

SuperMOS – PDNF5*6-8L $\pm 30\text{V}$ Complementary MOSFET

1. Description

The ESD3045DN33 uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

2. Features

- N-channel
30V $R_{DS(ON)}=18\text{m}\Omega(\text{Typ.}) @V_{GS}=10\text{V}$
 $R_{DS(ON)}=24\text{m}\Omega(\text{Typ.}) @V_{GS}=4.5\text{V}$
- P-channel
-30V $R_{DS(ON)}=15\text{m}\Omega(\text{Typ.}) @V_{GS}=-10\text{V}$
 $R_{DS(ON)}=22.5\text{m}\Omega(\text{Typ.}) @V_{GS}=-4.5\text{V}$
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

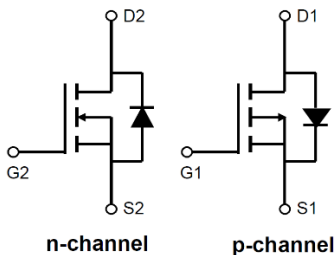
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESD3045DN33	PDNF5*6-8L	.AJ03R25/LOT	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
2	Gate2	Note 1 	
1	Source2		
7/8	Drain2		
4	Gate1		
3	Source1		
5/6	Drain1		

Note1:

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

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limit N-channel	Limit P-channel	Unit
Drain-Source Voltage		BV_{DSS}	30	-30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	25	-25	A
	$T_C=100^{\circ}\text{C}$		15.8	-15.8	
Maximum Power Dissipation		P_D	25	26.5	W
Pulsed Drain Current		I_{DM}	100	-100	A
Operating Junction Temperature		T_J	150		$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to +150		$^{\circ}\text{C}$

Thermal resistance ratings

Single Operation				
Parameter	Symbol	N-channel	P-channel	Unit
Junction-to-Case Thermal Resistance ($t \leq 10\text{s}$)	$R_{\theta JC}$	5.0	5.7	$^{\circ}\text{C/W}$

7. N-channel 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	1.2	1.7	2.2	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =5A		18	24	mΩ
		V _{GS} =4.5V, I _D =3A		24	34	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =15V		490		pF
Output Capacitance	C _{OSS}			80		
Reverse Transfer Capacitance	C _{RSS}			60		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =10V, V _{DS} =15V, I _D =5.8A		5.2		nC
Gate-to-Source Charge	Q _{GS}			1.0		
Gate-to-Drain Charge	Q _{GD}			1.3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DS} =15V, I _D =3A, R _{GEN} =3Ω		4.5		ns
Rise Time	t _r			2.5		
Turn-Off Delay Time	t _{d(OFF)}			14.5		
Fall Time	t _f			3.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =5.8A	0.45		1.5	V

