

SuperMOS – PDFN3*3-8L -20V BV_{DSS}, 8mΩ R_{DS(on)}, P-channel MOSFET

1. Description

The FDMC510P-ES 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 FDMC510P-ES is Pb-free.

2. Features

- -20V, R_{DS(ON)}=8mΩ(TYP.) @V_{GS}=-4.5V
- R_{DS(ON)}=11mΩ(TYP.) @V_{GS}=-2.5V
- 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	Packing	Quantity per reel	Flammability Rating	Reel Size
FDMC510P-ES	PDFN3*3-8L	ESN7407/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
4	Gate		
1/2/3	Source		
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}	-20	V	
Gate-Source Voltage	V_{GS}	± 12	V	
Continuous Drain Current	I_D	$T_C=25^\circ C$	-42	A
		$T_C=75^\circ C$	-32	
Maximum Power Dissipation	P_D	$T_C=25^\circ C$	30	W
		$T_C=75^\circ C$	18	
Pulsed Drain Current	I_{DM}	-160	A	
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$	
Storage Temperature Range	T_{stg}	-55 to 150	$^\circ C$	

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	30	40	$^\circ C/W$
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	3.5	4.2	

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}	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=-20V$			-1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.5	-0.65	-0.90	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-14A$		8	12	$m\Omega$
		$V_{GS}=-2.5V, I_D=-13A$		11	16	
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-14A$			100	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=-10V,$ $f=1MHz$		3500		pF
Output Capacitance	C_{OSS}			540		
Reverse Transfer Capacitance	C_{RSS}			440		
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$			6	Ω
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-4.5V, V_{DS}=-10V,$ $I_D=-14A$		45		nC
Gate-to-Source Charge	Q_{GS}			10		
Gate-to-Drain Charge	Q_{GD}			11		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-4.5V, V_{DS}=-10V,$ $R_L=0.75\Omega, R_G=3\Omega$		18		ns
Rise Time	t_r			32		
Turn-Off Delay Time	$t_{d(OFF)}$			136		
Fall Time	t_f			56		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=-1.0A$		-0.75	-1.2	V

