SuperMOS - PDFN3X3-8L -40V BV_{DSS},13mΩ $R_{DS(on)}$, -34A I_D P-channel MOSFET

1. Description

The ESN4485 is P-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 ESN4485 is Pb-free.

2. Features

- -40V, $R_{DS(ON)}$=13 mΩ(Typ), V_{GS}=-10V
  $R_{DS(ON)}$=17mΩ(Typ), V_{GS}=-4.5V
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

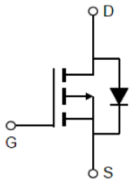
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED!

4. Ordering Information

Part Number	Package	Marking	Material	Quantity per reel	Flammability Rating
ESN4485	PDFN3X3-8L	ESN4485/LOT	Halogen free	5,000 PCS	UL 94V-0

5. Pin Configuration and Functions

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

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	-40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	-34	A
	T_C=75°C		-26	
Maximum Power Dissipation	T_C=25°C	P_D	30	W
	T_C=75°C		18	
Pulsed Drain Current [a]		I_{DM}	-120	A
Avalanche Current, Single Pulsed [b]		I_{AS}	34	A
Avalanche Energy, Single Pulsed [b]		E_{AS}	173	mJ
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{stg}	-55 to +150	°C

Thermal resistance ratings

Single Operation				
Parameter		Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	t ≤ 10 s	$R_{\theta JA}$	40	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	4.2	

Note:

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

b:Tj=25℃,V_{DD}=-30V,V_G=-10V,L=0.3mH,Rg=25Ω

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	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=-40V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.0	-1.6	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=-10V, I_D=-10A		13	16	mΩ
		V_{GS}=-4.5V, I_D=-7.5A		17	20	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS} =-20V, f=1MHz		2500		pF
Output Capacitance	C_{OSS}			260		
Reverse Transfer Capacitance	C_{RSS}			180		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=-10V, V_{DS}=-20V, I_D=-10A		42		nC
Gate-to-Source Charge	Q_{GS}			7		
Gate-to-Drain Charge	Q_{GD}			8.8		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=-10V, V_{DS}=-20V, R_L=1Ω, R_G=3Ω		10		ns
Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(OFF)}$			55		
Fall Time	t_f			30		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=-10A			-1.2	V