8. N-channel Typical Characteristic

Figure1: Output Characteristics

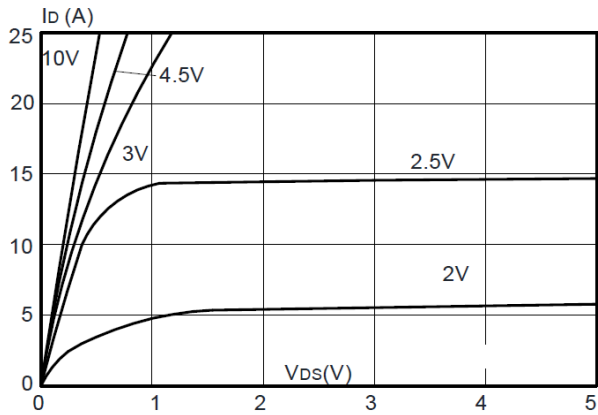


Figure 2: Typical Transfer Characteristics

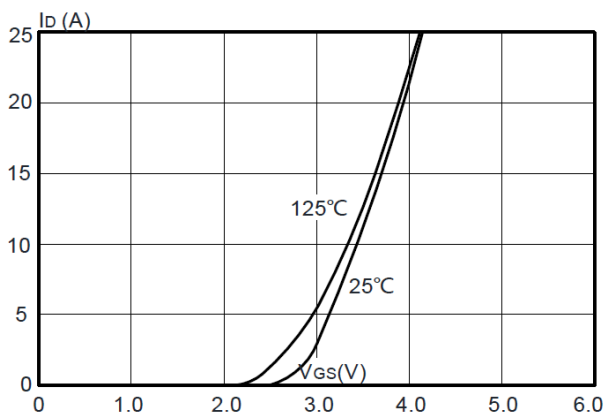


Figure 3: On-resistance vs. Drain Current

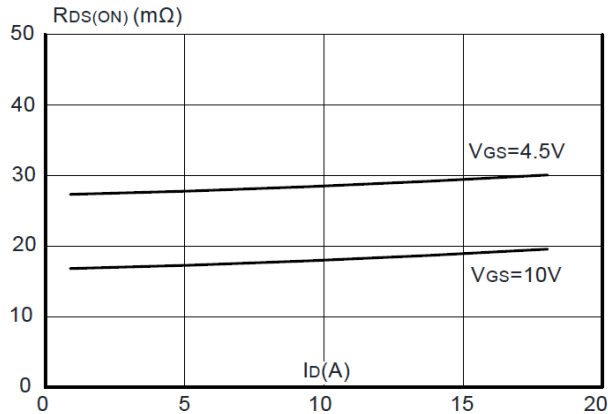


Figure 4: Body Diode Characteristics

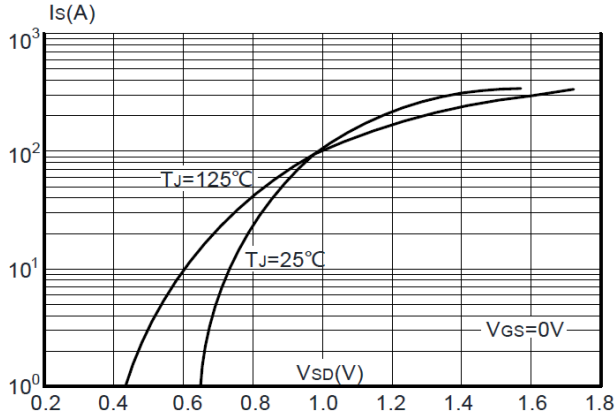


Figure 5: Capacitance Characteristics

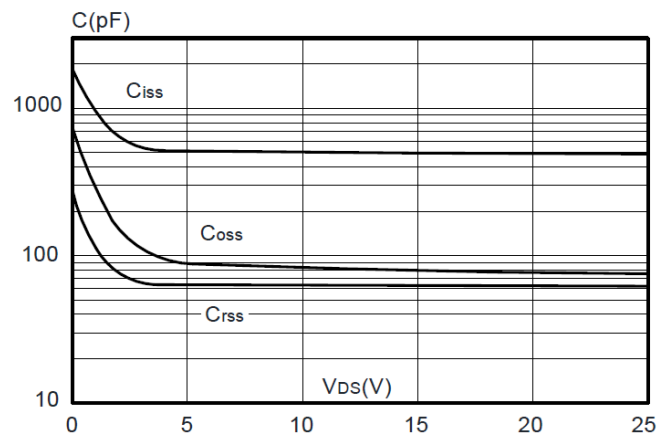
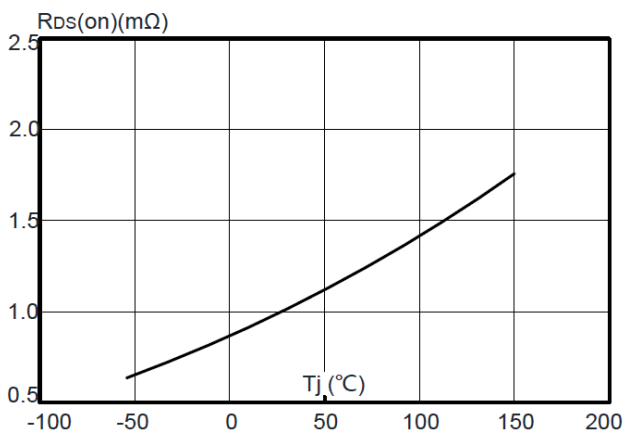
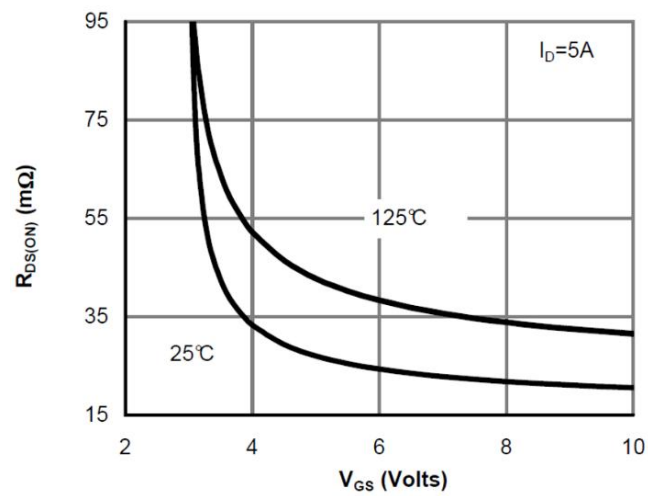


