

SuperMOS –PDFN3*3-8L 30V BV_{DSS} , 10m Ω $R_{DS(on)}$, N-channel MOSFET

1. Description

The ESN7414 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 ESN7414 is Pb-free.

2. Features

- 30V, $R_{DS(ON)}=10.0m\Omega(TYP.) @V_{GS}=10V$
- $R_{DS(ON)}=13.5m\Omega(TYP.) @V_{GS}=4.5V$
- 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
ESN7414	PDFN3*3-8L	ESN7414/lot	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

Table-1 Ordering information

5. Pin Configuration and Functions


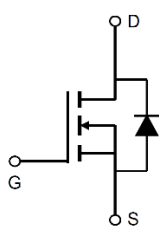
Pin	Function	Outline	Circuit Diagram
1/2/3	Source		
4	Gate		
5/6/7/8	Drain		

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	$T_C=25^\circ\text{C}$	I_D	23	A
	$T_C=75^\circ\text{C}$		18	
Maximum Power Dissipation	$T_C=25^\circ\text{C}$	P_D	15.7	W
	$T_C=75^\circ\text{C}$		9.4	
Pulsed Drain Current		I_{DM}	80	A
Avalanche Current, Single Pulsed ^a		I_{AS}	15.5	A
Avalanche Energy, Single Pulsed ^a		E_{AS}	36	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-Case Thermal Resistance	$t \leq 10 \text{ s}$	$R_{\theta JC}$		8	°C/W

Note:

a: EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.3\text{mH}$, $R_g=25\Omega$

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1.0	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.4	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		10	19	m Ω
		$V_{GS}=4.5V, I_D=8A$		13.5	26	
Forward Trans conductance	g_{FS}	$V_{DS}=5.0V, I_D=10A$			50	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, f=1MHz,$ $V_{DS}=15V$		600		pF
Output Capacitance	C_{OSS}			100		
Reverse Transfer Capacitance	C_{RSS}			70		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=15V,$ $I_D=10A$		14		nC
Gate-to-Source Charge	Q_{GS}			1.8		
Gate-to-Drain Charge	Q_{GD}			4		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=15V,$ $R_L=1.5\Omega, R_{GEN}=3\Omega$		5		ns
Rise Time	t_r			3.5		
Turn-Off Delay Time	$t_{d(OFF)}$			22		
Fall Time	t_f			4.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1.0A$	0.45		1.5	V