7. Typical Characteristic

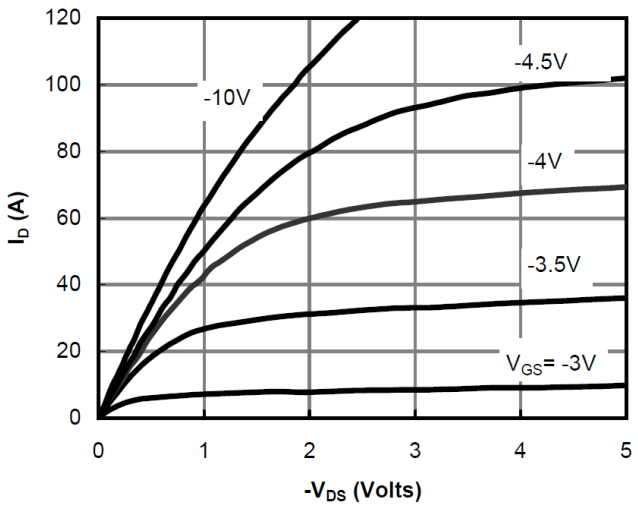


Figure 1: On-Region Characteristics

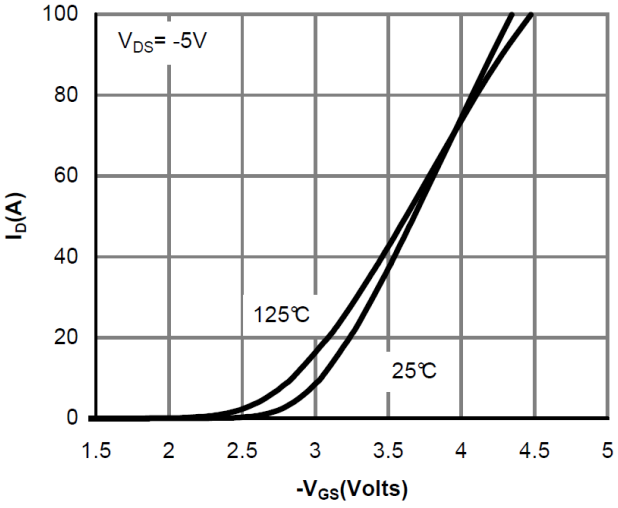


Figure 2: Transfer Characteristics

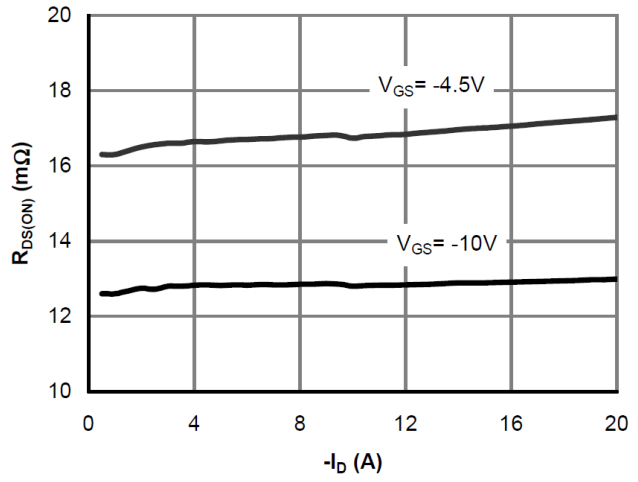


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

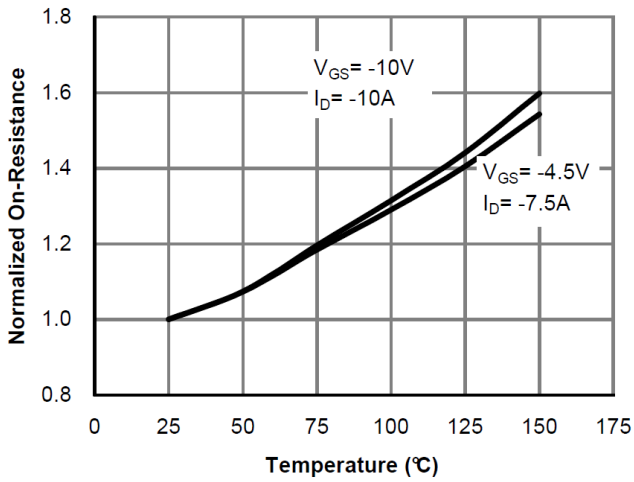


Figure 4: On-Resistance vs. Junction Temperature

