

# AP18P30Q

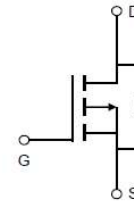
P-Channel Enhancement Mosfet

# AIPOWER

## DATA SHEET

### Feature

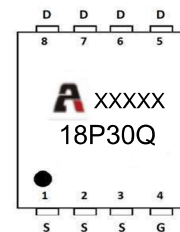
- -30V,-20A  
 $R_{DS(ON)} < 14m\Omega @ V_{GS} = -10V$  TYP:10.5 m $\Omega$   
 $R_{DS(ON)} < 19m\Omega @ V_{GS} = -4.5V$  TYP:15.5 m $\Omega$
- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability



Schematic Diagram

### Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch



Marking and pin Assignment

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
18P30Q	AP18P30Q	PDFN3*3	13 inch	-	5000

### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_a=25^\circ\text{C}$ )	$I_D$	-20	A
Continuous Drain Current ( $T_a=100^\circ\text{C}$ )	$I_D$	-13	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	-80	A
Singel Pulsed Avalanche Energy <sup>(4)</sup>	$E_{AS}$	140	mJ
Power Dissipation	$P_D$	30	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.1	$^\circ\text{C/W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

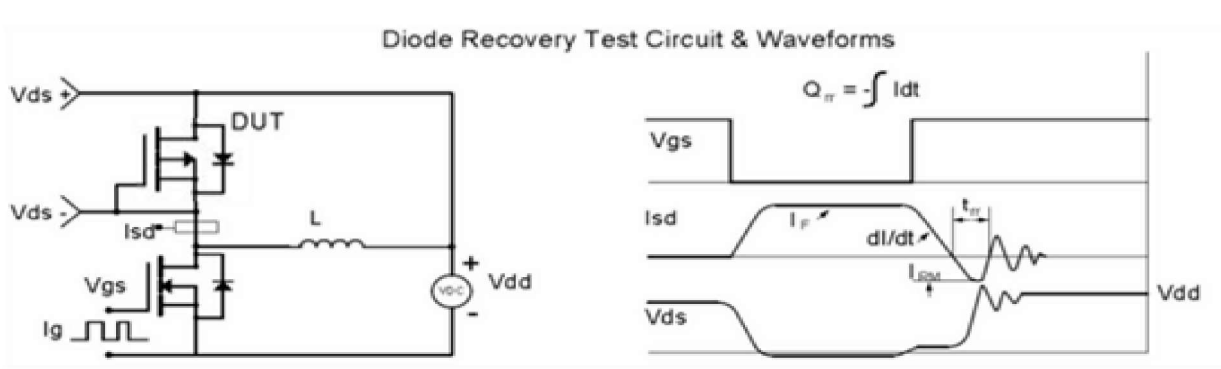
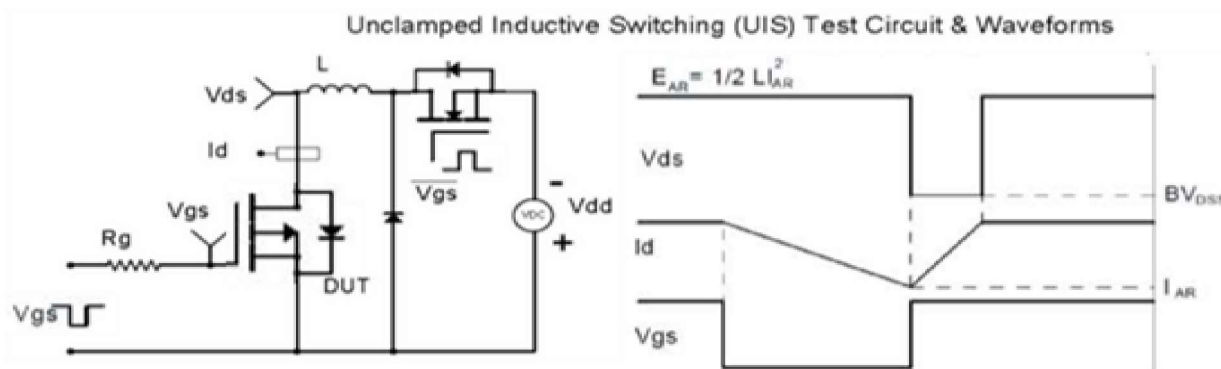
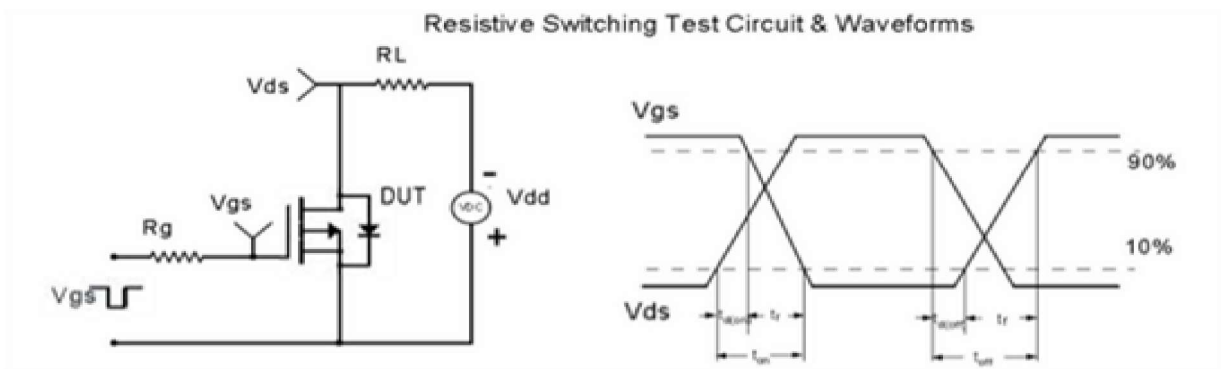
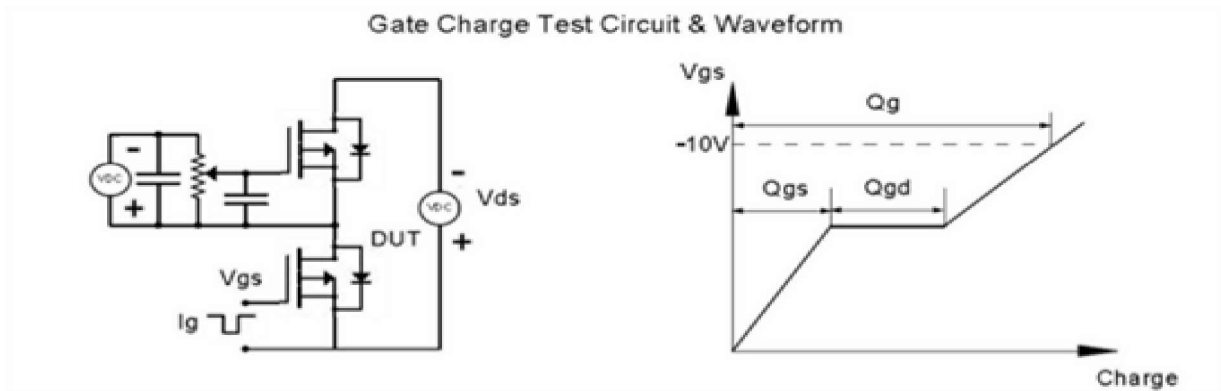
MOSFET ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(2)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.5	-2.5	V
Drain-source on-resistance <sup>(2)</sup>	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -12A$	-	10.5	14	m $\Omega$
		$V_{GS} = -4.5V, I_D = -8A$	-	15.5	19	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$	-	2863	-	pF
Output Capacitance	$C_{oss}$		-	349	-	
Reverse Transfer Capacitance	$C_{rss}$		-	237	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15V, I_D = -12A$ $V_{GS} = -10V, R_G = 2.5\Omega$	-	11.5	-	ns
Turn-on rise time	$t_r$		-	38.5	-	
Turn-off delay time	$t_{d(off)}$		-	89	-	
Turn-off fall time	$t_f$		-	19	-	
Total Gate Charge	$Q_g$	$V_{DS} = -15V, I_D = -10A,$ $V_{GS} = -10V$	-	54.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	7.5	-	
Gate-Drain Charge	$Q_{gd}$		-	12.5	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(2)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = -10A$	-	-	-1.2	V
Diode Forward current <sup>(3)</sup>	$I_S$		-	-	-20	A
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25^{\circ}, I_F = -20A, di/dt = 100A/\mu s$		14		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$T_J = 25^{\circ}, I_F = -20A, di/dt = 100A/\mu s$		2.4		nc

