

**SuperMOS – PDFN3\*3-8L 100V  $V_{DSS}$ , 82m $\Omega$   $R_{DS(ON)}$ , 10A  $I_D$  N-channel MOSFET**

**1. Description**

The ESN4486 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 ESN4486 is Pb-free.

**2. Features**

- 100V,  $R_{DS(ON)}$ =82m $\Omega$ (Tpy),  $V_{GS}$ =10V  
 $R_{DS(ON)}$ =90m $\Omega$ (Tpy),  $V_{GS}$ =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**


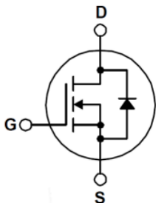
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**100% UIS TESTED!**

**4. Ordering Information**

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESN4486	PDFN3*3-8L	ESN4486/lot	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

**5. Pin Configuration and Functions**

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

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$BV_{DSS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	10
		$T_C=75^\circ\text{C}$	8
Maximum Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	20
		$T_C=75^\circ\text{C}$	12
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	40	A
Avalanche Current, Single Pulsed <sup>b</sup>	IAS	12.5	A
Avalanche Energy, Single Pulsed <sup>b</sup>	EAS	23.4	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	Maximum	Unit	
Junction-to-Ambient Thermal Resistance	$t \leq 10 \text{ s}$	$R_{\theta JA}$	110	°C/W	
Junction-to-Case Thermal Resistance <sup>c</sup>	Steady State	$R_{\theta JC}$	6.3		

Note:

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

b: EAS condition:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=50\text{V}$ ,  $V_G=10\text{V}$ ,  $L=0.3\text{mH}$ ,  $R_g=25\Omega$

c: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

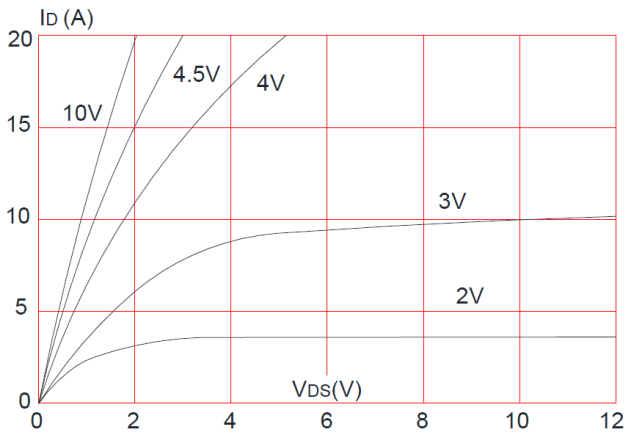
## Electrical Characteristics

At TA = 25°C unless otherwise specified

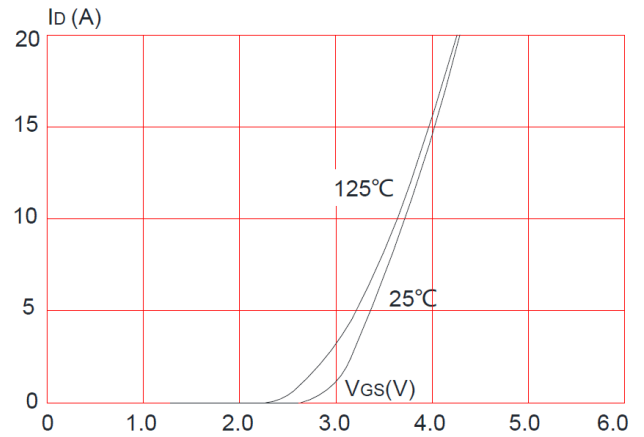
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$			1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.8	3.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$		82	122	m $\Omega$
		$V_{GS}=4.5V, I_D=3A$		90	142	
Forward Trans conductance	$g_{FS}$	$V_{DS}=5.0V, I_D=5A$			40	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, f=1MHz, V_{DS}=25V$		815		pF
Output Capacitance	$C_{OSS}$			50		
Reverse Transfer Capacitance	$C_{RSS}$			35		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=4.5V, V_{DS}=50V, I_D=2A$		12		nC
Gate-to-Source Charge	$Q_{GS}$			2.6		
Gate-to-Drain Charge	$Q_{GD}$			2.8		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=50V, R_L=1\Omega, R_G=3\Omega$		7		ns
Rise Time	$t_r$			5		
Turn-Off Delay Time	$t_{d(OFF)}$			18		
Fall Time	$t_f$			8		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A$		0.7	1.2	V