Figure 6: Normalized on Resistance vs. Junction Temperature



Fingure7: on-Resistance vs. Gate to Source



9. P-channel 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 _{GS} =0V, V _{DS} =-30V			-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	-1.5	-2.5	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-10A		15	20	mΩ
		V _{GS} =-4.5V, I _D =-6A		22.5	30	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V f=1MHz		980		pF
Output Capacitance	C _{OSS}			138		
Reverse Transfer Capacitance	C _{RSS}			115		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =-10V, V _{DS} =-15V I _D =-10A		20		nC
Gate-to-Source Charge	Q _{GS}			3		
Gate-to-Drain Charge	Q _{GD}			5.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-10V, V _{DS} =-15V I _D = -10A, R _G =3Ω		7.5		ns
Rise Time	t _r			16		
Turn-Off Delay Time	t _{d(OFF)}			49		
Fall Time	t _f			32		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =-10A	-0.45		-1.5	V

10. Typical Characteristic

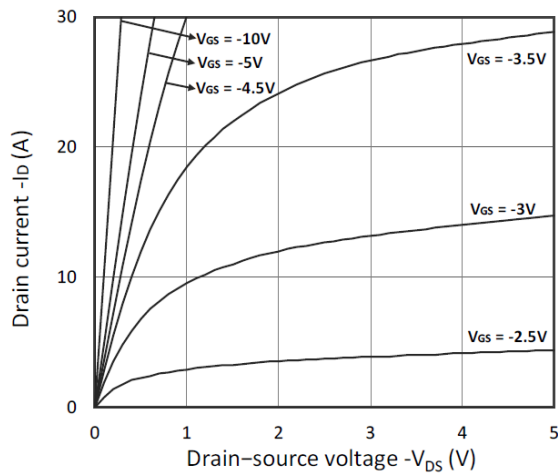


Figure 1. Output Characteristics

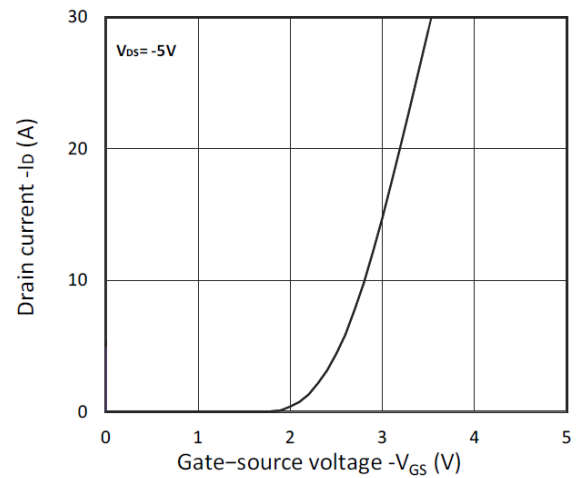


Figure 2. Transfer Characteristics

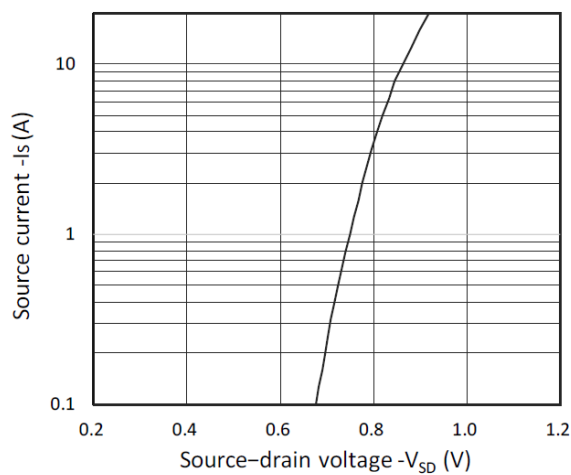
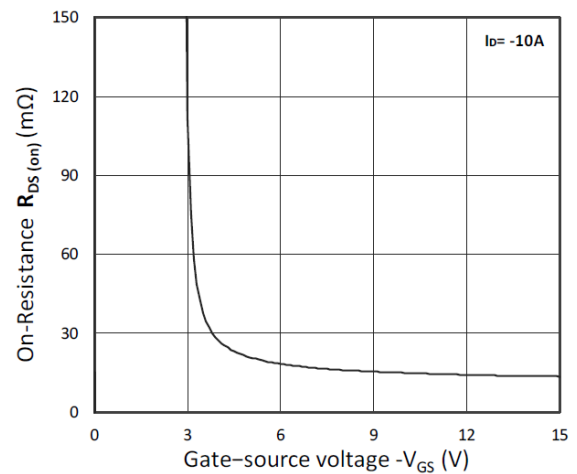
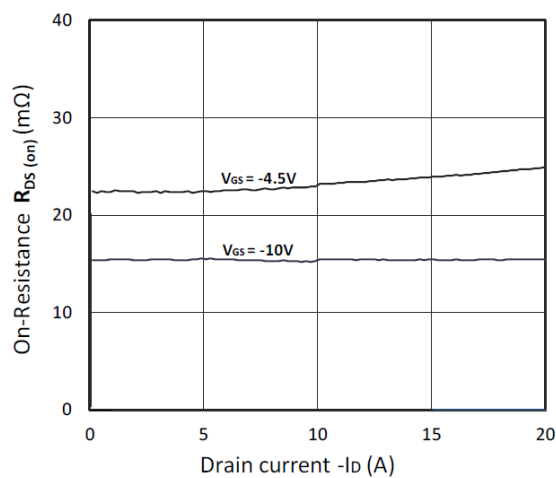
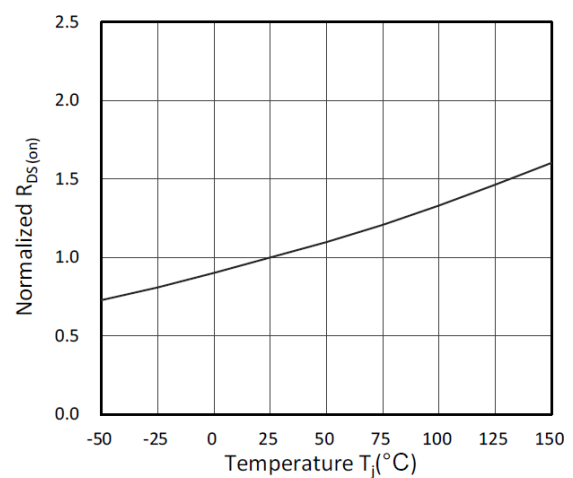


Figure 3. Forward Characteristics of Reverse

Figure 4. $R_{DS(on)}$ vs. V_{GS} Figure 5. $R_{DS(on)}$ vs. I_D Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