**Notes:**

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. Surface Mounted on FR4 Board,  $t \leq 10$  sec
4.  $L = 0.5mH, V_{DD} = -15V, R_G = 25\Omega, T_J = 25^{\circ}\text{C}$

**Test Circuit & Waveform**



**Typical Performance Characteristics**

Fig.1 Power Dissipation Derating Curve

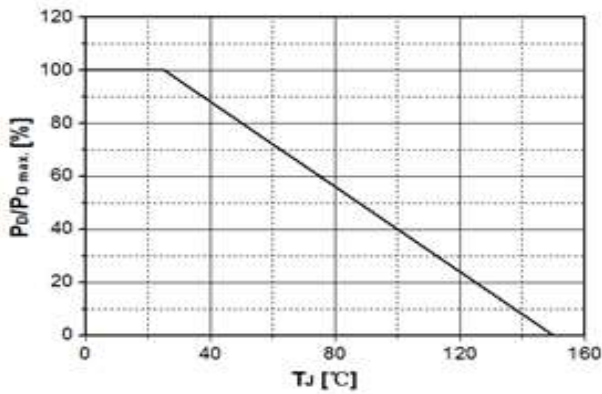


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

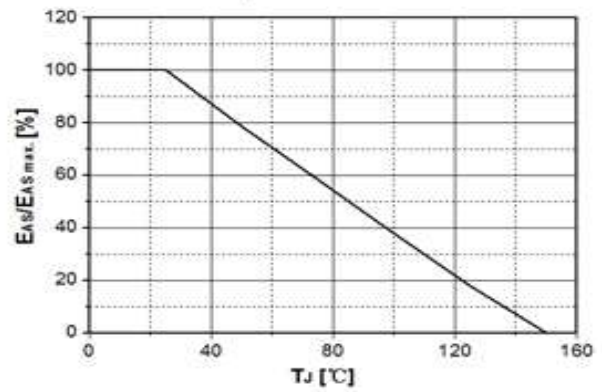


Fig.3 Typical Output Characteristics