7. Typical Characteristic

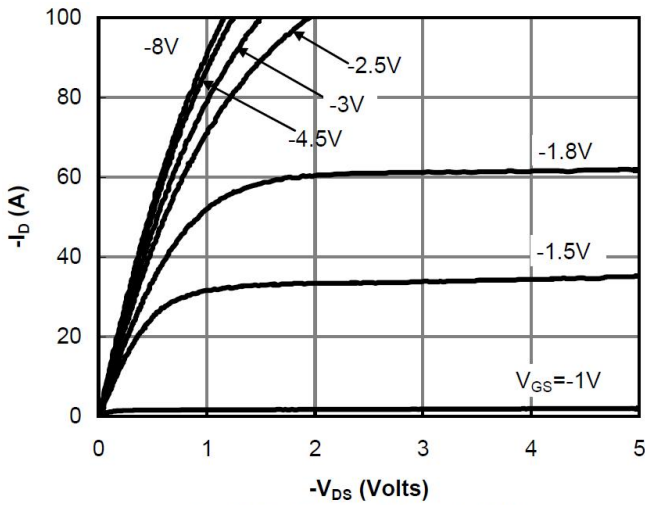


Fig 1: On-Region Characteristics

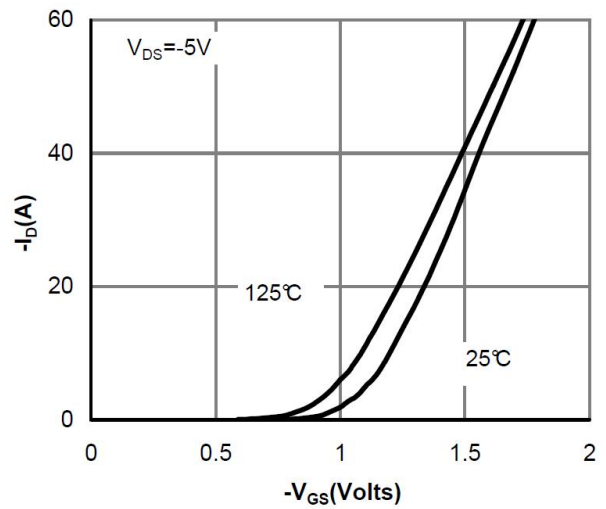


Figure 2: Transfer Characteristics

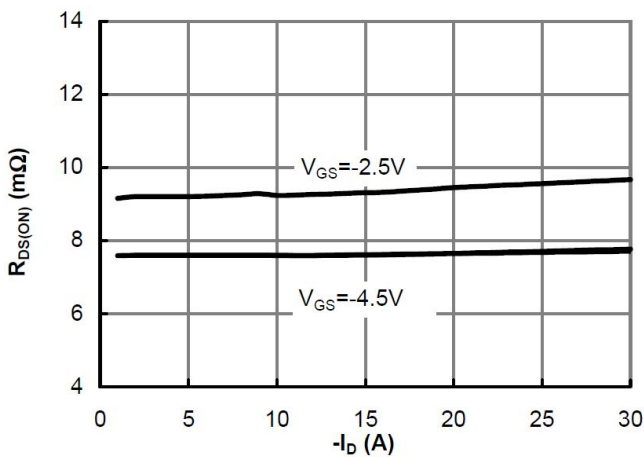


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

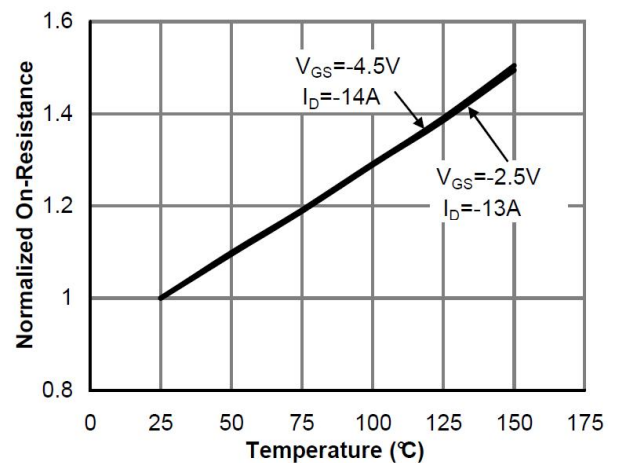


Figure 4: On-Resistance vs. Junction Temperature