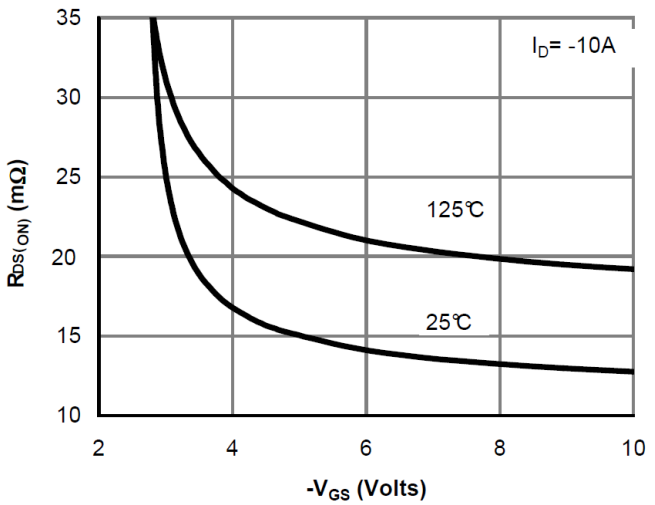


Figure 5: On-Resistance vs. Gate-Source Voltage

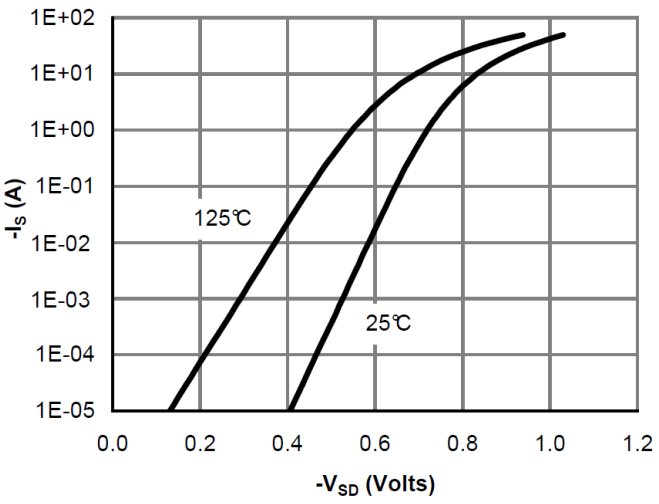


Figure 6: Body-Diode Characteristics

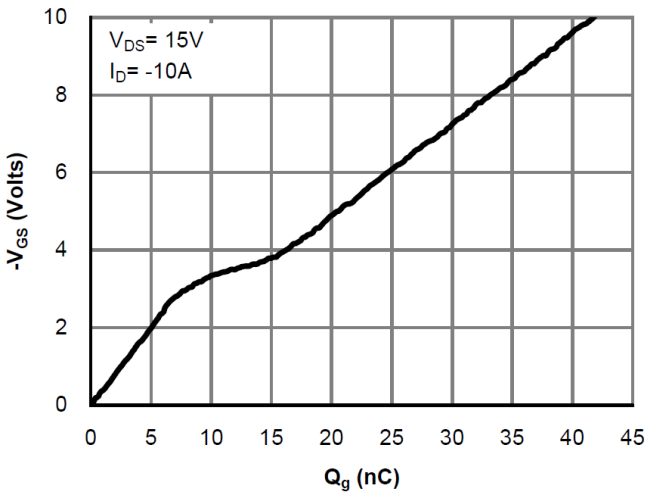


Figure 7: Gate-Charge Characteristics

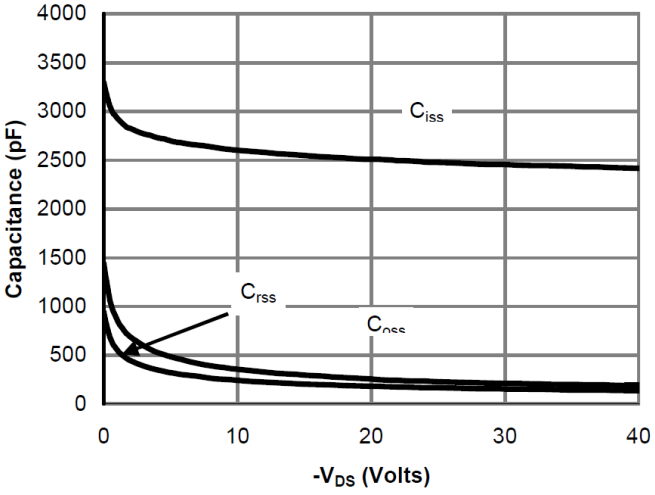


Figure 8: Capacitance Characteristics

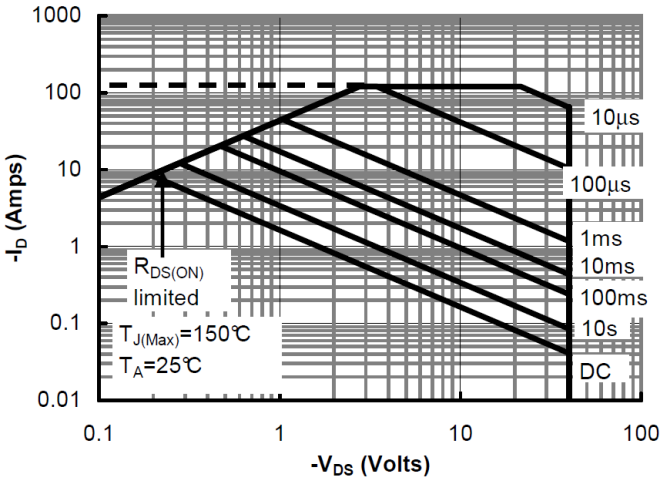


Figure 9: Maximum Forward Biased Safe Operating Area