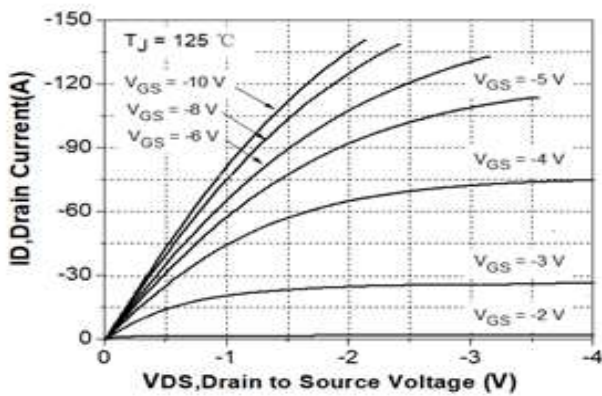


Fig. 4 Transconductance vs. Drain Current

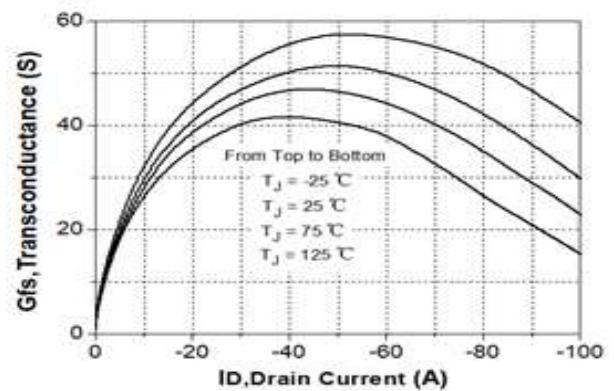


Fig.5 Typical Transfer Characteristics

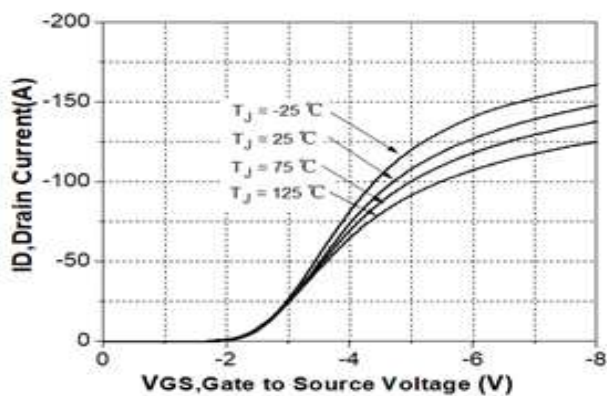


Fig. 6 State Resistance vs. Drain Current @-25°C

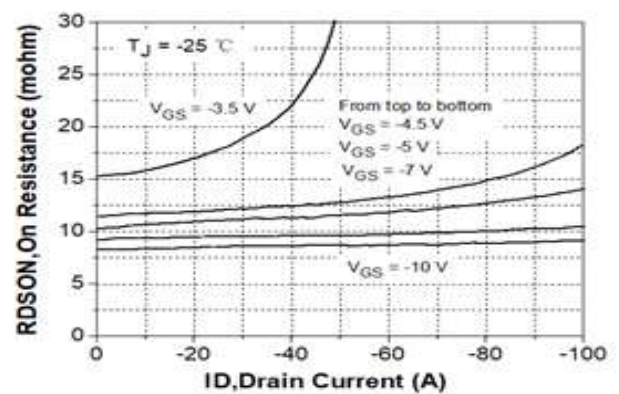


Fig.7 State Resistance vs. Drain Current @25°C

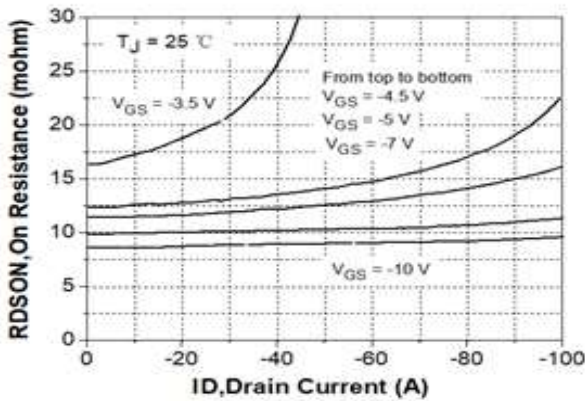


Fig. 8 State Resistance vs. Drain Current @125°C