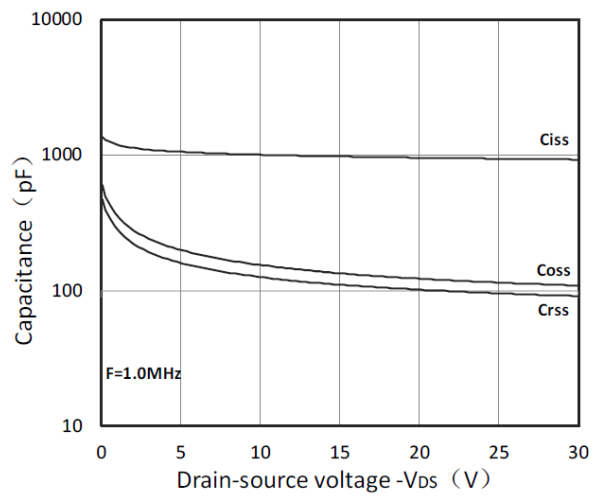
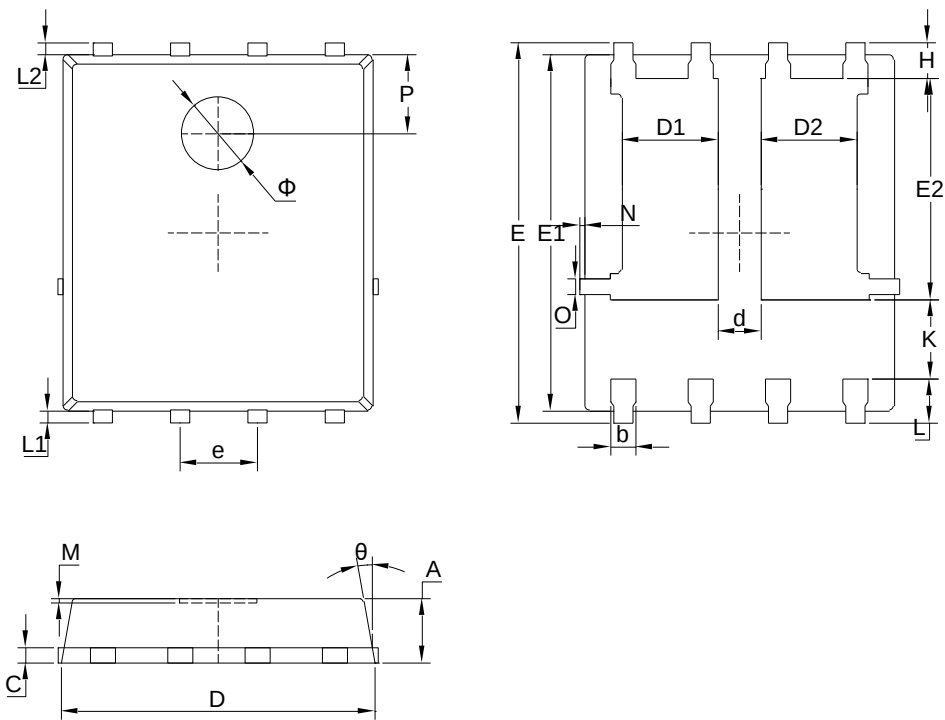


Figure 7. Capacitance Characteristics

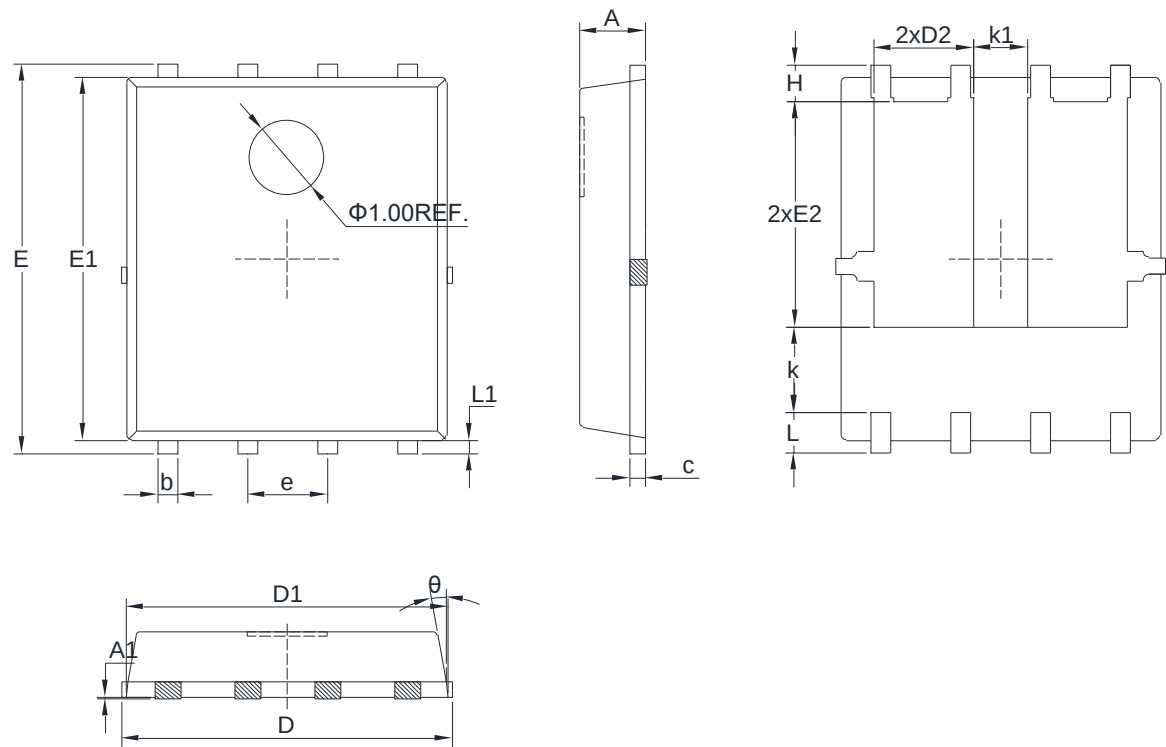
11. Dimension (PDFN5*6-8L)

