

AP18P30Q

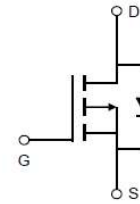
P-Channel Enhancement Mosfet

AIPOWER

DATA SHEET

Feature

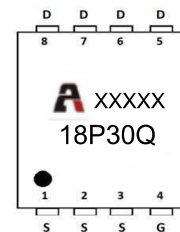
- -30V,-20A
 $R_{DS(ON)} < 14m\Omega @ V_{GS} = -10V$ TYP:10.5 m Ω
 $R_{DS(ON)} < 19m\Omega @ V_{GS} = -4.5V$ TYP:15.5 m Ω
- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability



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	PDFN3X3	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}	± 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 ⁽¹⁾	I_{DM}	-80	A
Single Pulsed Avalanche Energy ⁽⁴⁾	E_{AS}	140	mJ
Power Dissipation	P_D	30	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.1	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

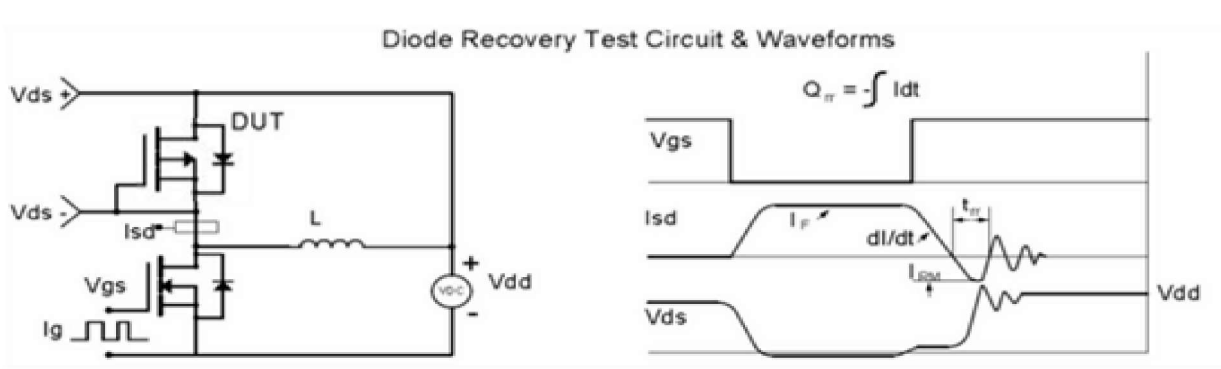
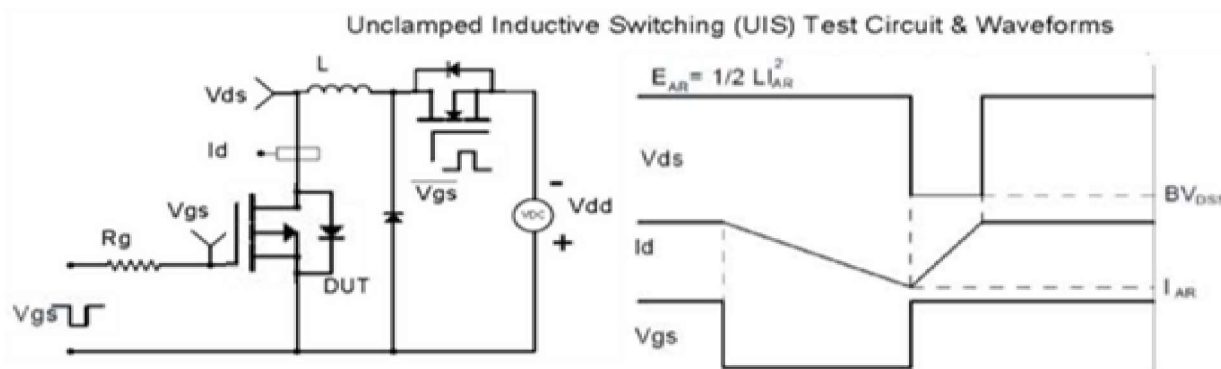