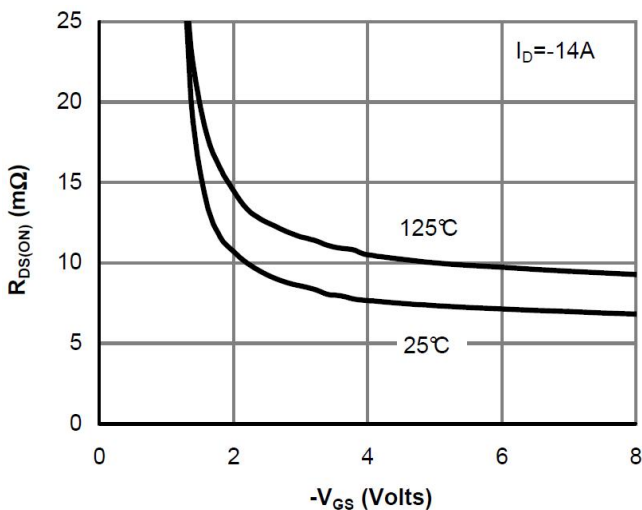


Figure 5: On-Resistance vs. Gate-Source Voltage

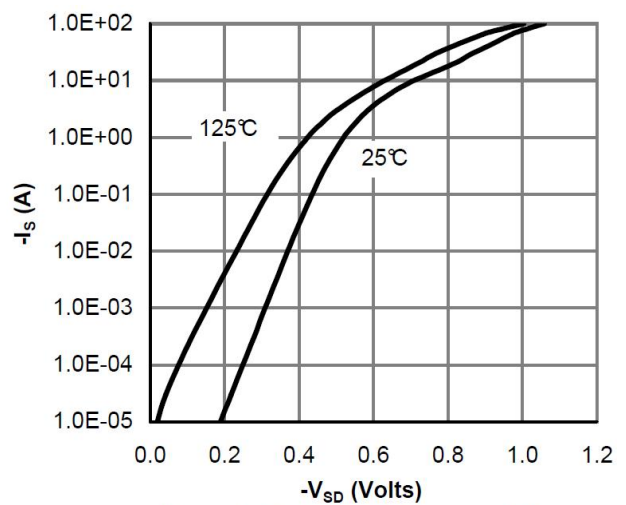


Figure 6: Body-Diode Characteristics

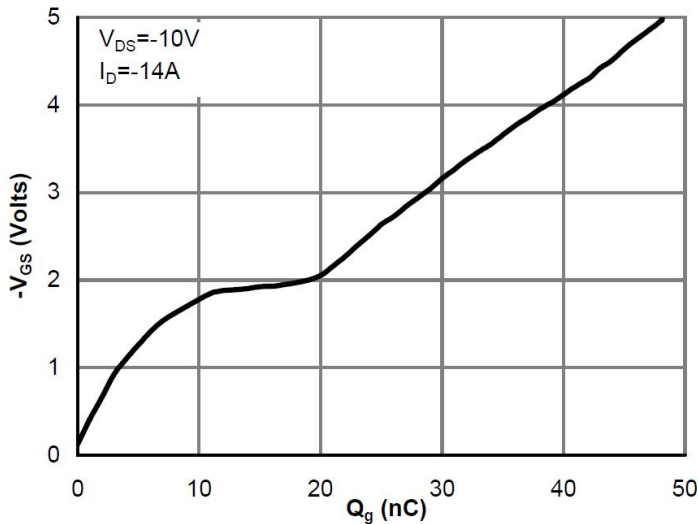


Figure 7: Gate-Charge Characteristics

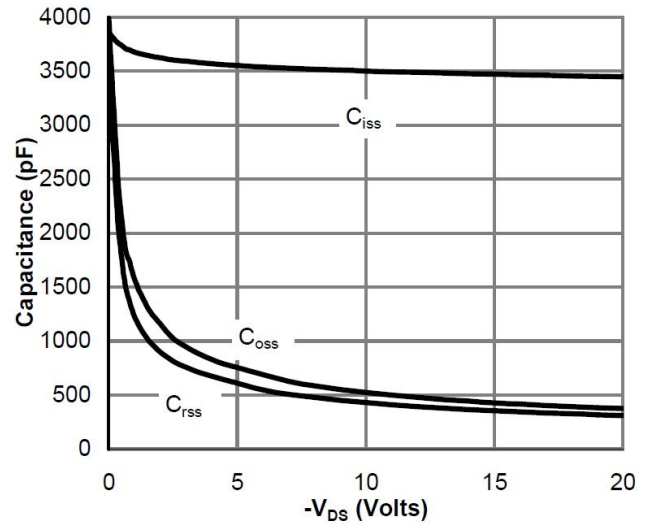


Figure 8: Capacitance Characteristics

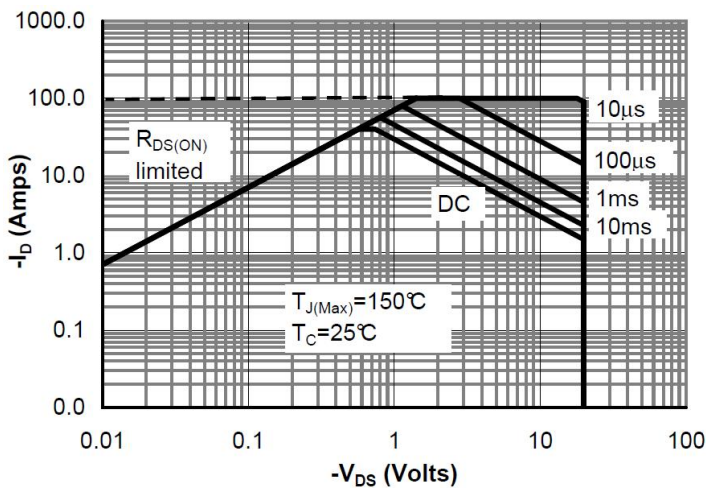


