

## 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,  $R_{DS(ON)}=7.3m\Omega(TYP.) @V_{GS}=10V$
- Reliable and rugged
- $R_{DS(ON)}=11.5m\Omega(TYP.) @V_{GS}=4.5V$
- Avalanche Rated
- High density cell design for low  $R_{DS(on)}$
- Low leakage current
- Material: Halogen free

## 3. Applications

- PWM applications 100% UIS TESTED
- 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 Size
ESN4838	PDFN3*3-8L	.DNH03R085/lot	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

Table-1 Ordering information

## 5. Pin Configuration and Functions


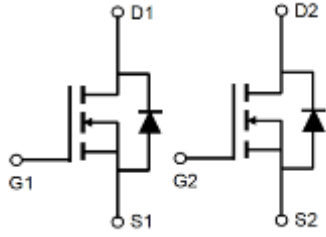
Pin	Function	Outline	Circuit Diagram
1	Source1	Note 2  	
2	Gate1		
7/8	Drain1		
3	Source2		
4	Gate2		
5/6	Drain2		

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	$I_D$	$T_C=25^{\circ}C$	30
		$T_C=100^{\circ}C$	25
Maximum Power Dissipation	$P_D$	23	W
Pulsed Drain Current	$I_{DM}$	120	A
Avalanche Current, Single Pulsed <sup>a</sup>	$I_{AS}$	14	A
Avalanche Energy, Single Pulsed <sup>a</sup>	$E_{AS}$	49	mJ
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	Unit
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	5.5	°C/W

#### Notes:

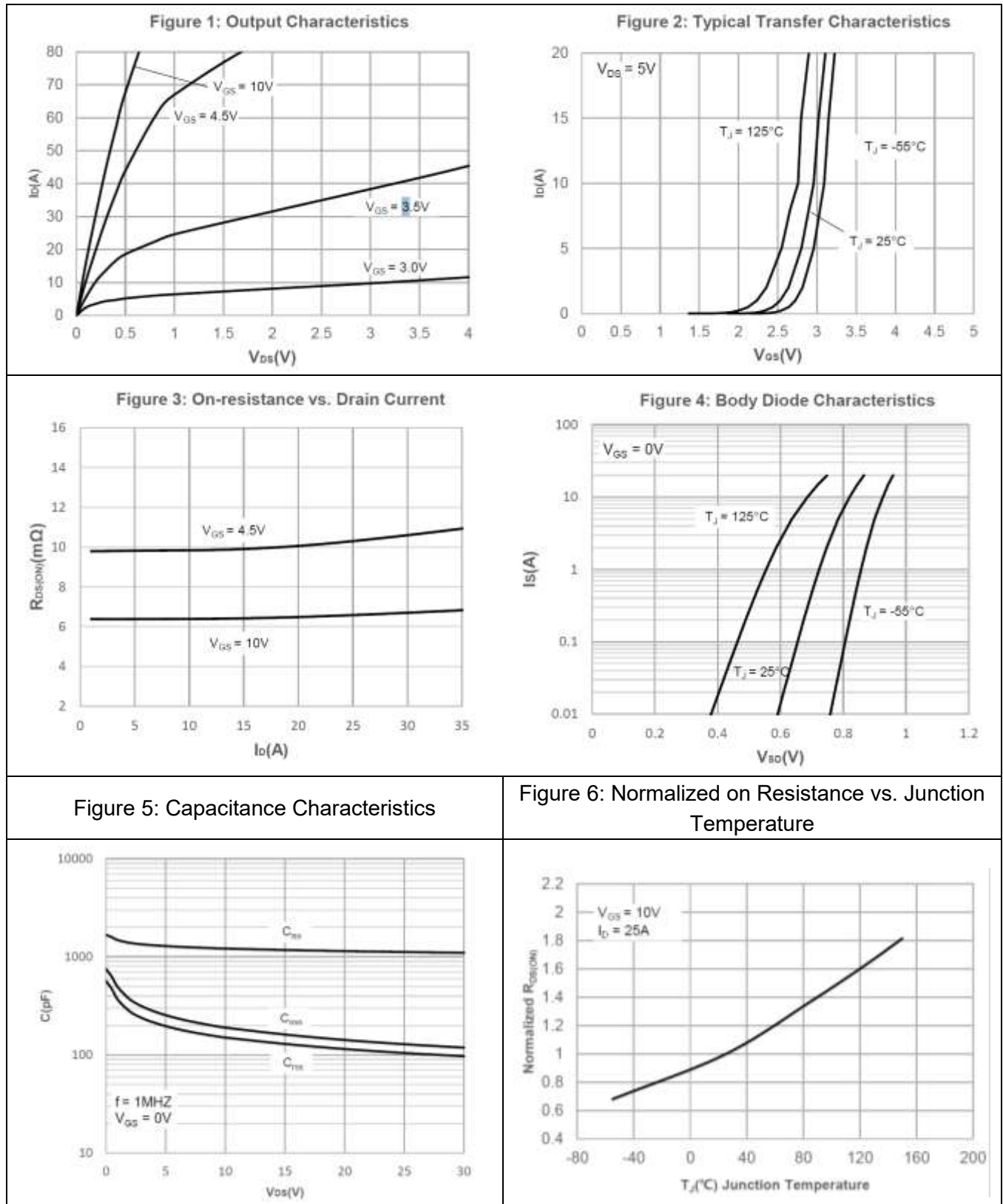
1. EAS condition :  $T_J=25^{\circ}C, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=14A$ .
2. This diagram is only an electrical schematic, and the actual pin size is based on POD.

