

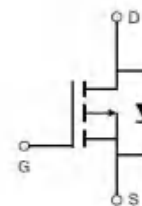
AP18P30Q

P-Channel Enhancement Mosfet



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
Singel 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	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

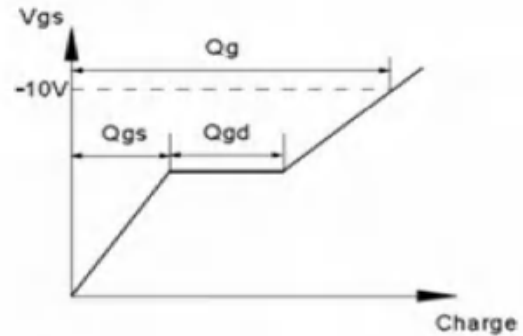
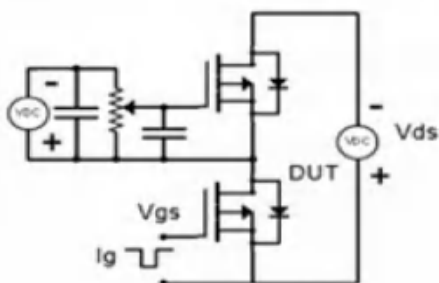
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽²⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250μA	-1	-1.5	-2.5	V
Drain-source on-resistance ⁽²⁾	R _{DS(on)}	V _{GS} = -10V, I _D = -12A	-	10.5	14	mΩ
		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 = 2.5Ω	-	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	trr	T _J = 25° , IF = -20A, di/dt = 100A/us		14		ns
Body Diode Reverse Recovery Charge	Qrr	T _J = 25° , IF = -20A, di/dt = 100A/us		2.4		nc

Notes:

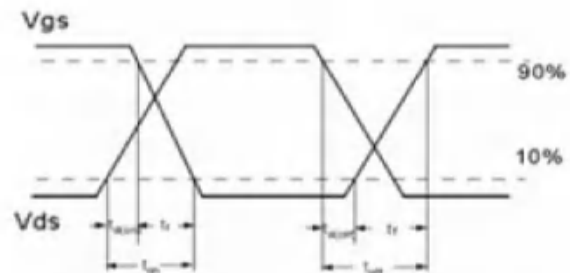
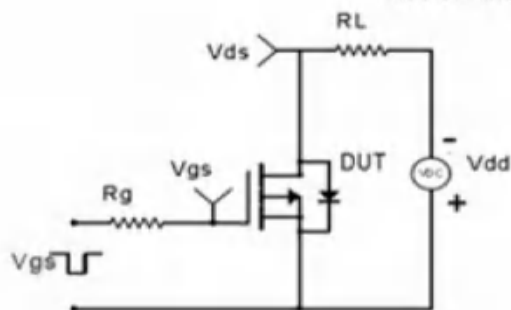
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%
3. Surface Mounted on FR4 Board, t ≤ 10 sec
4. L = 0.5mH, V_{DD} = -15V, R_G = 25Ω, T_J = 25°C

Test Circuit & Waveform

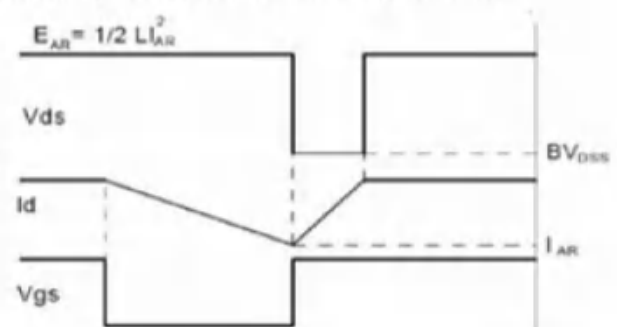
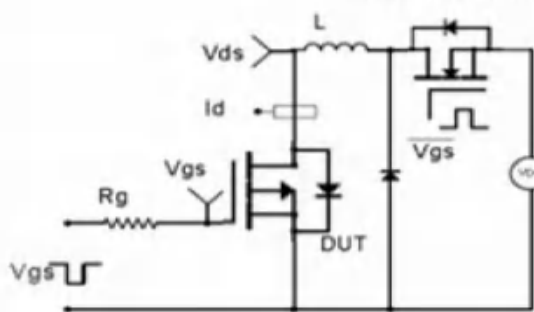
Gate Charge Test Circuit & Waveform