## 7. Typical Characteristic

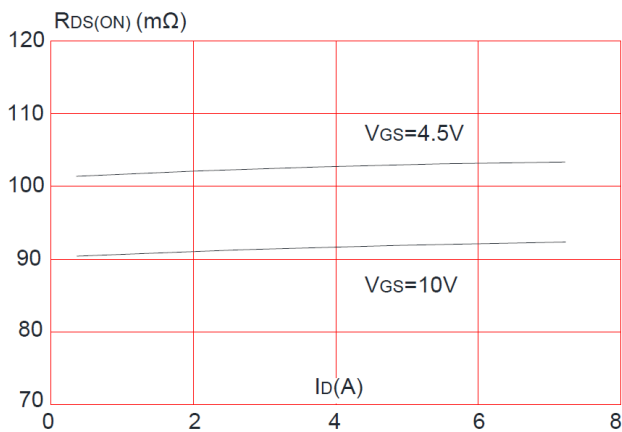
**Figure 1: Output Characteristics**



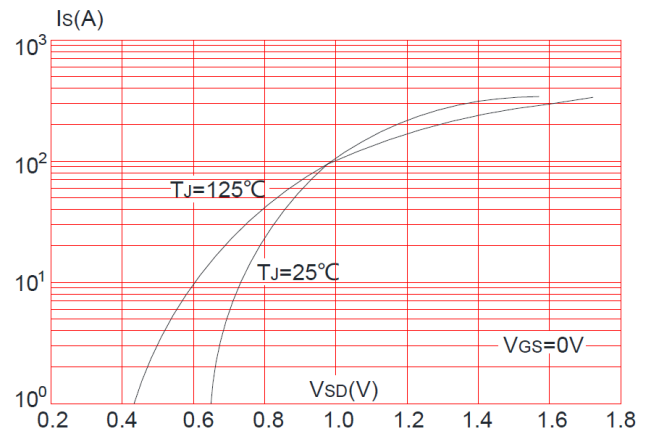
**Figure 2: Typical Transfer Characteristics**



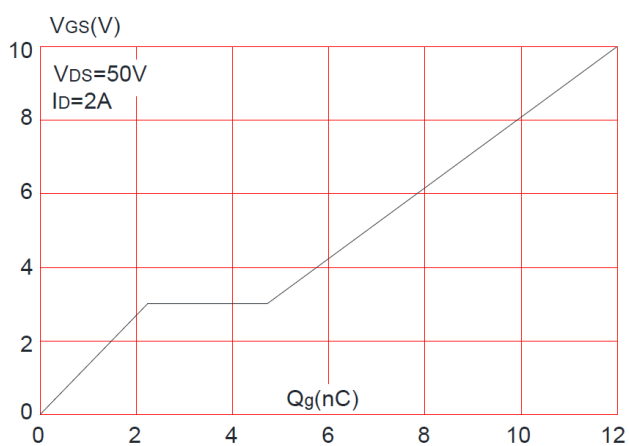
**Figure 3: On-resistance vs. Drain Current**