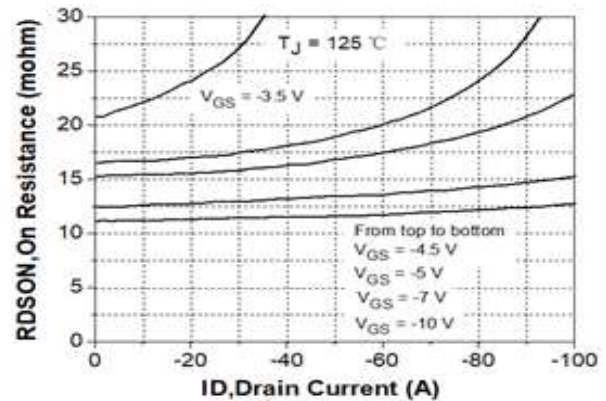


Fig.9 Typical Capacitance vs. Drain Source Voltage

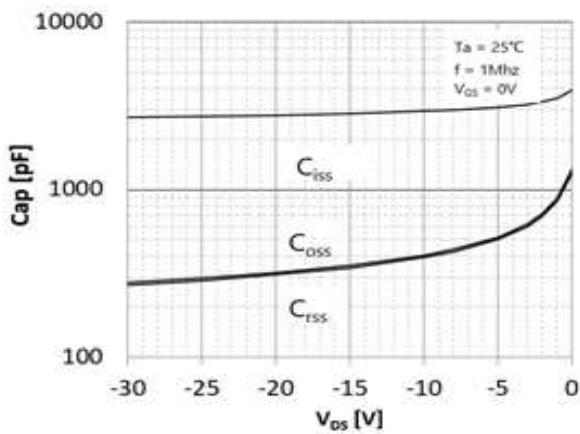


Fig.10 Dynamic Input Characteristics

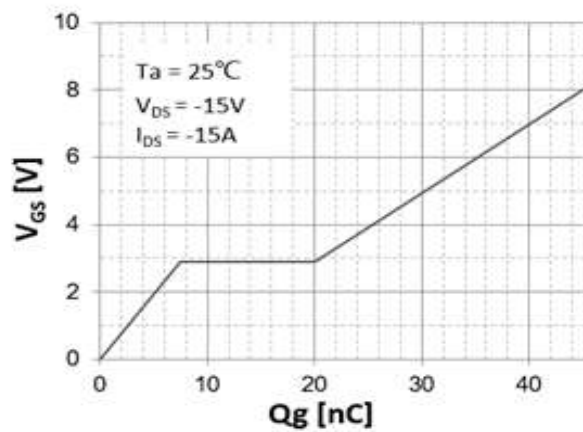


Fig.11 Breakdown Voltage vs. Junction Temperature

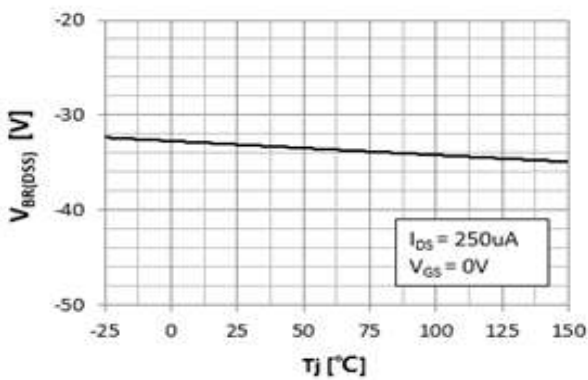


Fig. 12 Gate Threshold Voltage vs. Junction Temperature

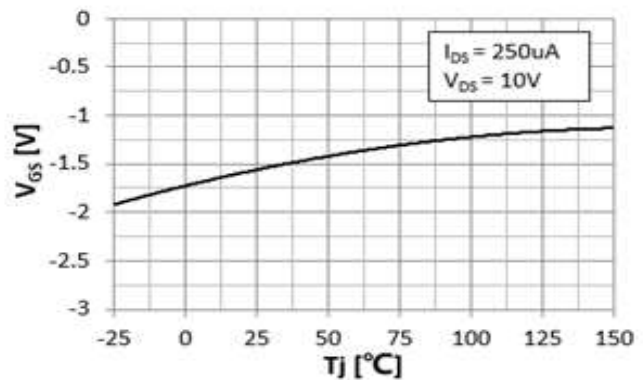




Fig.13 On-Resistance Variation vs. Junction Temperature