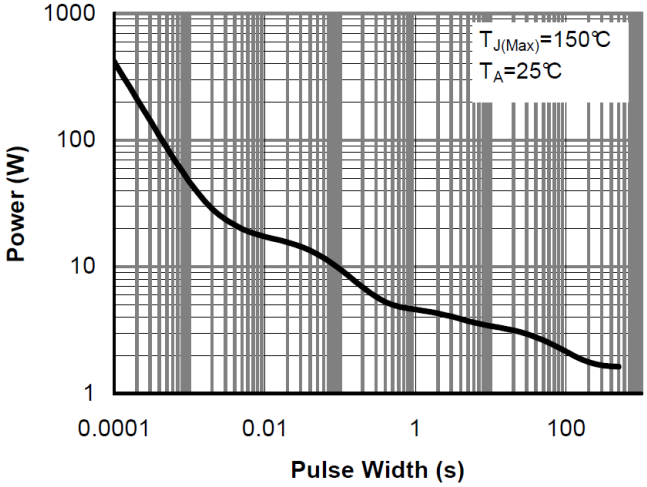


Figure 10: Single Pulse Power Rating Junction-to-Ambient

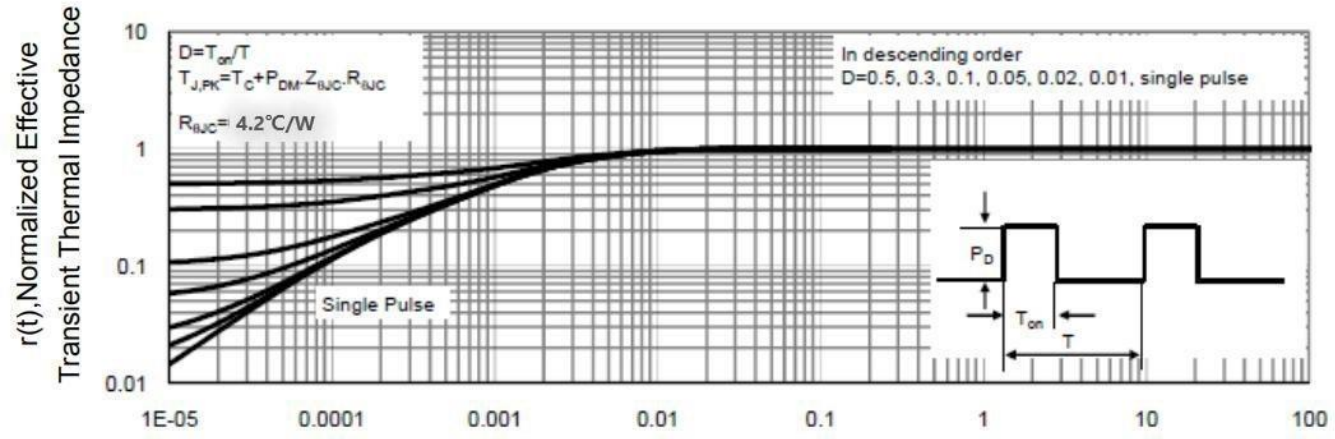
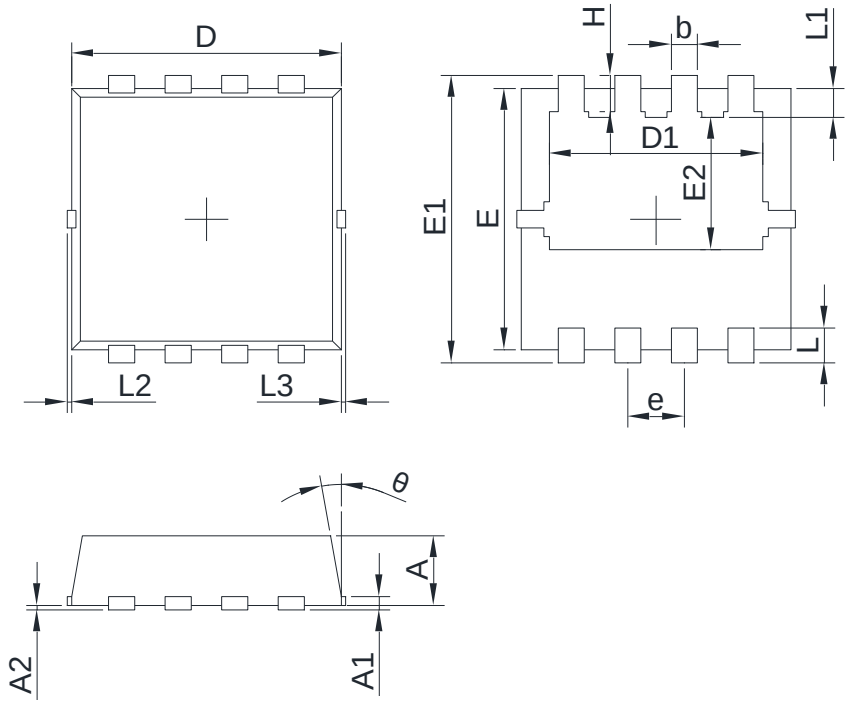


Figure 11 Normalized Maximum Transient Thermal Impedance

8. Dimension (PDFN3X3-8L)



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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