7. Typical Characteristic

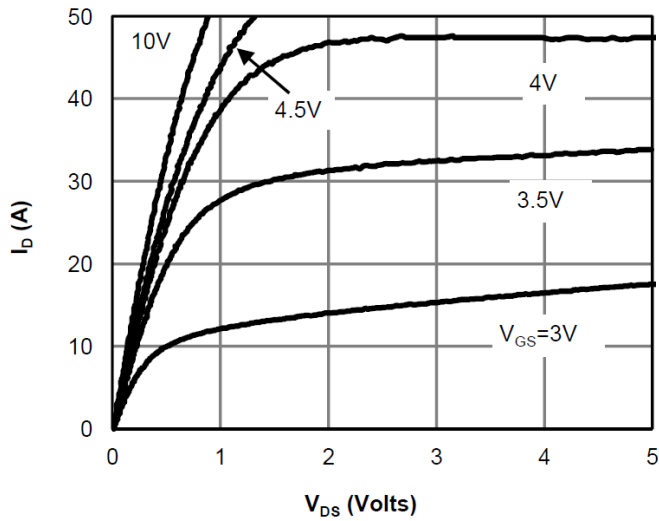


Fig 1: On-Region Characteristics

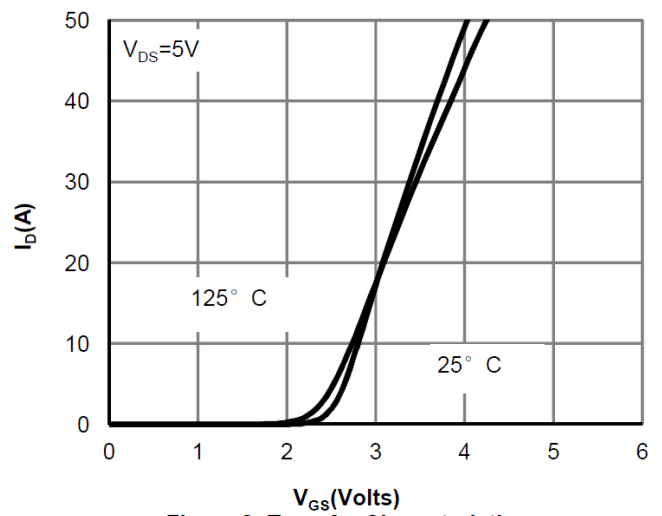


Figure 2: Transfer Characteristics

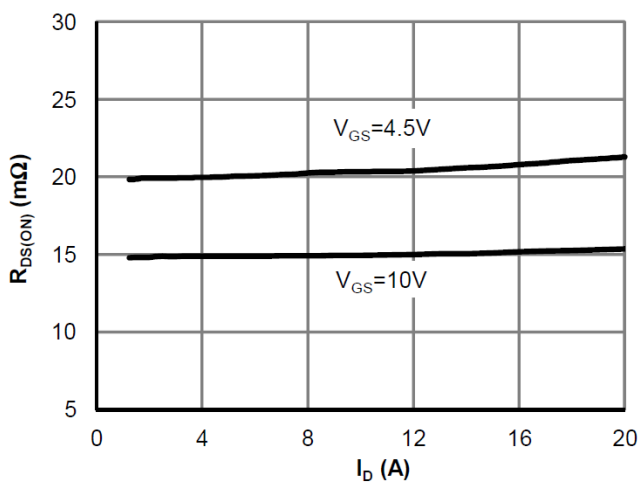


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

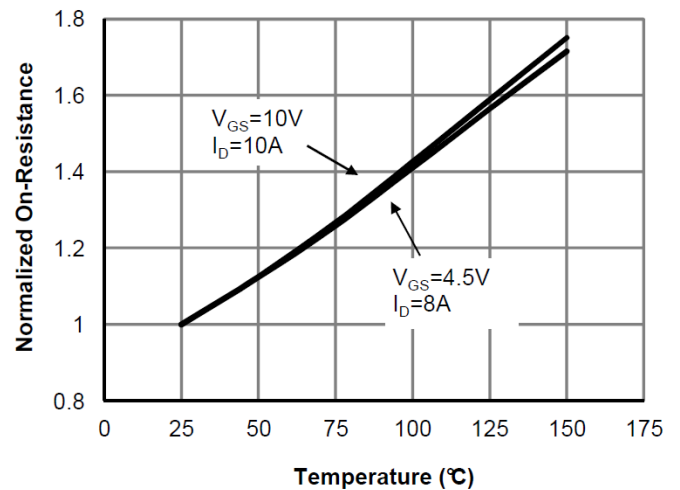


Figure 4: On-Resistance vs. Junction Temperature

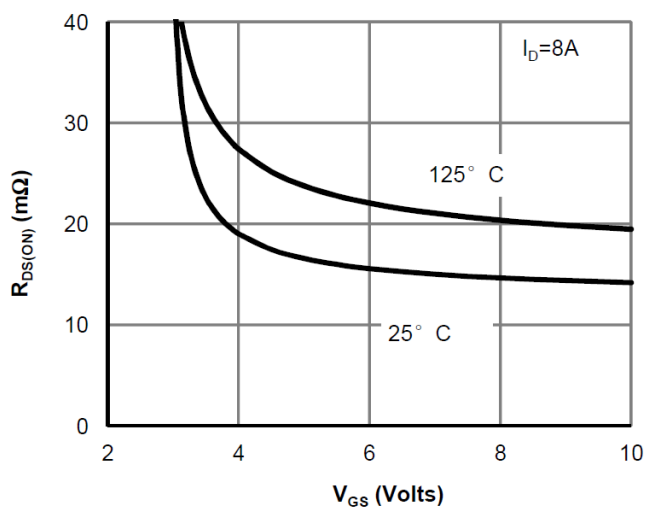


Figure 5: On-Resistance vs. Gate-Source Voltage

