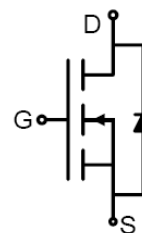


## Feature

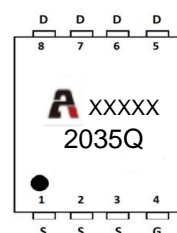
- 20V,70A  
 $R_{DS(ON)} < 4m\Omega @ V_{GS}=4.5V$  TYP=3.1 m $\Omega$   
 $R_{DS(ON)} < 5.8m\Omega @ V_{GS}=2.5V$  TYP=4.0 m $\Omega$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



Schematic Diagram

## Application

- PWM applications
- Load Switch
- Power management



Marking and pin Assignment

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
2035Q	AP2035Q	PDFN3X3-8L	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current ( $T_a=25^{\circ}C$ )	$I_D$	70	A
Continuous Drain Current ( $T_a=100^{\circ}C$ )	$I_D$	52	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	220	A
Singel Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	88	mJ
Power Dissipation	$P_D$	30	W
Thermal Resistance from Junction to Case <sup>(4)</sup>	$R_{\theta JC}$	3.2	$^{\circ}C/W$
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

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

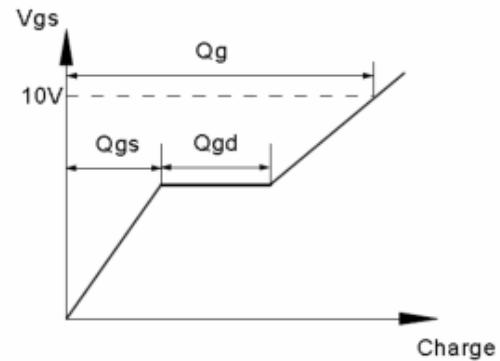
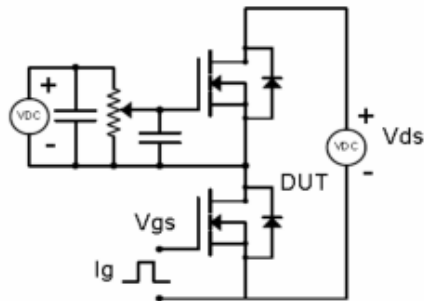
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	20	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V,V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.7	0.9	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	-	3.1	4.0	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =20A	-	4.0	5.8	
Dynamic characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f =1MHz	-	2560	-	pF
Output Capacitance	C <sub>oss</sub>		-	368	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	356	-	
Switching characteristics						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =30A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =1.8Ω	-	7.8	-	ns
Turn-on rise time	t <sub>r</sub>		-	30	-	
Turn-off delay time	t <sub>d(off)</sub>		-	50	-	
Turn-off fall time	t <sub>f</sub>		-	42	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>D</sub> S=10V, I <sub>D</sub> =30A, V <sub>G</sub> S=4.5V	-	38	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2.9	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	15	-	
Source-Drain Diode characteristics						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	70	A

**Notes:**

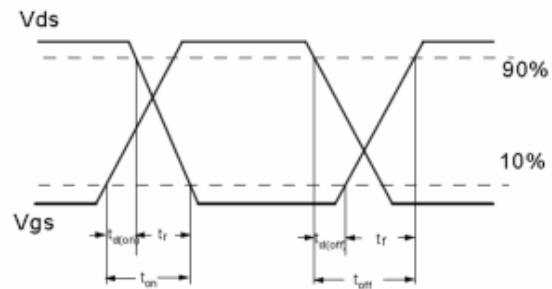
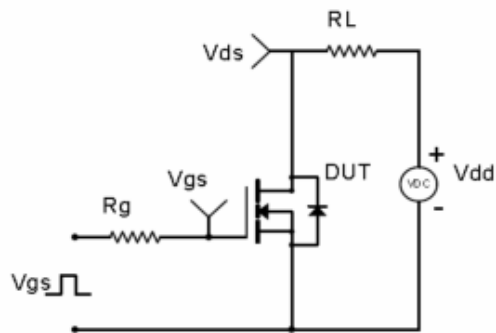
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:  $T_J = 25^{\circ}\text{C}, V_{DD} = 15V, R_G = 25\Omega, L = 0.5mH$
3. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
4. Surface Mounted on FR4 Board,  $t \leq 10\text{ sec}$

