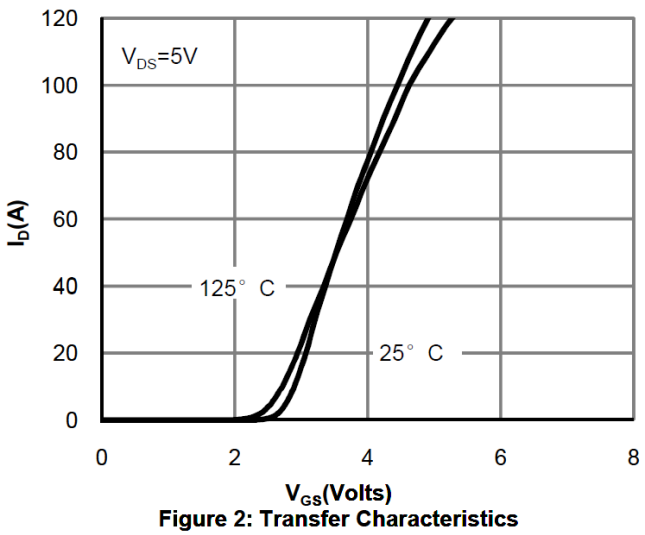


Figure 2: Transfer Characteristics

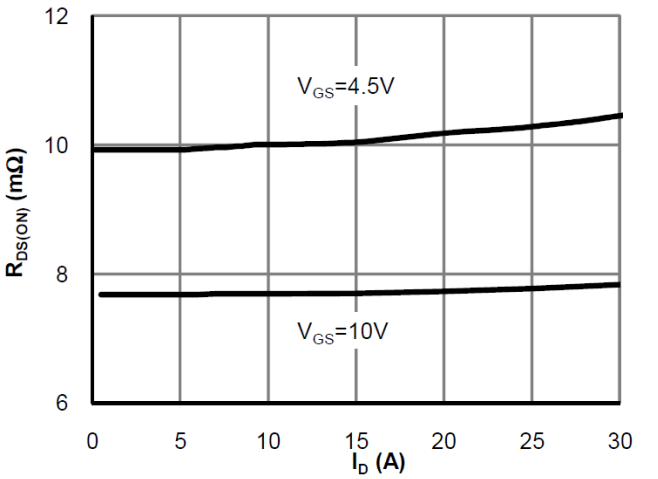


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

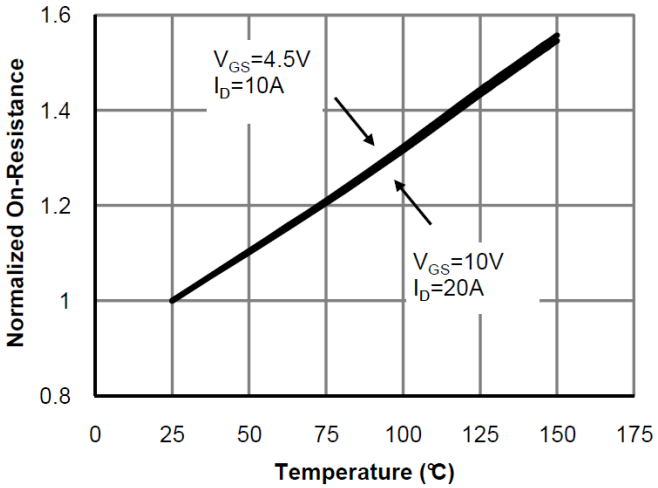


Figure 4: On-Resistance vs. Junction Temperature

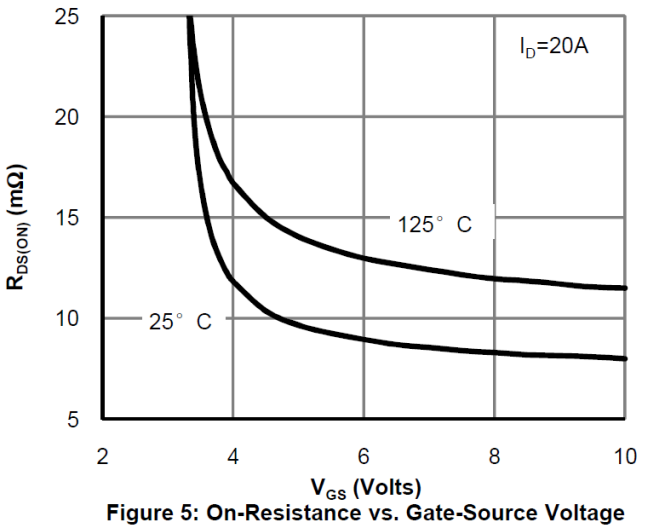


Figure 5: On-Resistance vs. Gate-Source Voltage

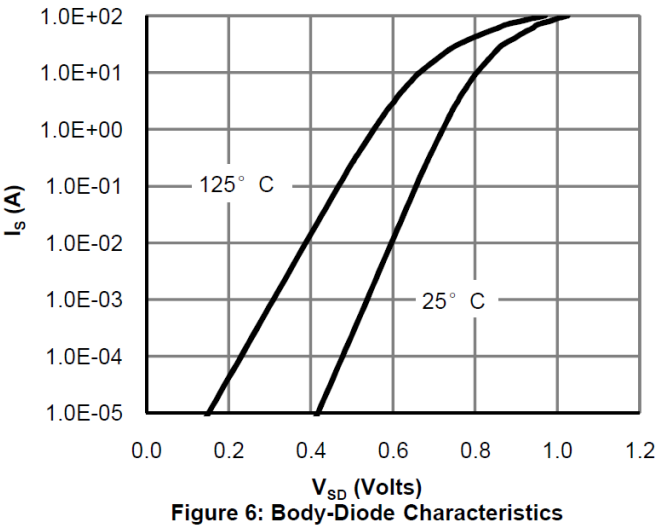


Figure 6: Body-Diode Characteristics

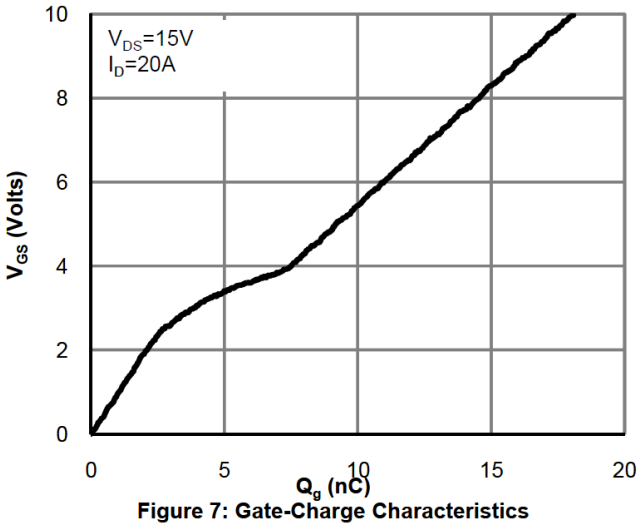


Figure 7: Gate-Charge Characteristics

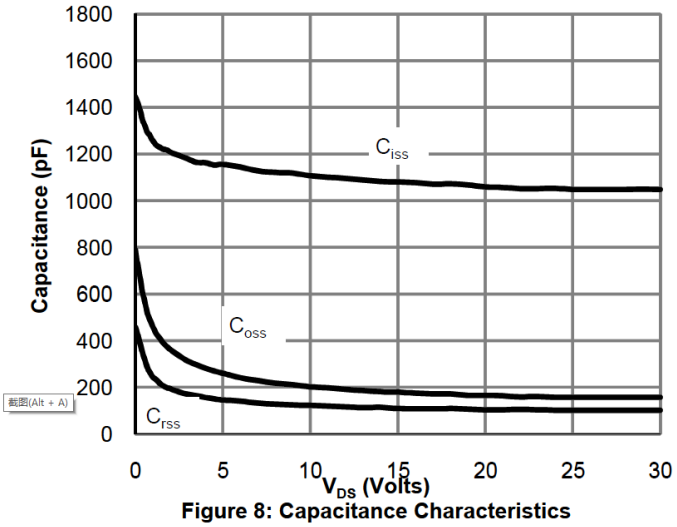