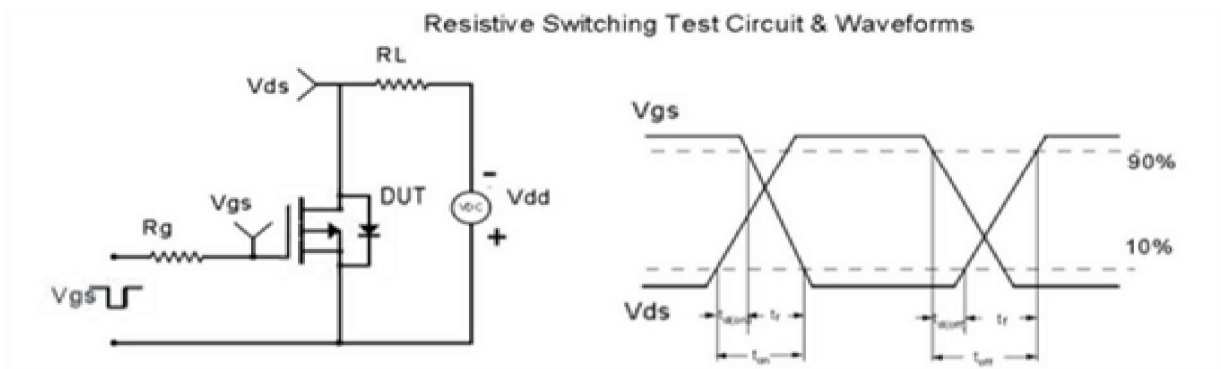
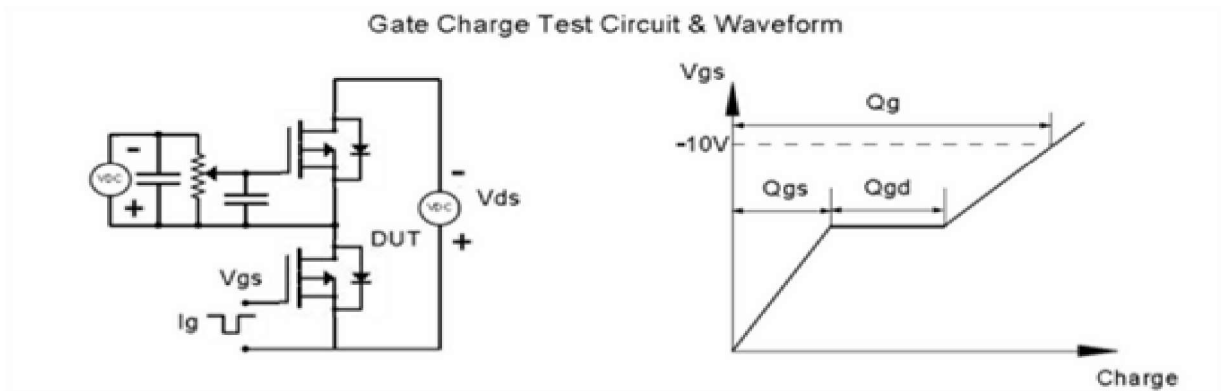
MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
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	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽²⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.5	-2.5	V
Drain-source on-resistance ⁽²⁾	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -12A$	-	10.5	14	m Ω
		$V_{GS} = -4.5V, I_D = -8A$	-	15.5	19	
Dynamic characteristics						
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	-	
Switching characteristics						
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	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽²⁾	V_{DS}	$V_{GS} = 0V, I_S = -10A$	-	-	-1.2	V
Diode Forward current ⁽³⁾	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