## Electrical Characteristics

At TA = 25°C unless otherwise specified

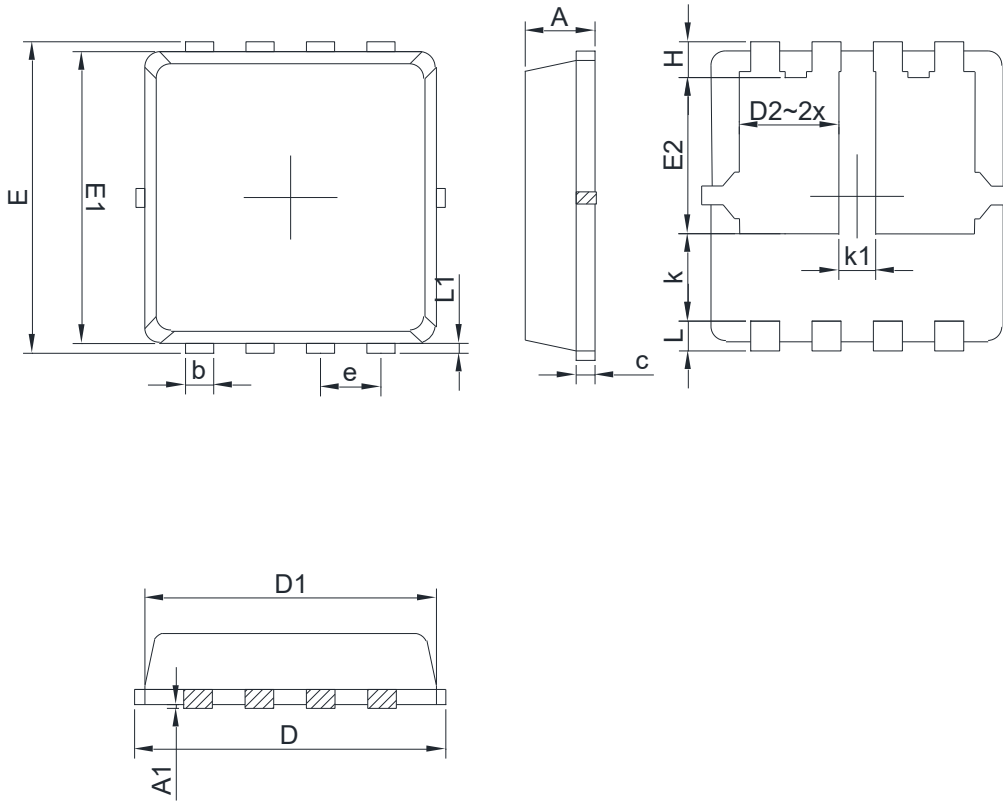
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$			1.0	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	2.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=25A$		7.3	8.5	m $\Omega$
		$V_{GS}=4.5V, I_D=15A$		11.5	15	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, f=1MHz, V_{DS}=15V$		1175		pF
Output Capacitance	$C_{OSS}$			160		
Reverse Transfer Capacitance	$C_{RSS}$			130		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=15V, I_D=20A$		25		nC
Gate-to-Source Charge	$Q_{GS}$			4.5		
Gate-to-Drain Charge	$Q_{GD}$			5.5		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=15V, I_D=15A, R_{GEN}=3\Omega$		7		ns
Rise Time	$t_r$			15		
Turn-Off Delay Time	$t_{d(OFF)}$			25		
Fall Time	$t_f$			6		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=30A$			1.5	V