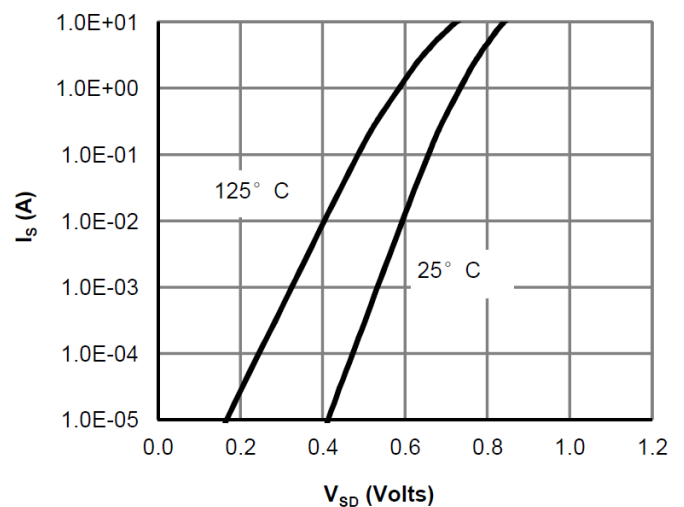


Figure 6: Body-Diode Characteristics

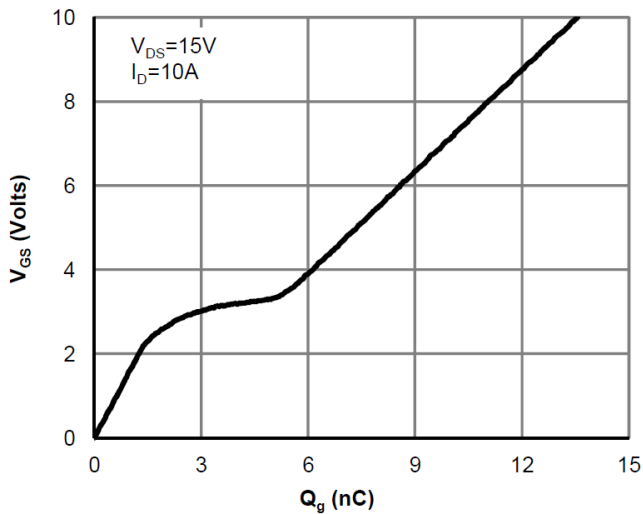


Figure 7: Gate-Charge Characteristics

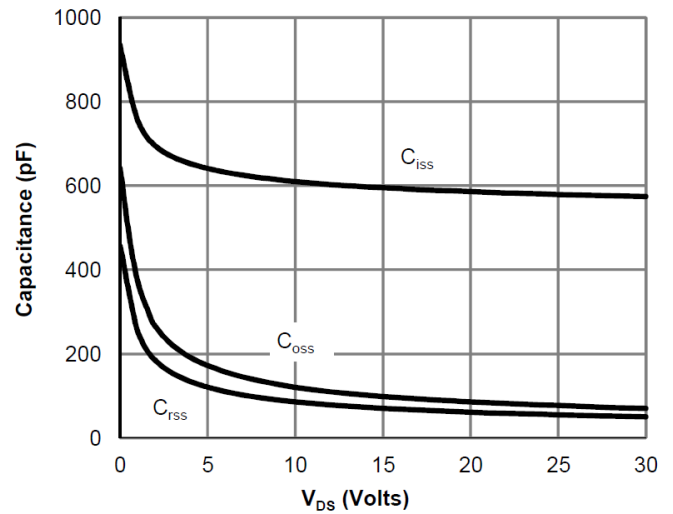


Figure 8: Capacitance Characteristics

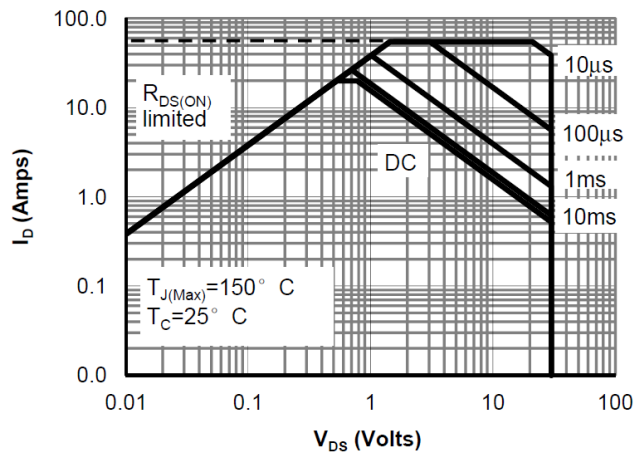


Figure 9: Maximum Forward Biased Safe Operating Area

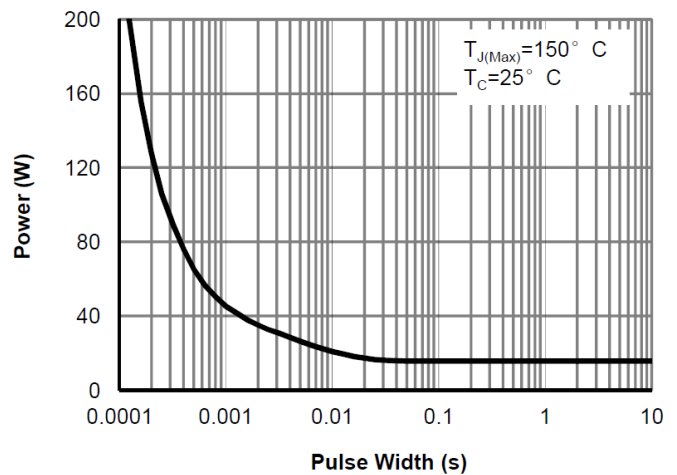


Figure 10: Single Pulse Power Rating Junction-to-Case

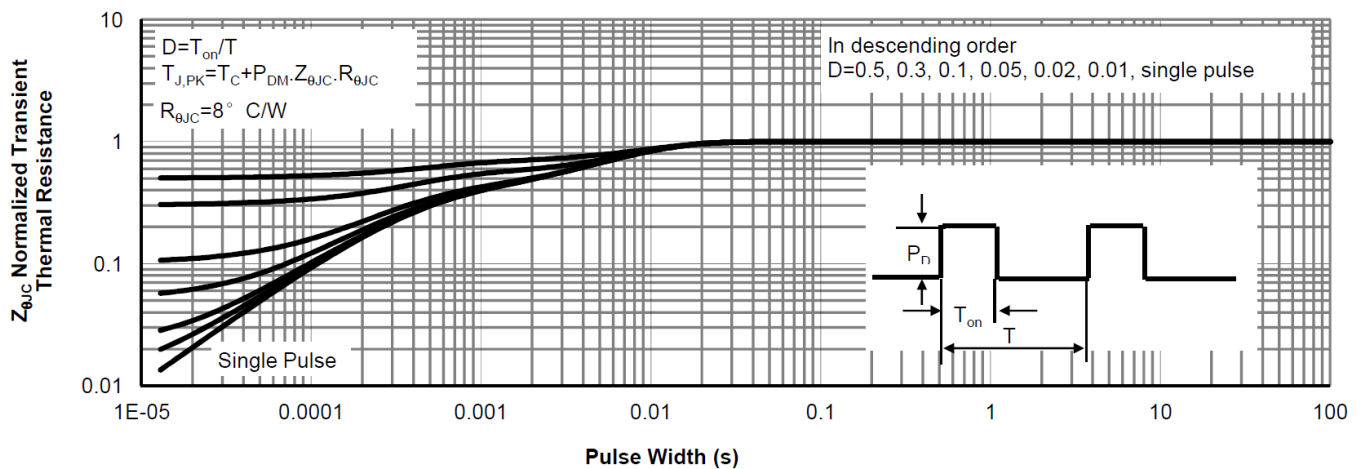