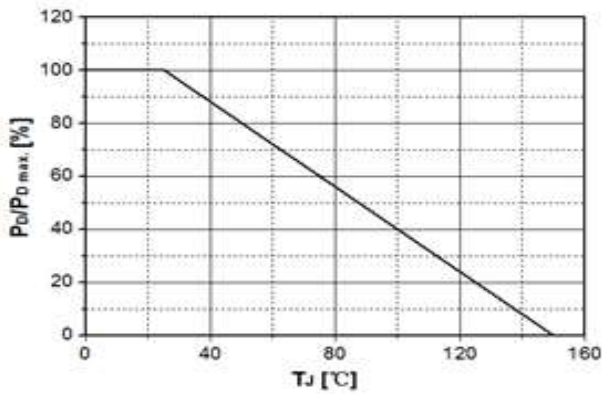


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

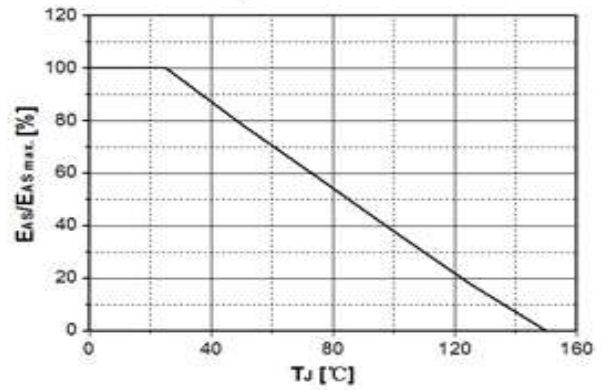


Fig.3 Typical Output Characteristics

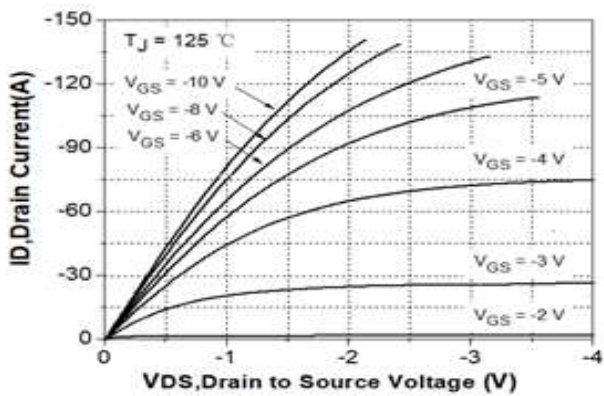


Fig. 4 Transconductance vs. Drain Current

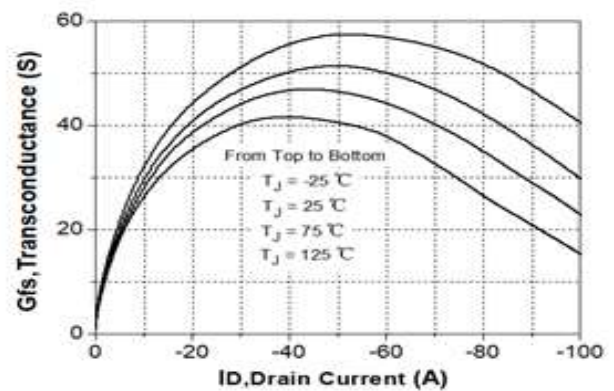


Fig.5 Typical Transfer Characteristics

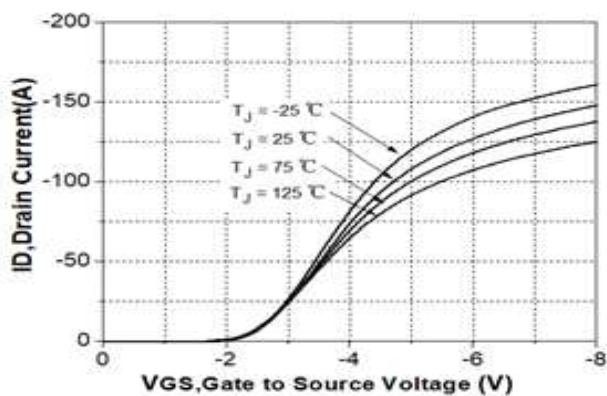


Fig. 6 State Resistance vs. Drain Current @-25°C

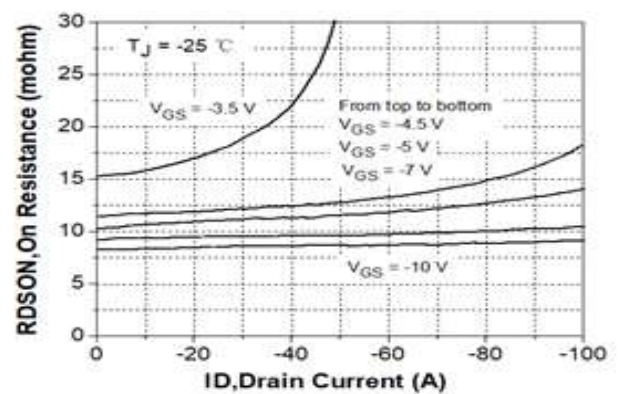


