SuperMOS – PDFN3*3-8L 100V BV_{DSS},82mΩ $R_{DS(ON)}$,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, $R_{DS(ON)}$=82mΩ(Tpy), V_{GS}=10V
  $R_{DS(ON)}$=90mΩ(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

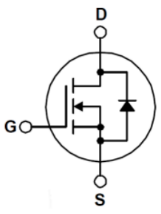
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

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 ℃ ambient temperature unless otherwise specified.

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

Note:

a: Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%

b: EAS condition：Tj=25℃,V_{DD}=50V,V_G=10V,L=0.3mH,Rg=25Ω

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

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	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			1	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	1.8	3.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=5A		82	122	mΩ
		V_{GS}=4.5V, I_D=3A		90	142	
Forward Trans conductance	g_{FS}	V_{DS}=5.0V, I_D=5A			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
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		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=10V, V_{DS}=50V, R_L=1Ω, R_G=3Ω		7		ns
Rise Time	t_r			5		
Turn-Off Delay Time	$t_{d(OFF)}$			18		
Fall Time	t_f			8		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A		0.7	1.2	V

7. Typical Characteristic

Figure1: Output Characteristics

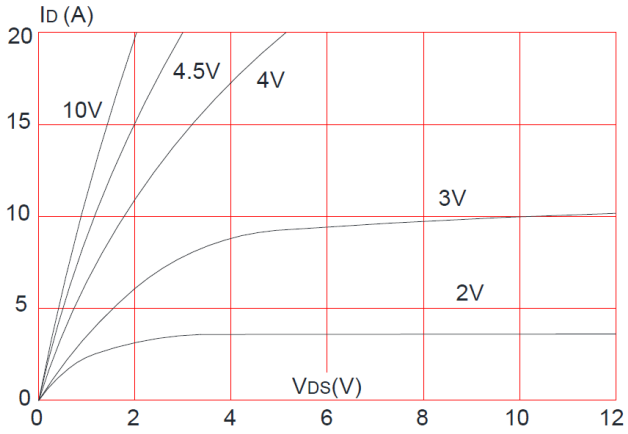


Figure 2: Typical Transfer Characteristics

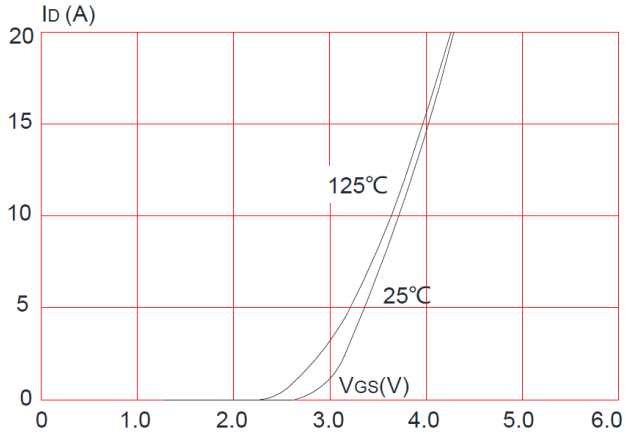


Figure 3: On-resistance vs. Drain Current

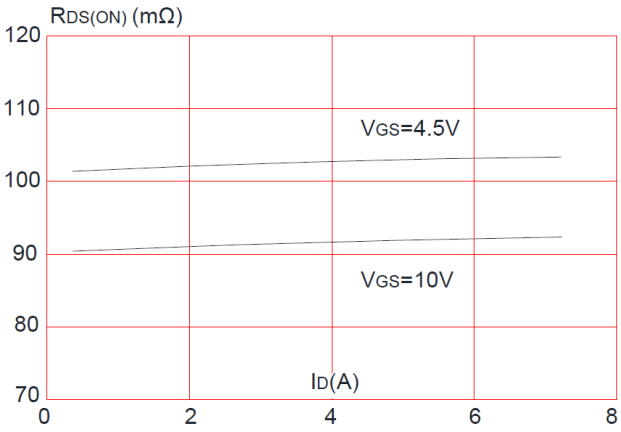


Figure 4: Body Diode Characteristics

