

1. Description

The FDMS7650(ES) is N-Channel enhancement MOS Field Effect Transistor. Uses advanced shielded gate 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 FDMS7650(ES) is Pb-free.

2. Features

- 30V, $R_{DS(ON)}=1.15m\Omega(TYP.) @V_{GS}=10V$
 $R_{DS(ON)}=1.65m\Omega(TYP.) @V_{GS}=4.5V$
- 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
FDMS7650(ES)	PDFN5*6-8L	.6512A/LOT	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

Table-1 Ordering information

5. Pin Configuration and Functions

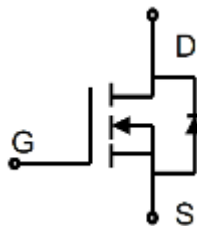
Pin	Function	Outline	Circuit Diagram
4	Gate	Note b 	
1/2/3	Source		
5/6/7/8	Drain		

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}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}C$	I_D	180	A
	$T_C=100^{\circ}C$		108	
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	83	W
Pulsed Drain Current		I_{DM}	720	A
Avalanche Current (L=0.5mH)		I_{AS}	33	A
Avalanche energy ^a		E_{AS}	272	mJ
Operating Junction Temperature		T_J	-55 to 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	Unit
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	1.5	°C/W

Notes:

a: EAS condition: Starting $T_J=25^{\circ}C$, $V_{DD}=15V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5mH$.

b: This diagram is only an electrical schematic, and the actual pin size is based on POD.

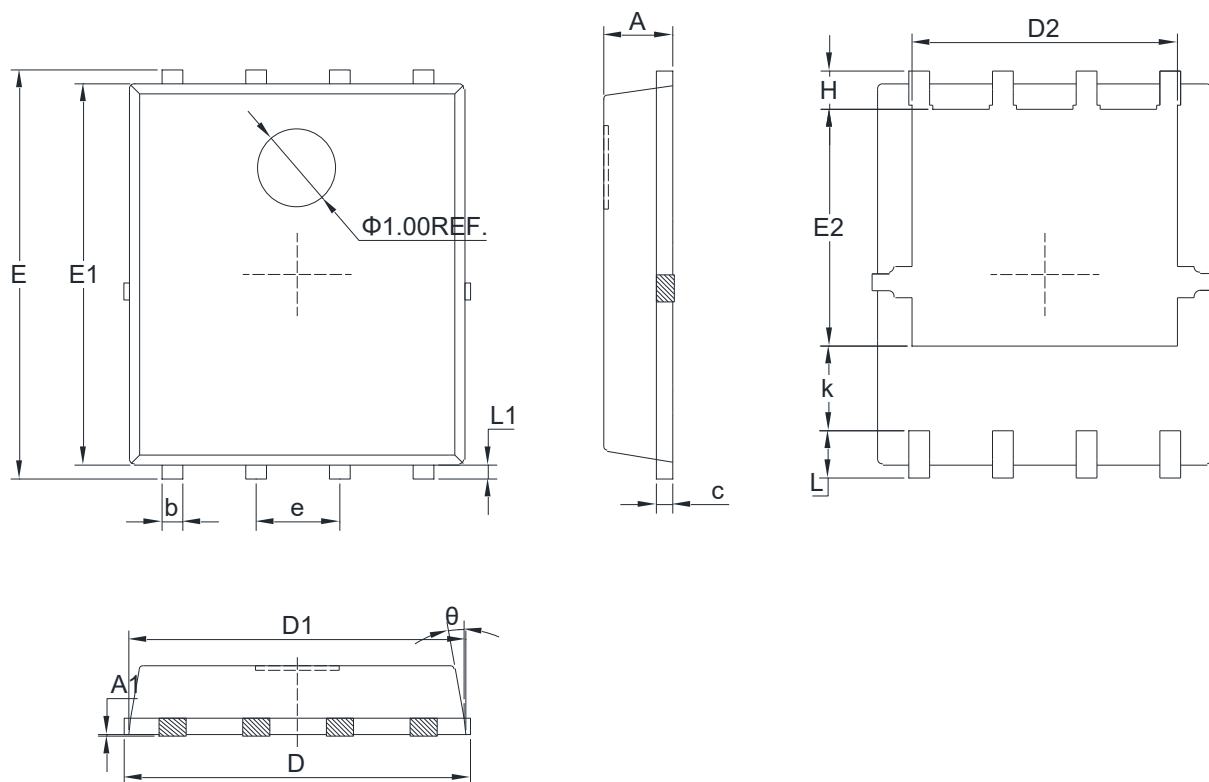
Electrical Characteristics

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 =250uA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V			1.0	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	1.1	1.6	2.2	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =30A		1.15	1.5	mΩ
		V _{GS} =4.5V, I _D =20A		1.65	2.2	mΩ
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =15V		3100		pF
Output Capacitance	C _{OSS}			1757		
Reverse Transfer Capacitance	C _{RSS}			98		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =0 to 10V, V _{DS} =20V, I _D =30A		44		nC
Gate-to-Source Charge	Q _{GS}			9		
Gate-to-Drain Charge	Q _{GD}			6		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DD} =20V, I _D =30A, R _G =1.6Ω		17		ns
Rise Time	t _r			5		
Turn-Off Delay Time	t _{d(OFF)}			52		
Fall Time	t _f			12		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =30A			1.2	V