POD A(J)



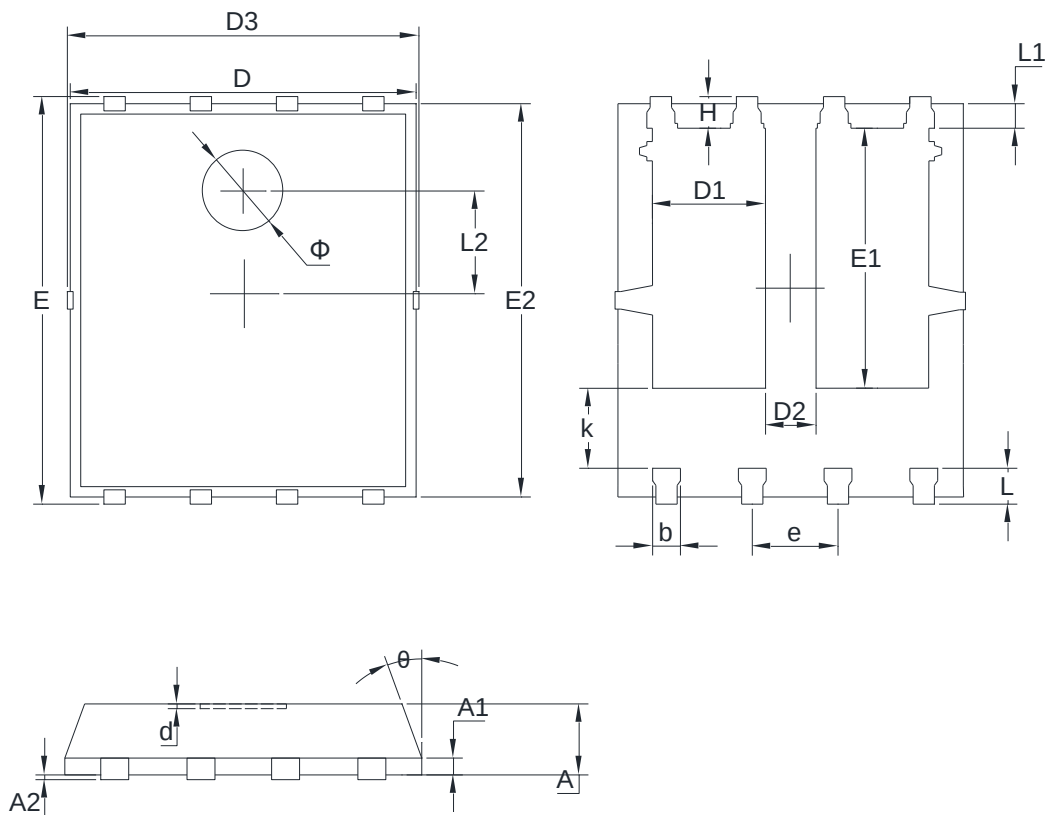
Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0. 90	1. 05	1. 20	H	0. 48	0. 58	0. 68
b	0. 35	0. 40	0.50	K	1. 17	1. 27	1. 37
C	0. 20	0. 25	0. 35	L	0. 64	0. 74	0. 84
D	4. 90	5. 05	5. 20	L1/L2	0. 20 REF.		
D1/D2	1.51	1.61	1.71	θ	8°	10°	12°
d	0.50	0.60	0.70	M	0. 08 REF.		
E	6. 00	6. 15	6. 30	N	0	-	0. 15
E1	5. 60	5. 75	5. 90	O	0. 25 REF.		
E2	3. 47	3. 57	3. 67	P	1. 28 REF.		
e	1. 27 BSC.			Φ	1.20 REF		