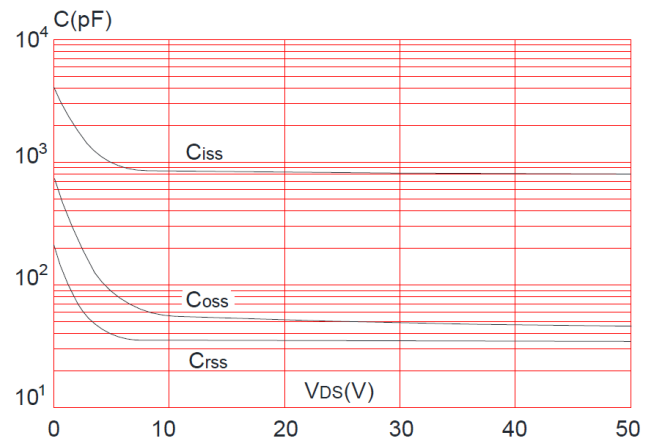
**Figure 4: Body Diode Characteristics**



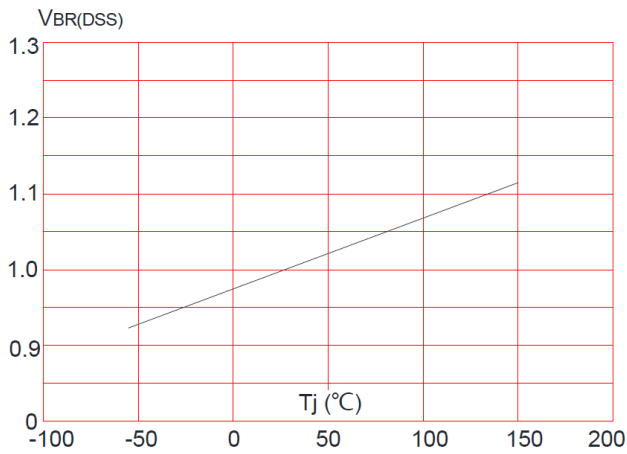
**Figure 5: Gate Charge Characteristics**



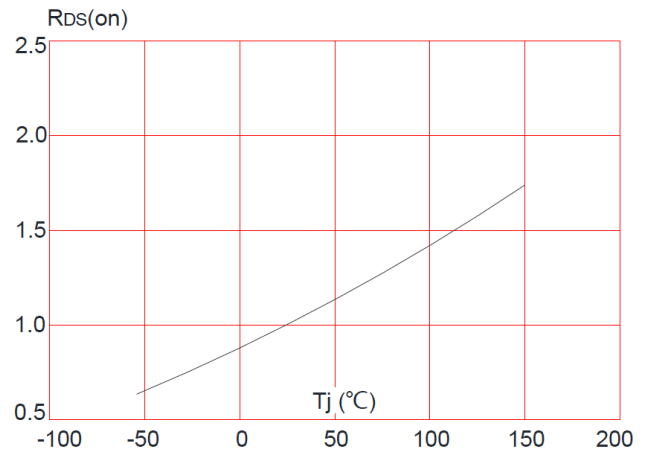
**Figure 6: Capacitance Characteristics**



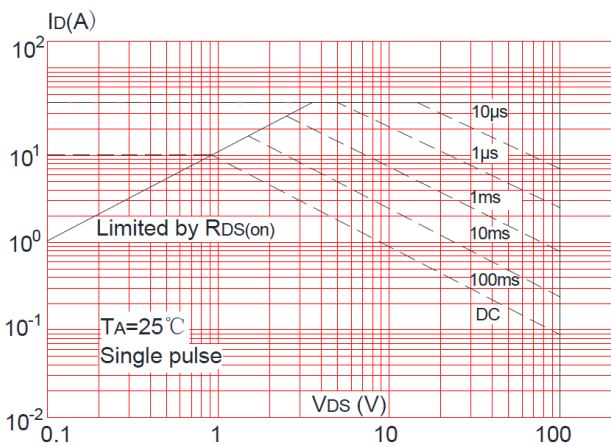
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