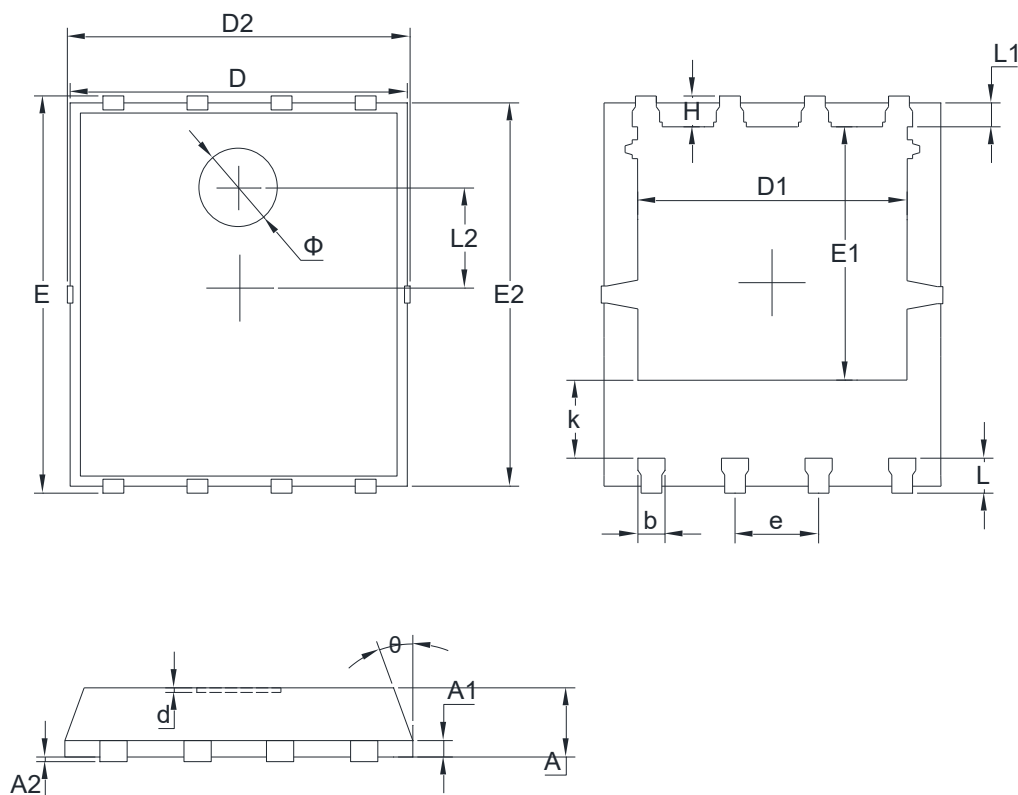
7. Dimension (PDFN5*6-8L)

POD A(Q)



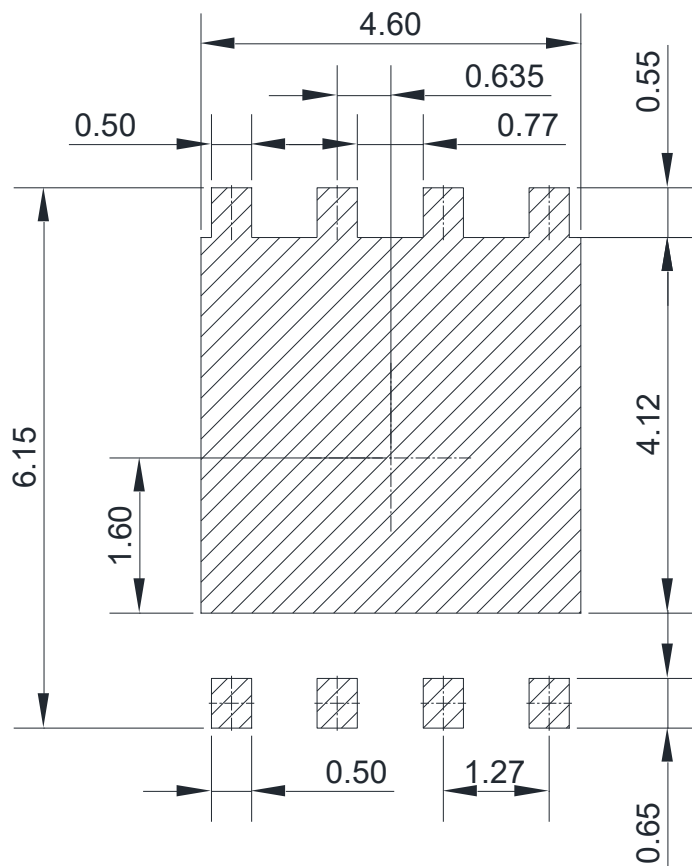
Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.90	1.00	1.10	H	0.46	0.56	0.66
A1			0.05	k	1.10		
b	0.30	0.40	0.50	L	0.51	0.61	0.71
c	0.20	0.25	0.30	L1	0.05	0.15	0.25
D	4.80	5.10	5.40	θ	8°	10°	12°
D2	3.75	3.90	4.05	D1	4.80	4.90	5.00
E	5.95	6.05	6.15				
E1	5.65	5.75	5.85				
e	1.27BCS						
E2	3.34	3.49	3.64				

POD B(X)



Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.900	1.000	1.100	H	0.549	0.625	0.701
A1	0.254 REF			k	1.190	1.290	1.390
A2	0.000		0.050	L	0.534	0.610	0.686
D	4.824	4.900	4.976	L1	0.424	0.500	0.576
D1	3.910	4.010	4.110	θ	8°	10°	12°
D2	4.924	5.000	5.076	L2	1.800 REF		
E	5.924	6.000	6.076	Φ	1.100	1.200	1.300
E1	3.375	3.475	3.575	d			0.100
e	1.270 TYP			b	0.350	0.400	0.450
E2	5.674	5.750	5.826				

8. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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