POD B(Q)



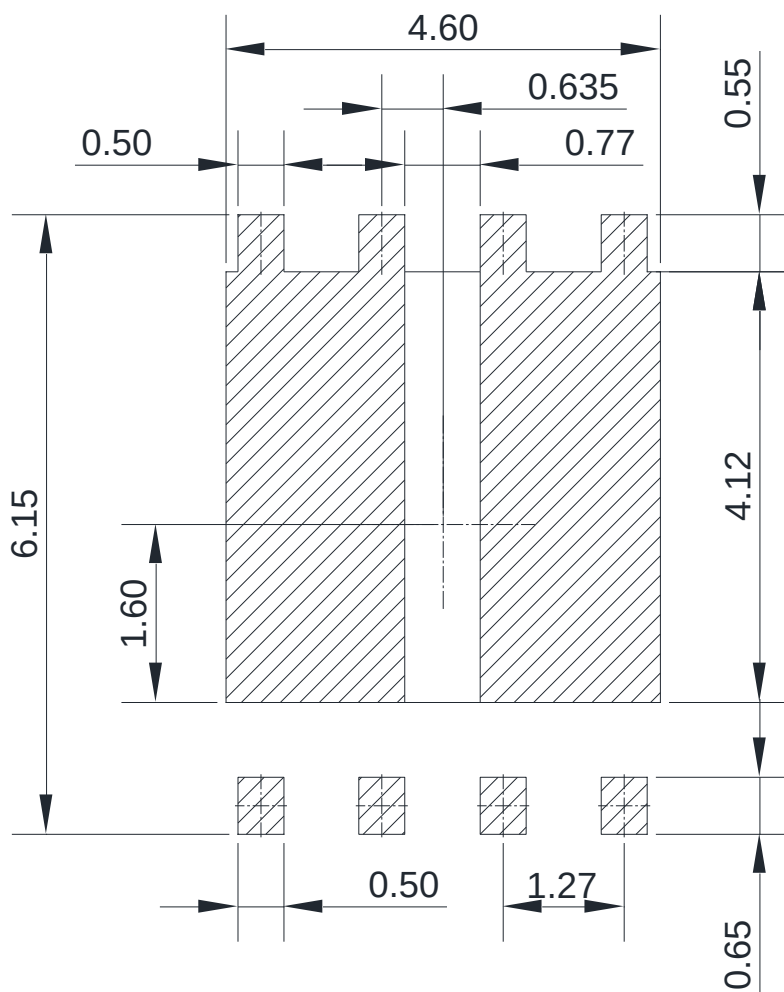
Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.90	1.00	1.10	H	0.46	0.56	0.66
A1			0.05	k	1.10		
b	0.30	0.40	0.50	L	0.51	0.61	0.71
c	0.20	0.25	0.30	L1	0.05	0.15	0.25
D	4.80	5.10	5.40	θ	8°	10°	12°
D2	1.50	1.65	1.80	D1	4.80	4.90	5.00
E	5.95	6.05	6.15	k1	0.45	0.60	0.75
E1	5.65	5.75	5.85				
e	1.27BCS						
E2	3.34	3.49	3.64				

POD C(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	1.605	1.705	1.805	θ	8°	10°	12°
D2	0.500	0.600	0.700	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	D3	4.924	5.000	5.076

12. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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