## 7. Typical Characteristic



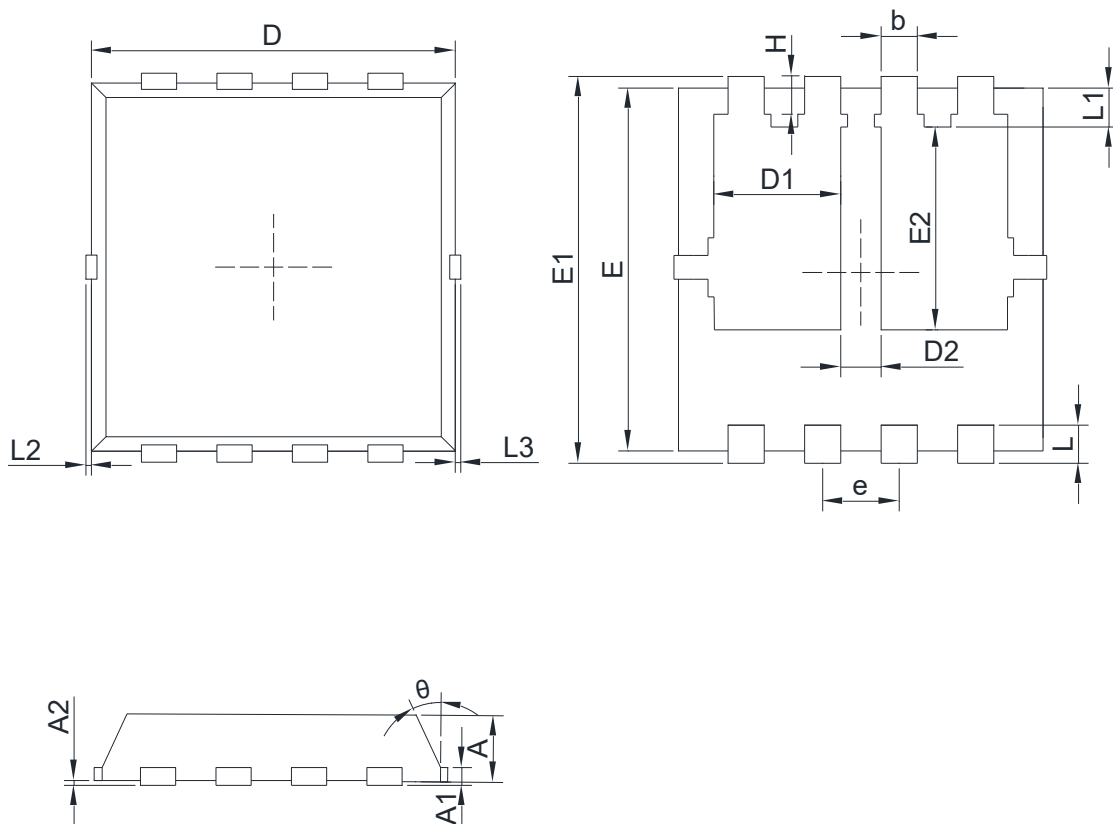
### 8. Dimension (PDFN3\*3-8L)