Figure 9: Maximum Forward Biased Safe Operating Area

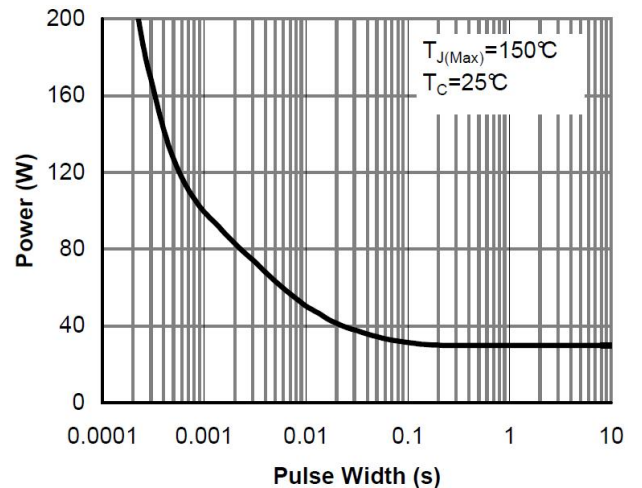


Figure 10: Single Pulse Power Rating Junction-to-Case

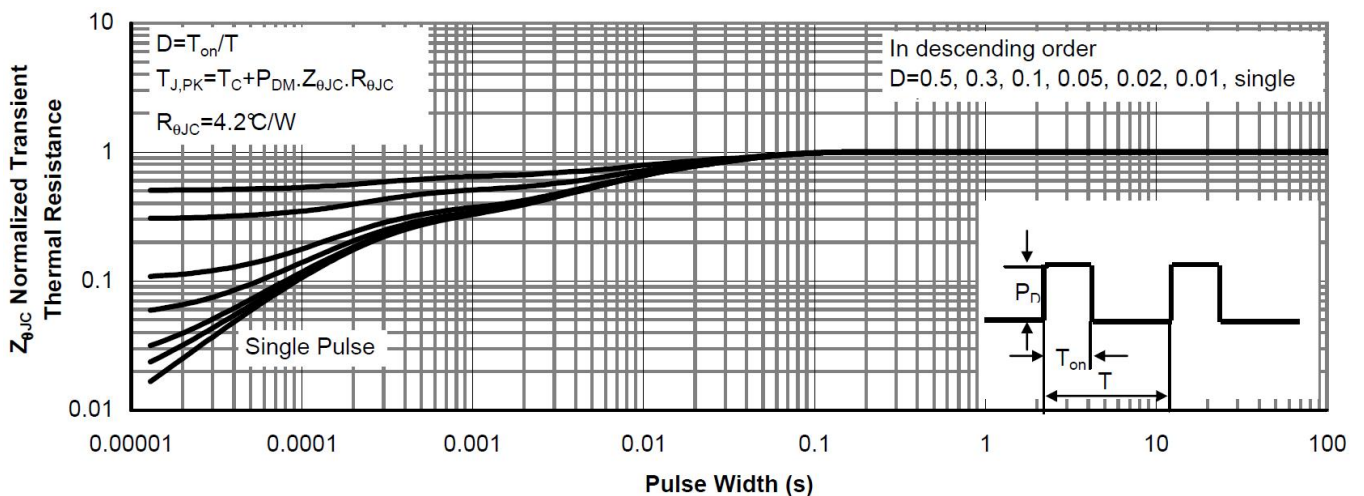
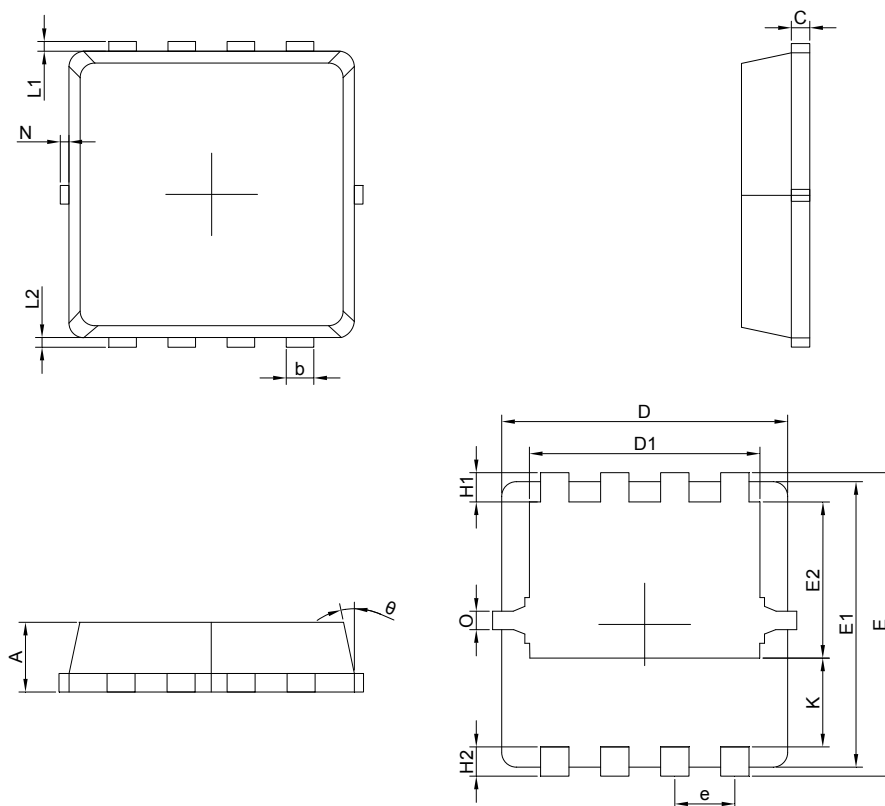


Figure 11: Normalized Maximum Transient Thermal Impedance

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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