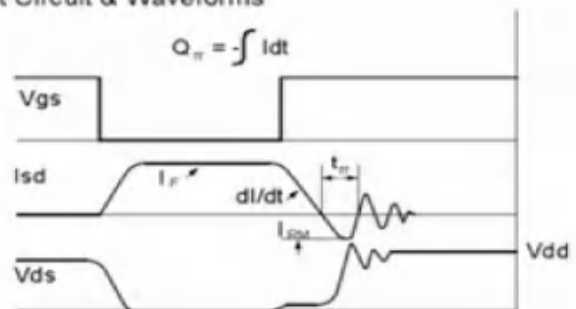
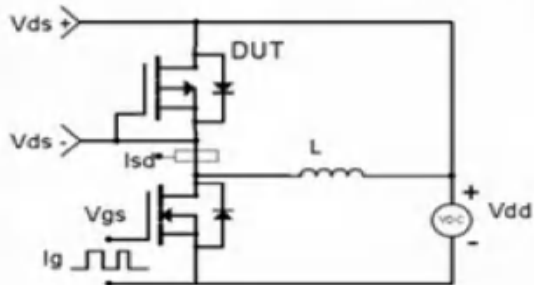
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

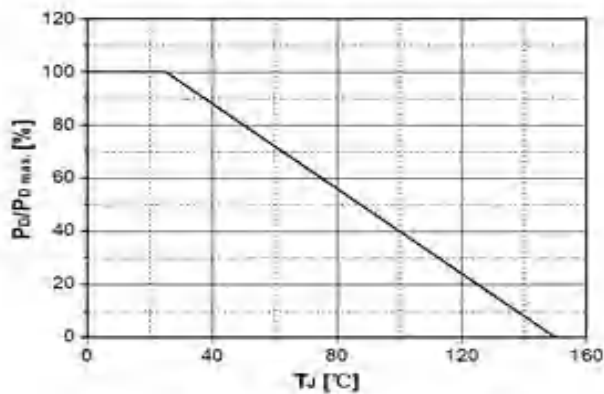


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

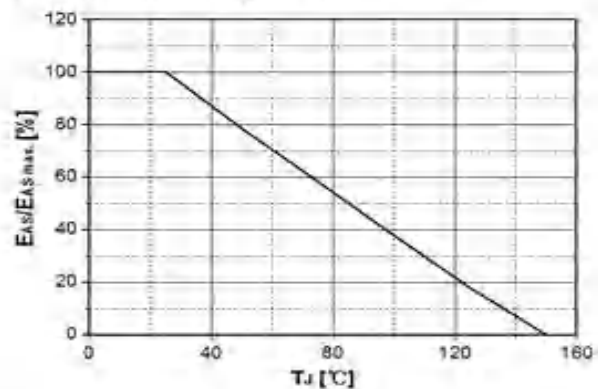


Fig.3 Typical Output Characteristics

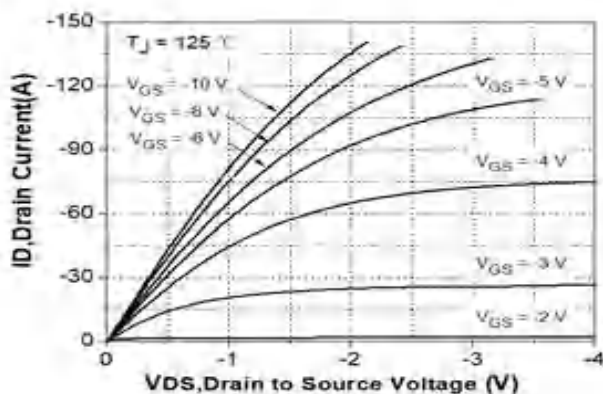


Fig. 4 Transconductance vs. Drain Current

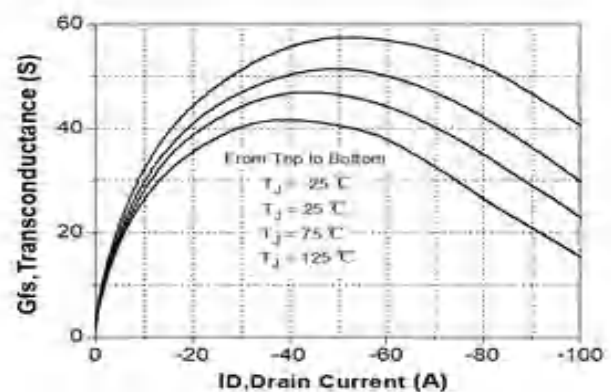


Fig.5 Typical Transfer Characteristics

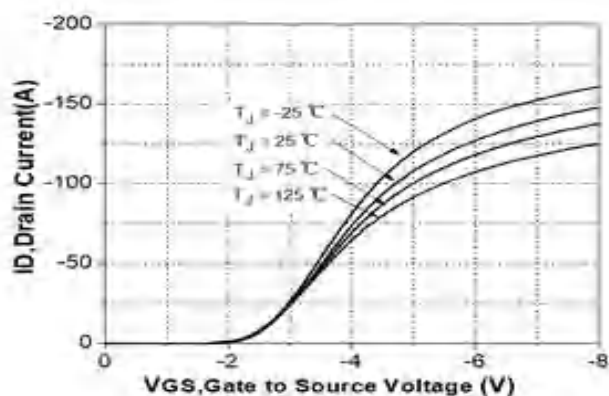