#### POD A(Q)



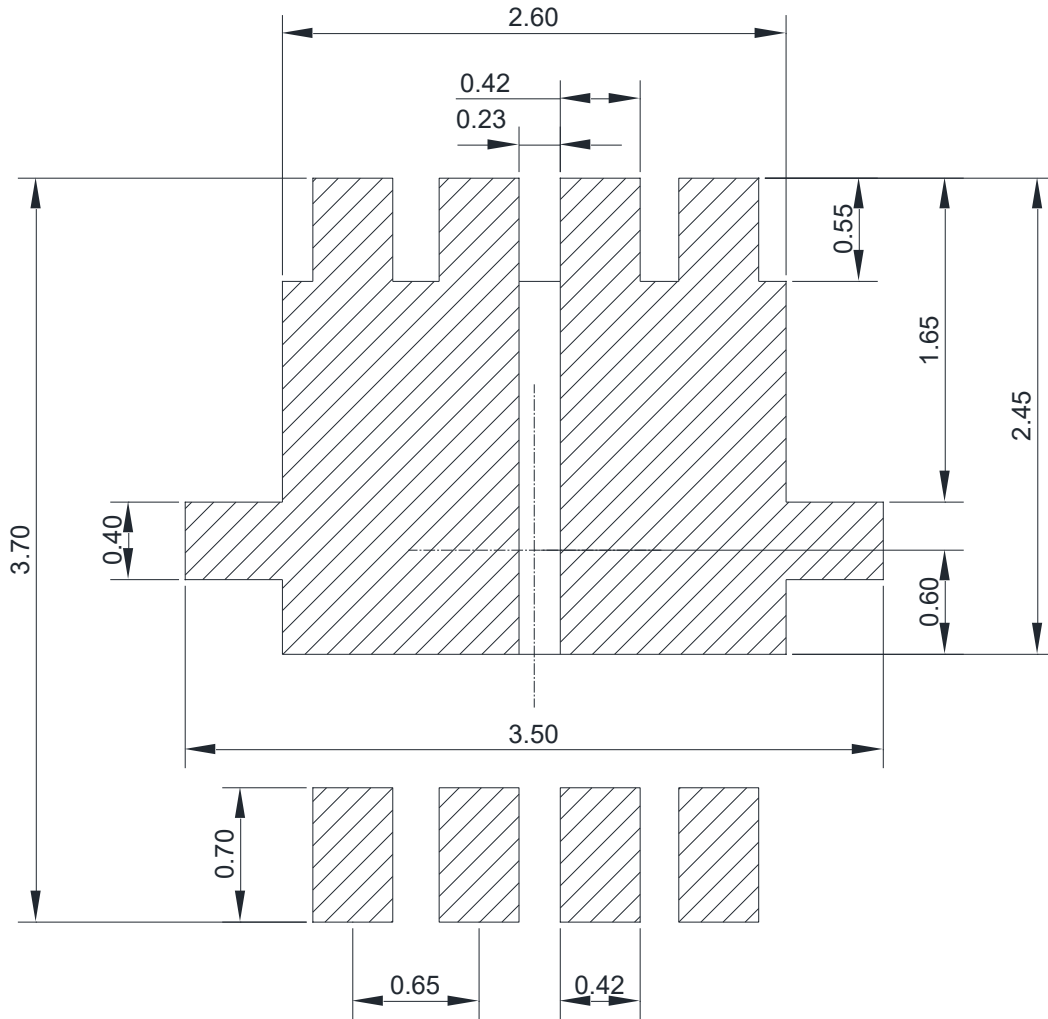
Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	Min.	NOM.	Max.		Min.	NOM.	Max.
A	0.65	0.75	0.85	H	0.385	0.485	0.585
A1			0.05	k	0.30		
b	0.20	0.30	0.40	L	0.30	0.40	0.50
c	0.10	0.15	0.25	e	0.65BCS		
D	3.05	3.20	3.35	L1	0.025	0.125	0.225
D1	3.05	3.15	3.25	D2	0.89	1.04	1.19
E	3.25	3.35	3.45	E2	1.55	1.70	1.85
E1	3.00	3.10	3.20	k1	0.23	0.38	0.53

POD B(X)



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

9. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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