## Test Circuit & Waveform

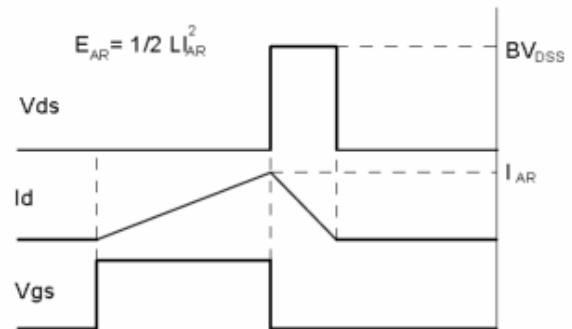
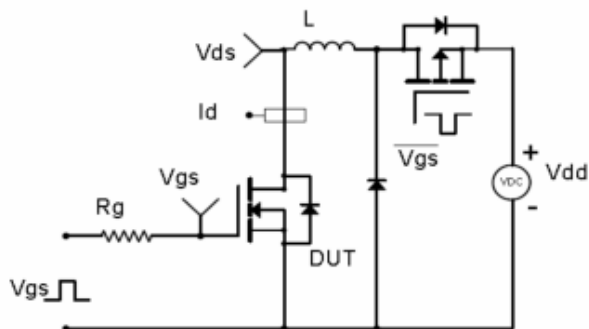
Gate Charge Test Circuit & Waveform



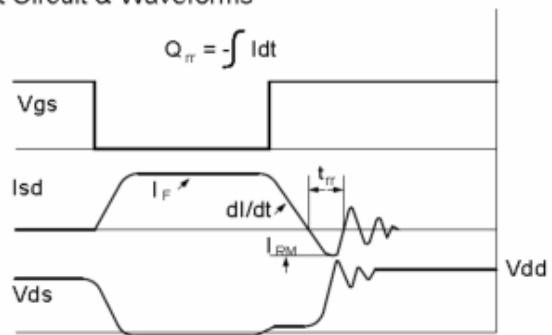
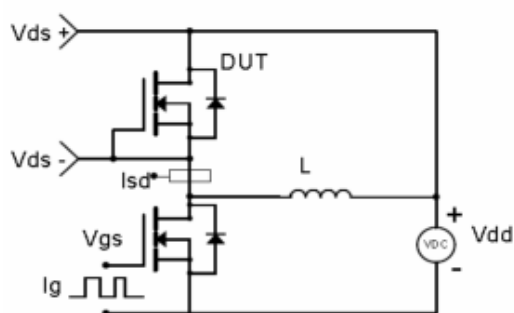
Resistive Switching Test Circuit & Waveforms



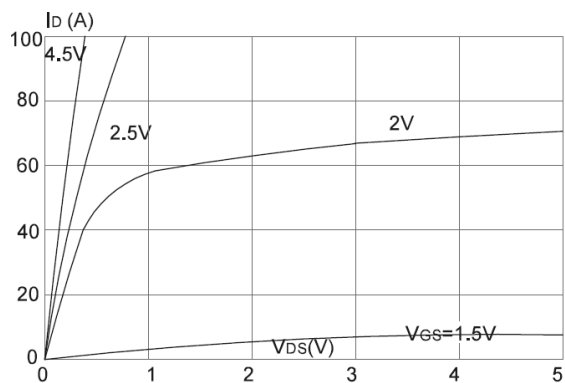
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