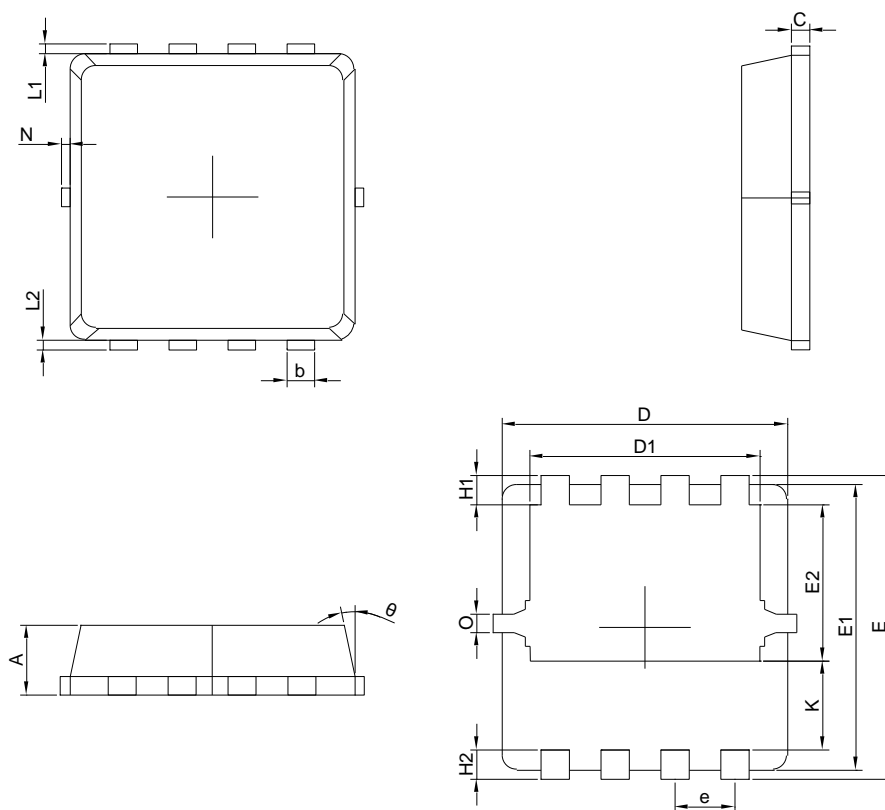


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (PDFN3*3-8L)



Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.65	0.75	0.85	e	0.65 BSC.		
b	0.25	0.30	0.35	H1	0.21	0.31	0.41
C	0.15	0.20	0.25	H2	0.30	0.40	0.50
D	3.00	3.10	3.20	K	0.78	0.88	0.98
D1	2.40	2.50	2.60	L1/L2	0.10 REF.		
E	3.20	3.30	3.40	theta	11°	12°	13°
E1	3.00	3.10	3.20	N	0	-	0.15
E2	1.60	1.70	1.80	O	0.2 REF.		

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