Figure 8: Capacitance Characteristics

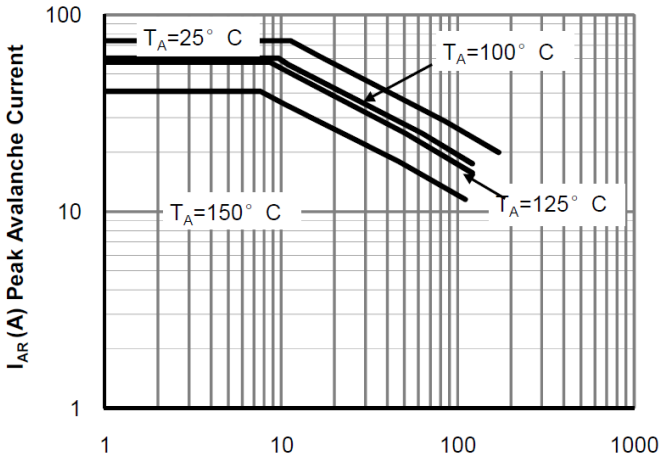


Figure 9: Single Pulse Avalanche capability

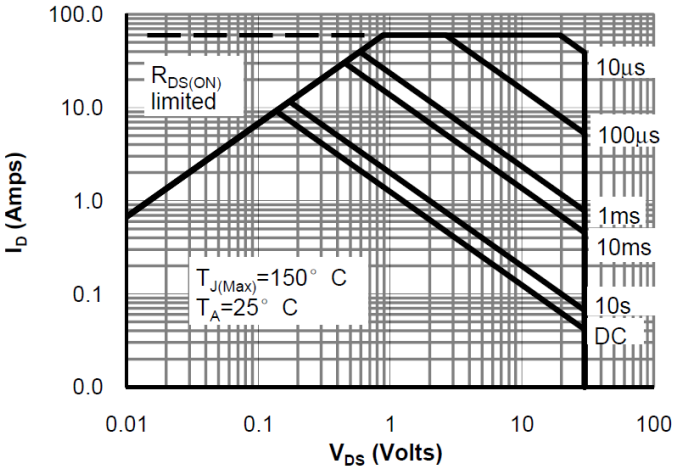


Figure 10: Maximum Forward Biased Safe Operating Area

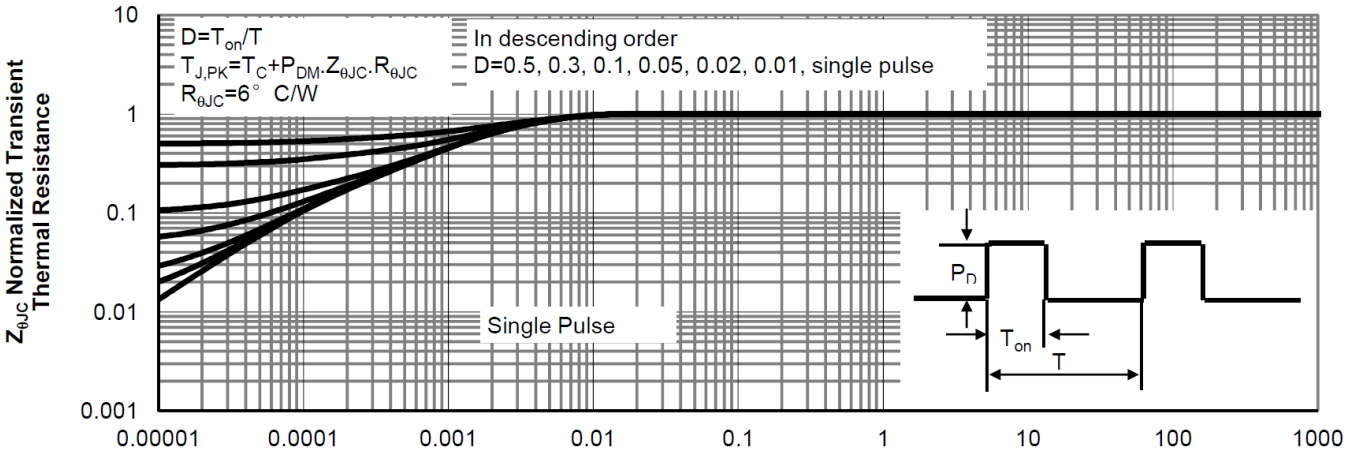
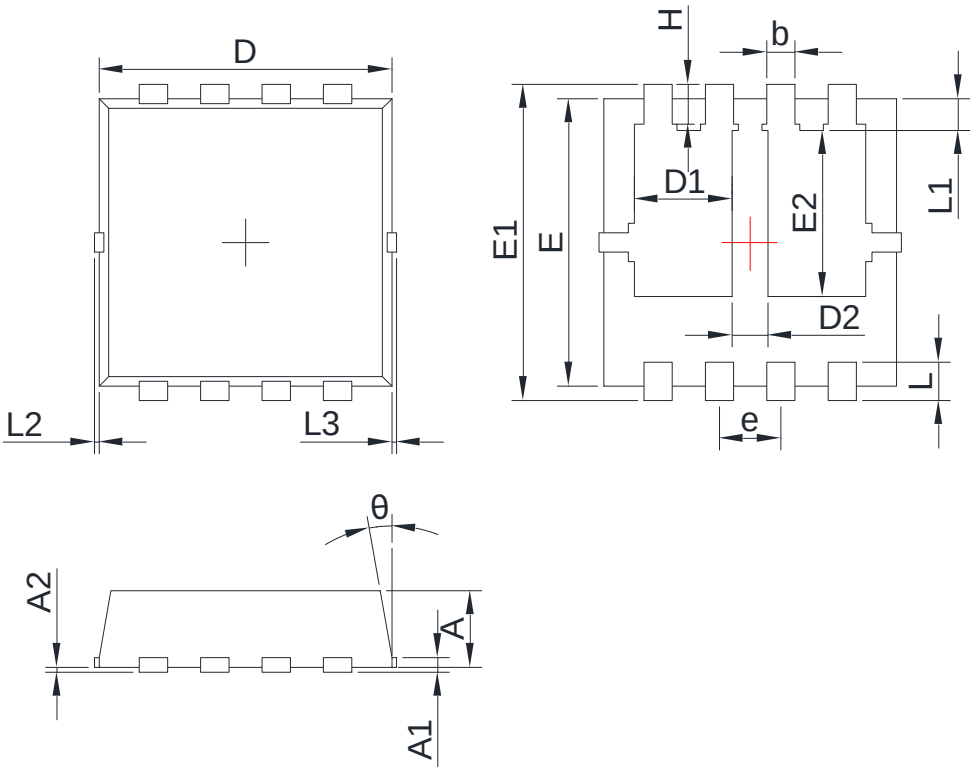


Figure 11: Normalized Maximum Transient Thermal Impedance

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				

DISCLAIMER

ELECSUPER PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with ElecSuper products. You are solely responsible for
(1) selecting the appropriate ElecSuper products for your application;
(2) designing, validating and testing your application;
(3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.
These resources are subject to change without notice. ElecSuper grants you permission to use these resources only for development of an application that uses the ElecSuper products described in the resource. Other reproduction and display of these resources are prohibited. No license is granted to any other ElecSuper intellectual property right or to any third party intellectual property right. ElecSuper disclaims responsibility for, and you will fully indemnify ElecSuper and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources. ElecSuper’s products are provided subject to ElecSuper’s Terms of Sale or other applicable terms available either on www.elecsuper.com or provided in conjunction with such ElecSuper products. ElecSuper’s provision of these resources does not expand or otherwise alter ElecSuper’s applicable warranties or warranty disclaimers for ElecSuper products.