Fig.7 State Resistance vs. Drain Current @25°C

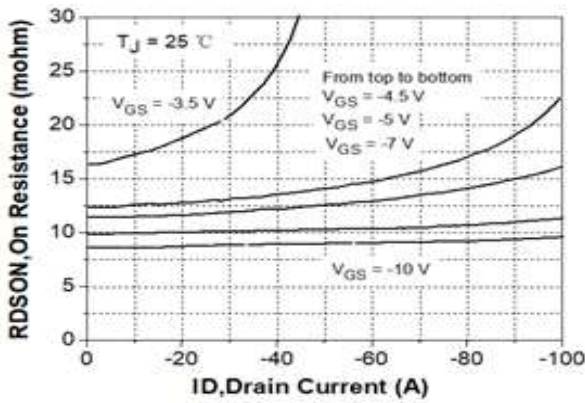


Fig. 8 State Resistance vs. Drain Current @125°C

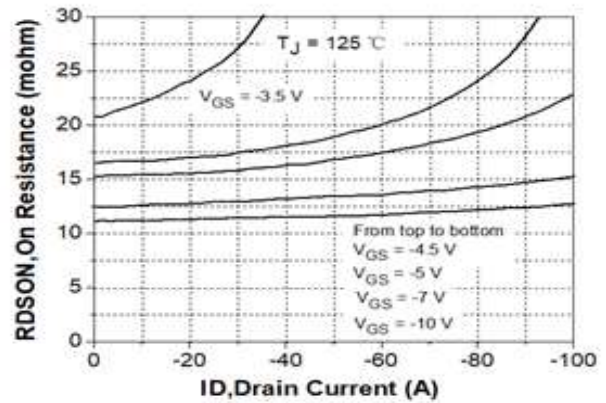


Fig.9 Typical Capacitance vs. Drain Source Voltage

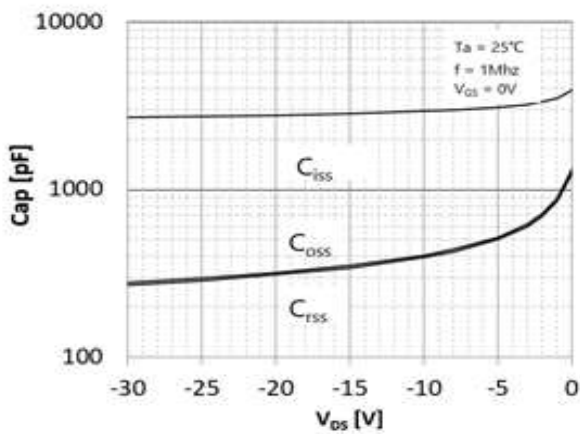


Fig.10 Dynamic Input Characteristics

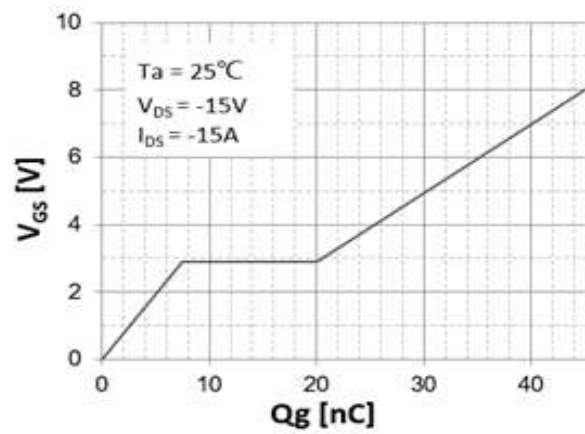


Fig.11 Breakdown Voltage vs. Junction Temperature

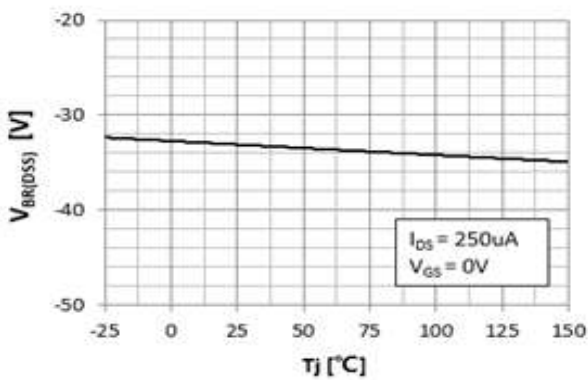


Fig. 12 Gate Threshold Voltage vs. Junction Temperature