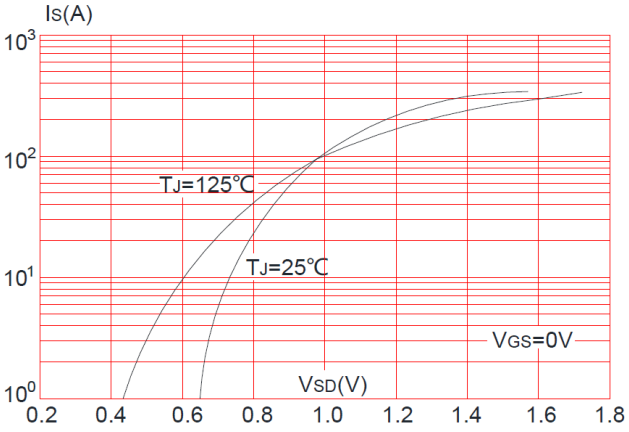


Figure 5: Gate Charge Characteristics

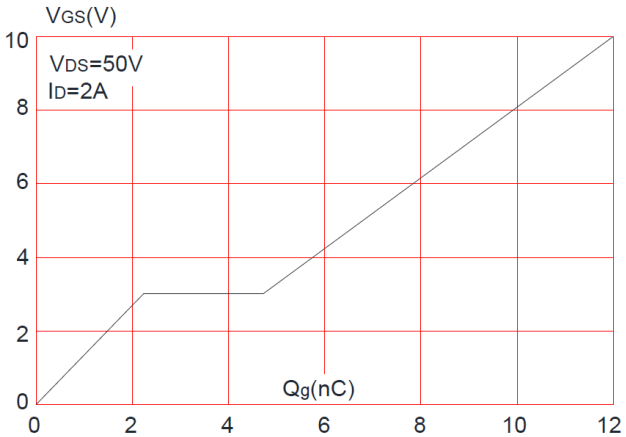


Figure 6: Capacitance Characteristics

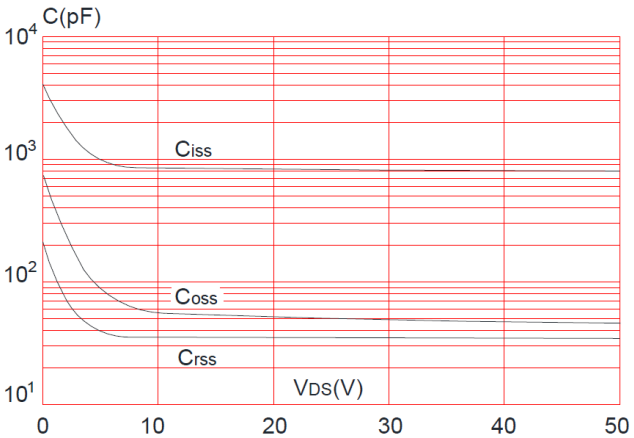


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

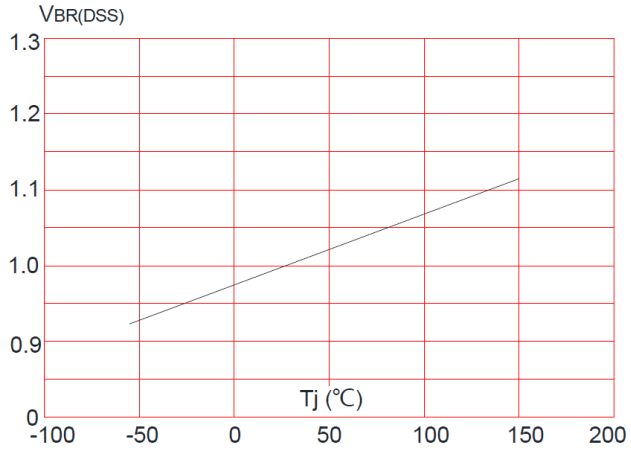


Figure 8: Normalized on Resistance vs. Junction Temperature

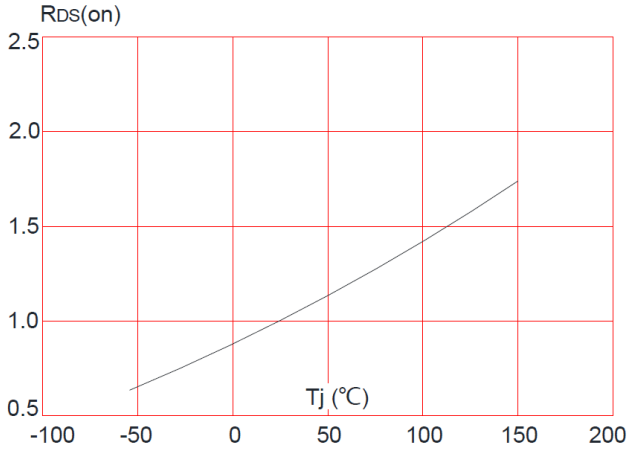


Figure 9: Maximum Safe Operating Area

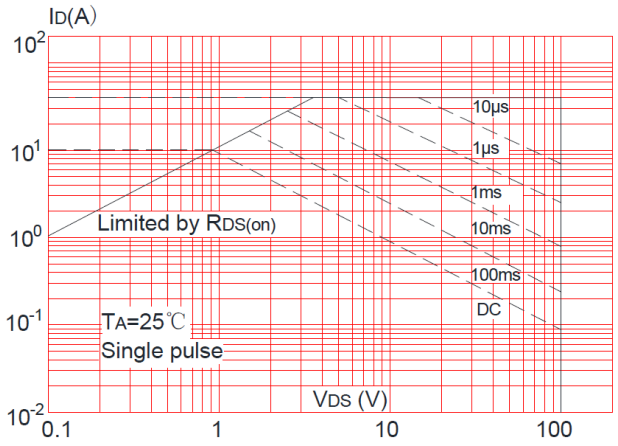


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

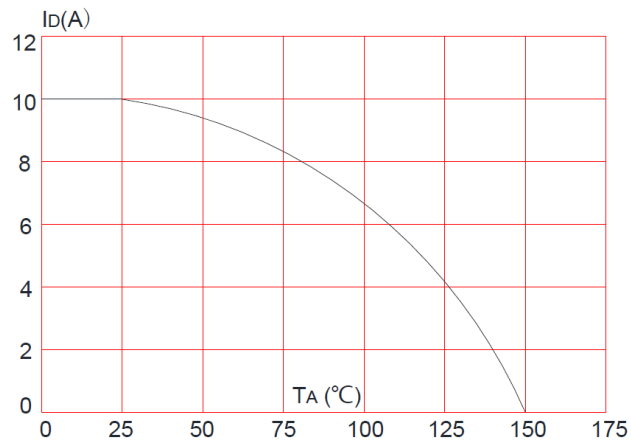
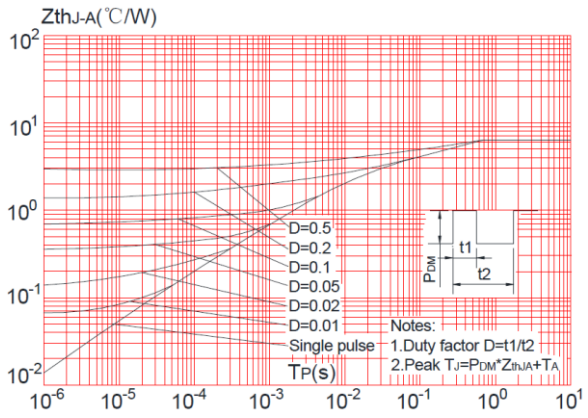
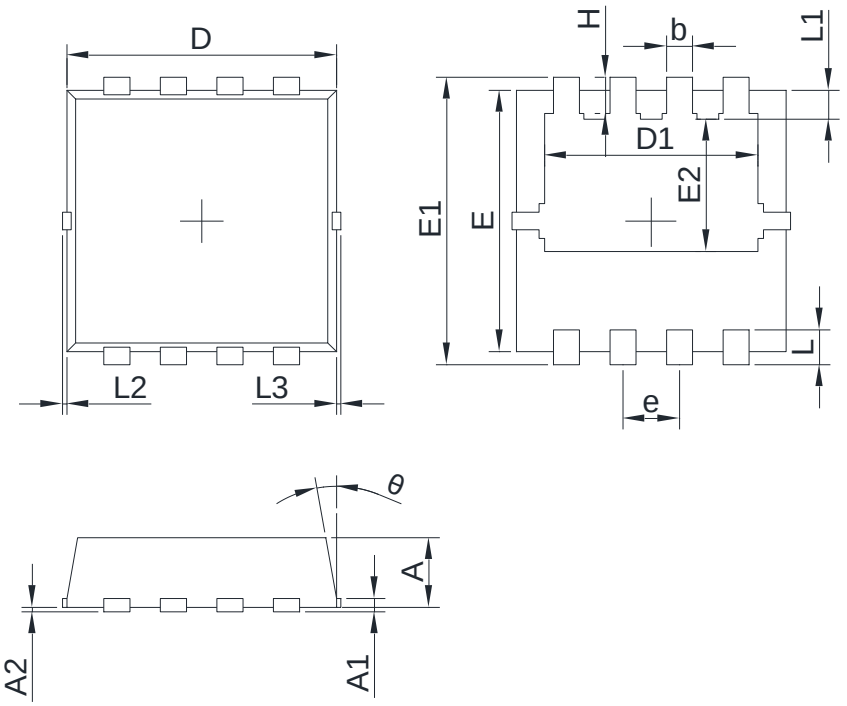


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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	θ	8°	10°	12°

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