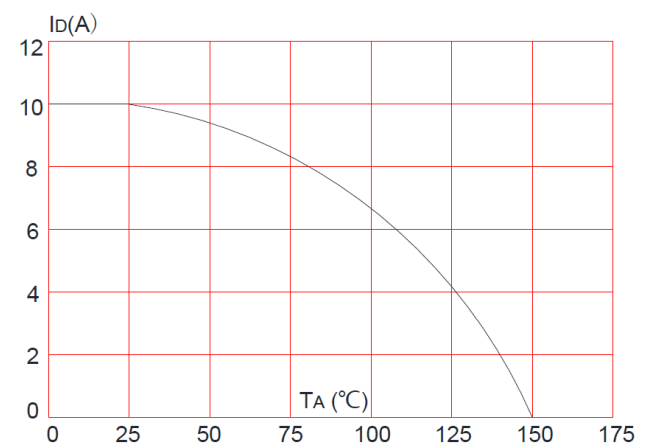
**Figure 8:** Normalized on Resistance vs. Junction Temperature



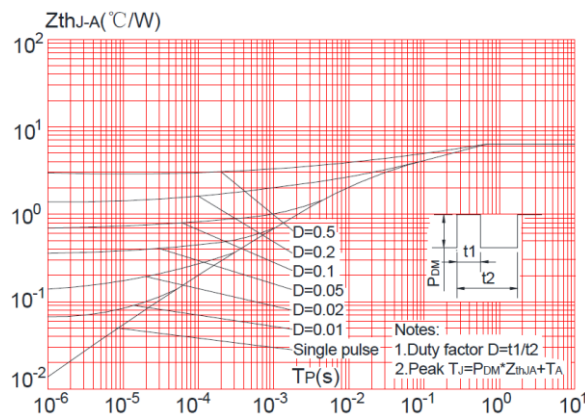
**Figure 9:** Maximum Safe Operating Area



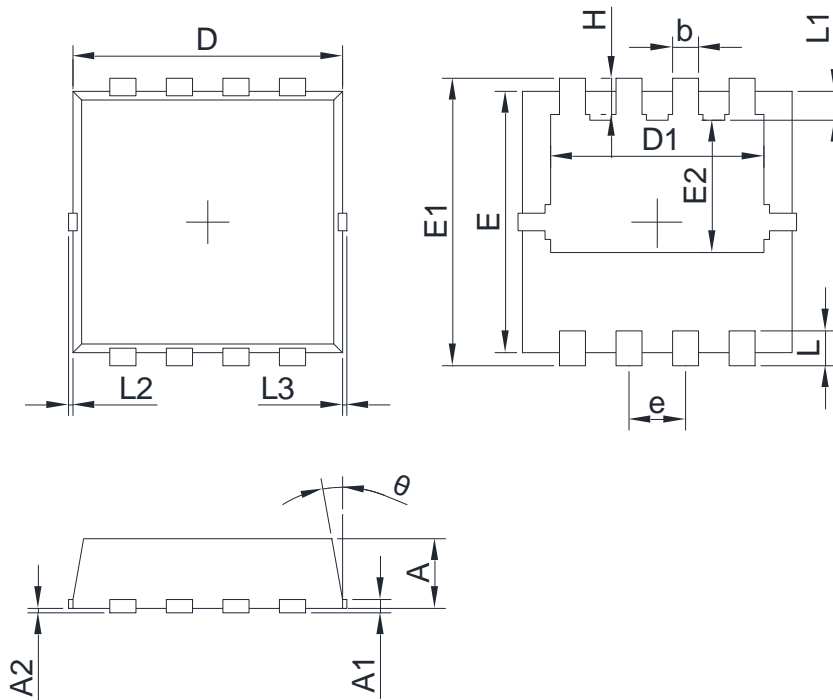
**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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



Unit: mm

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	2.300	2.450	2.600	L2	0~0.100		
E	2.900	3.000	3.100	L3	0~0.100		
E1	3.150	3.300	3.450	H	0.315	0.415	0.515
E2	1.320	1.520	1.720	theta	8°	10°	12°

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