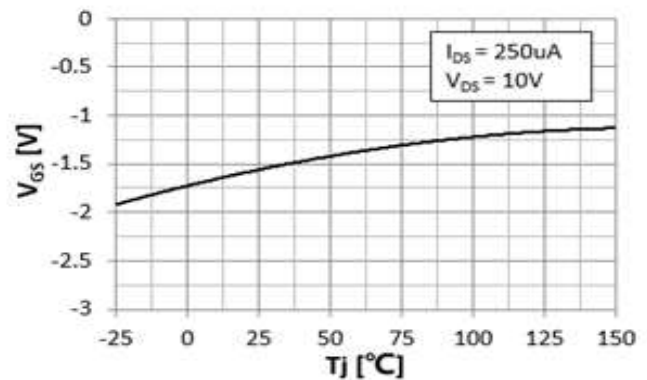


Fig.13 On-Resistance Variation vs. Junction Temperature

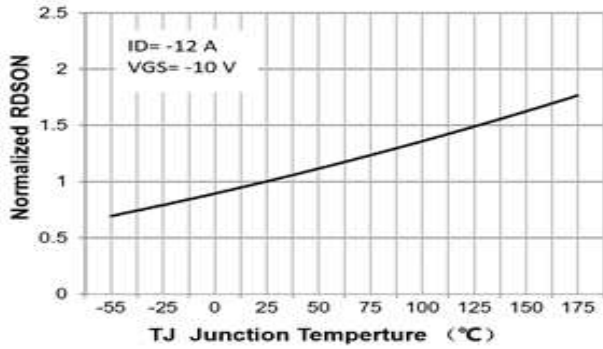


Fig.14 Maximum Drain Current vs. Case Temperature

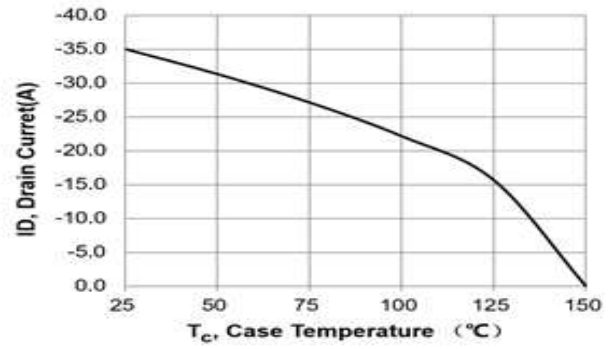
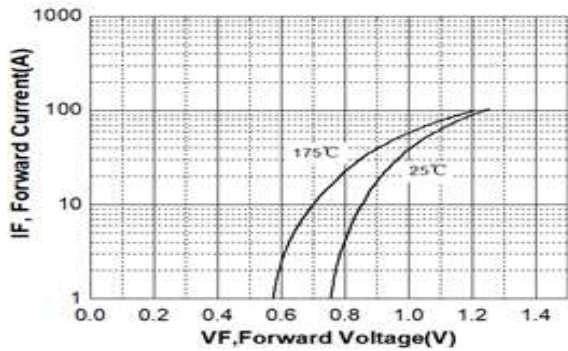


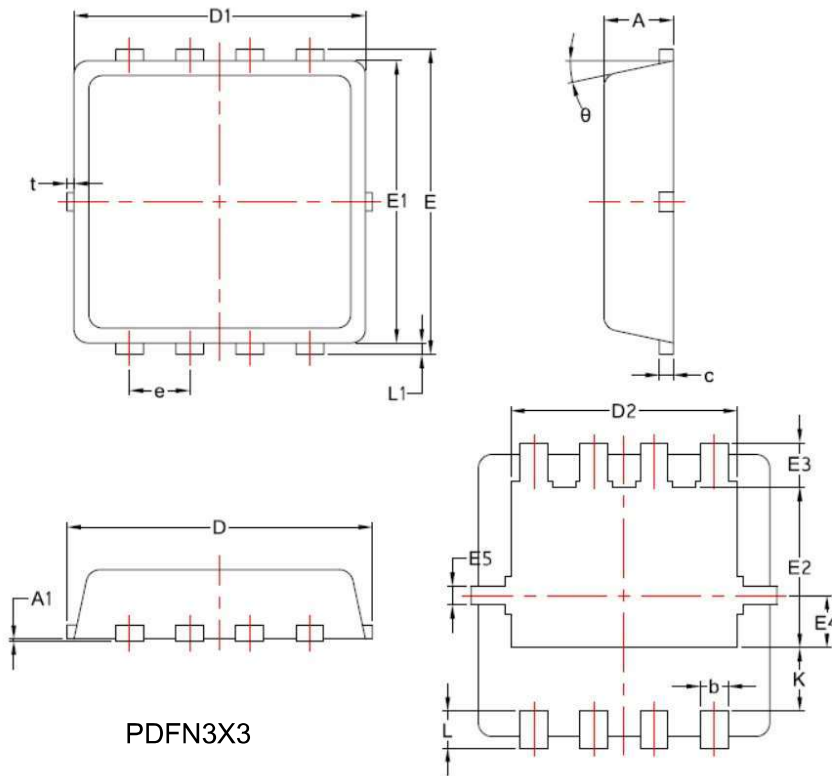
Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current



AP18P30Q

P-Channel Enhancement Mosfet

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
theta	10°	12°	14°