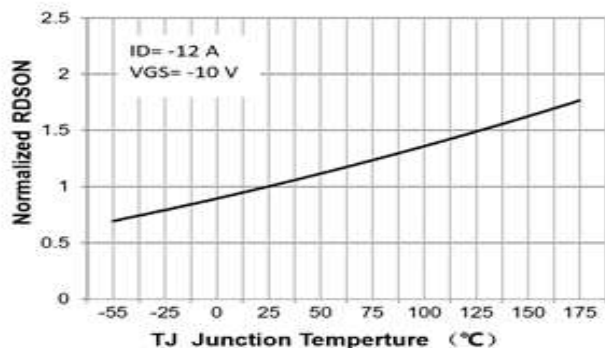


Fig.14 Maximum Drain Current vs. Case Temperature

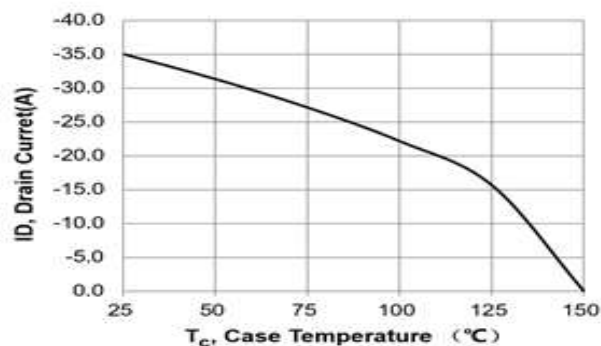
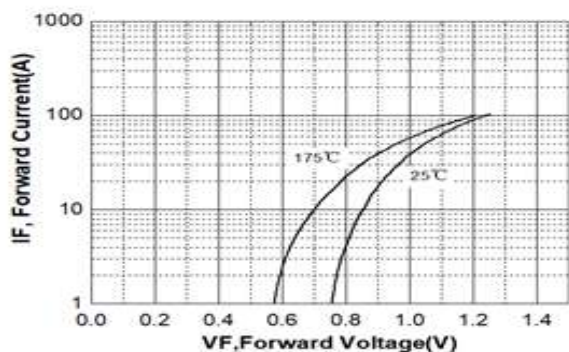


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current



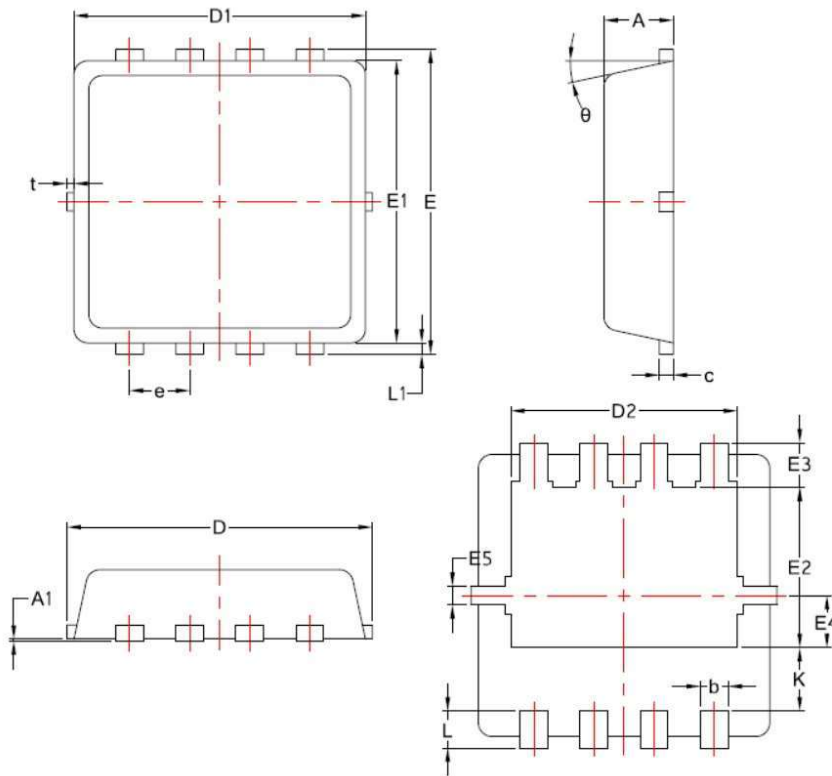
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### Package Mechanical Data



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
θ	10°	12°	14°

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