Fig. 6 State Resistance vs. Drain Current @-25°C

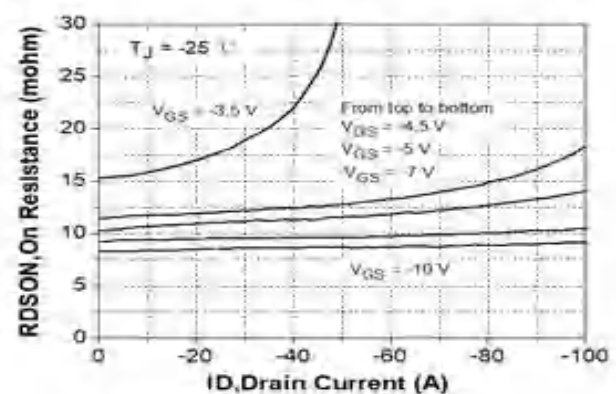


Fig. 7 State Resistance vs. Drain Current @25°C

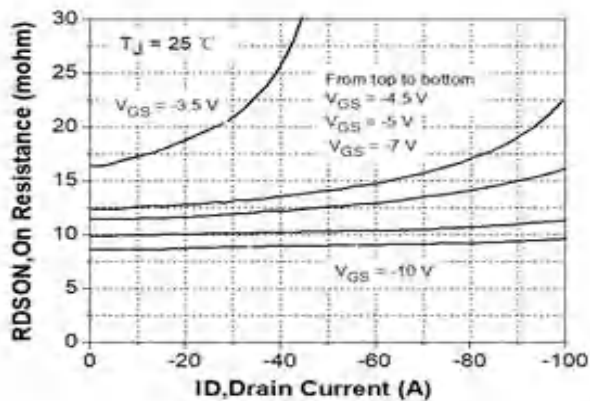


Fig. 8 State Resistance vs. Drain Current @125°C

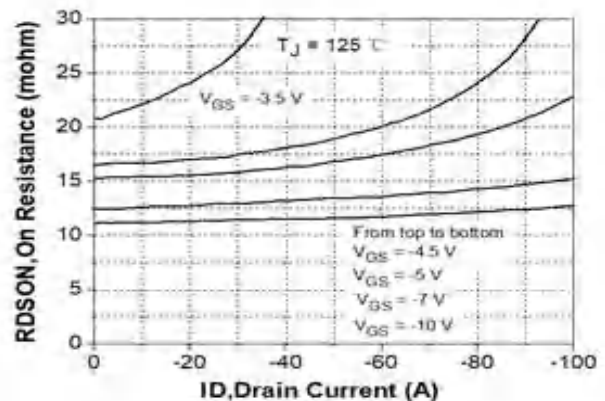


Fig.9 Typical Capacitance vs. Drain Source Voltage

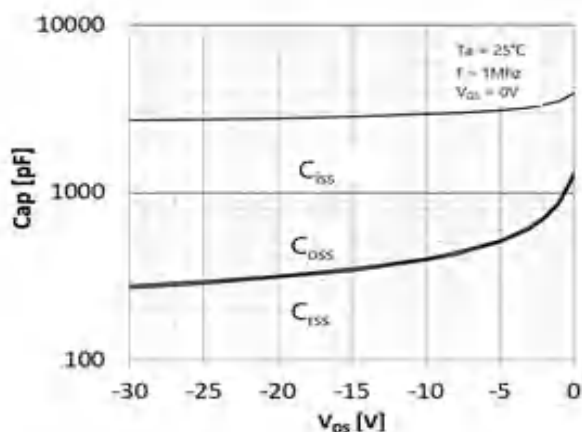


Fig.10 Dynamic Input Characteristics

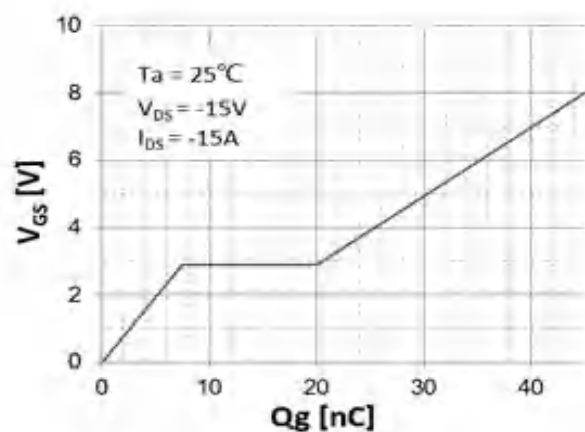


Fig.11 Breakdown Voltage vs. Junction Temperature

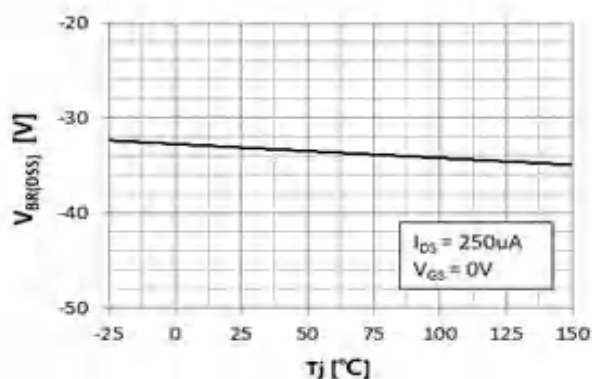
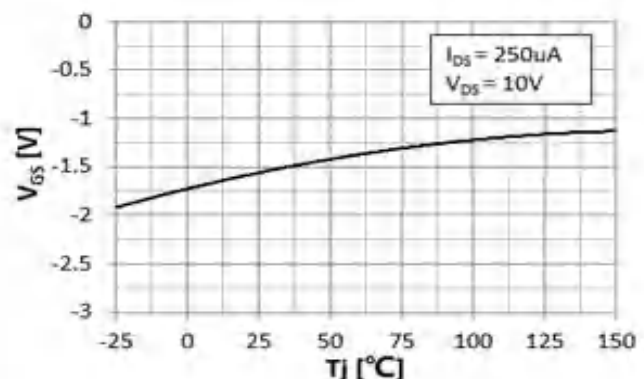


Fig. 12 Gate Threshold Voltage vs. Junction Temperature



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Fig.13 On-Resistance Variation vs. Junction Temperature

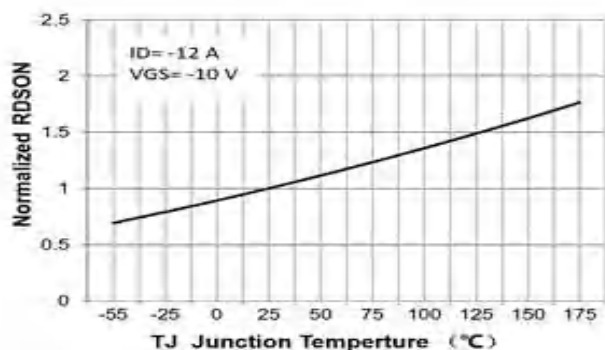


Fig.14 Maximum Drain Current vs. Case Temperature

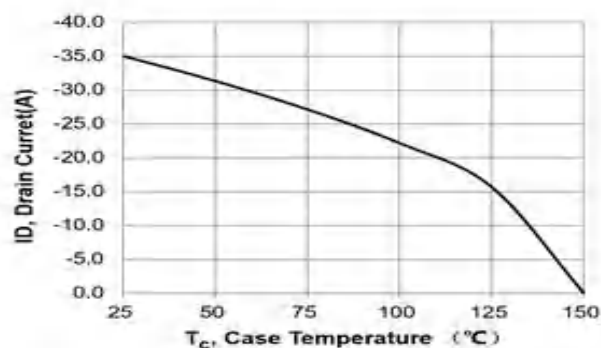
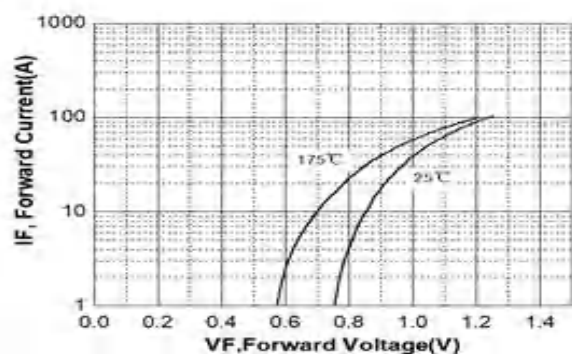


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current



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Package Mechanical Data