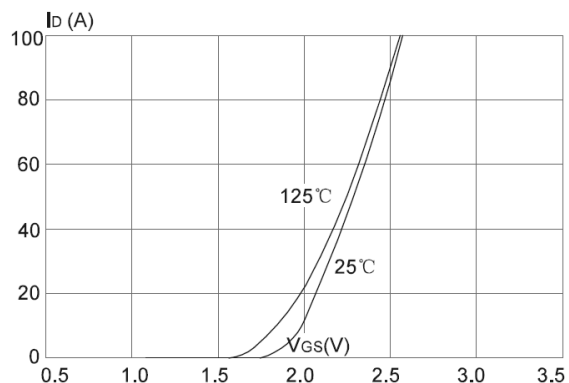
Diode Recovery Test Circuit & Waveforms



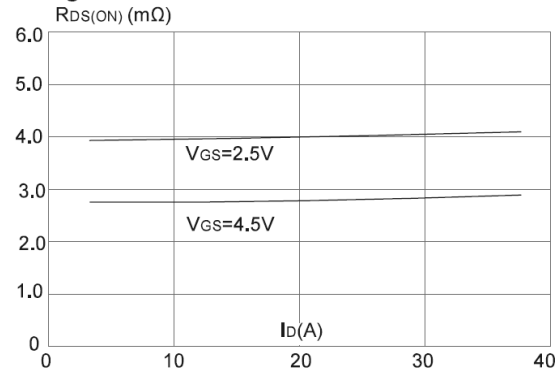
**Figure1: Output Characteristics**



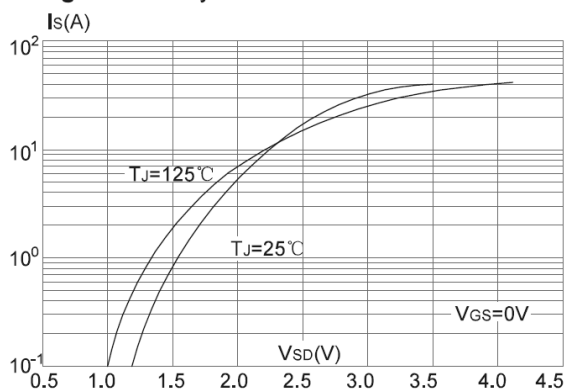
**Figure 2: Typical Transfer Characteristics**



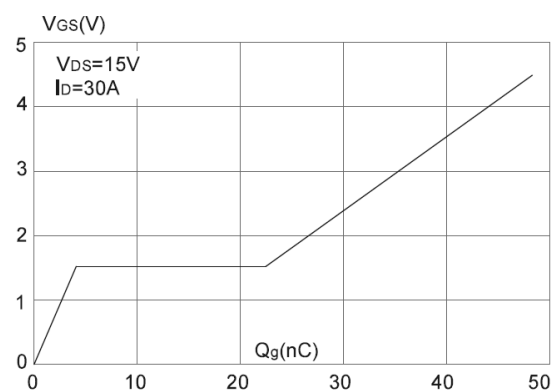
**Figure 3: On-resistance vs. Drain Current**



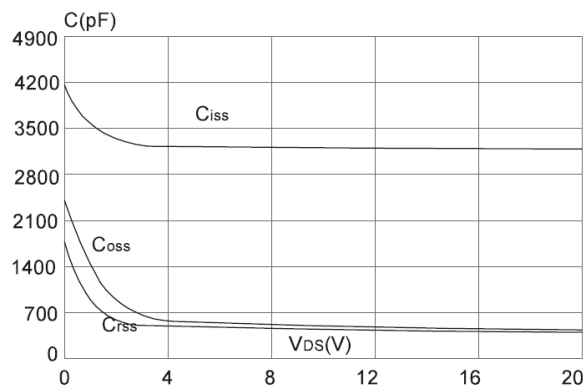
**Figure 4: Body Diode Characteristics**



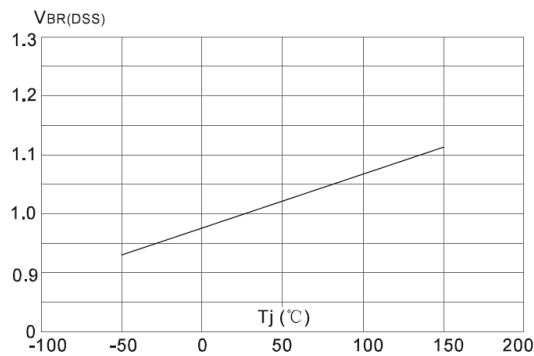
**Figure 5: Gate Charge Characteristics**



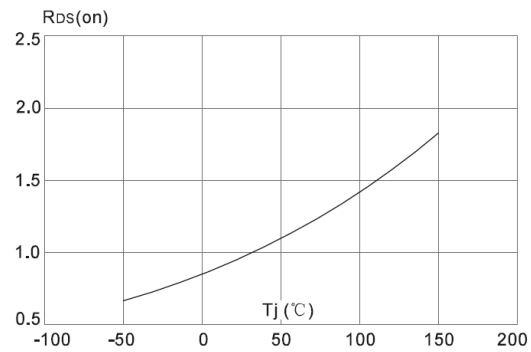
**Figure 6: Capacitance Characteristics**



**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



**Figure 8:** Normalized on Resistance vs. Junction Temperature



**Figure.9:**Maximum Drain Current vs. Case Temperature

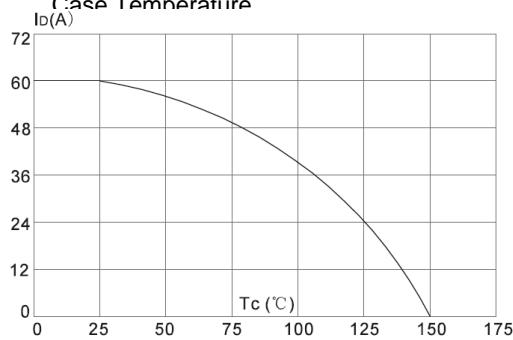


Fig.10 Safe Operating Area

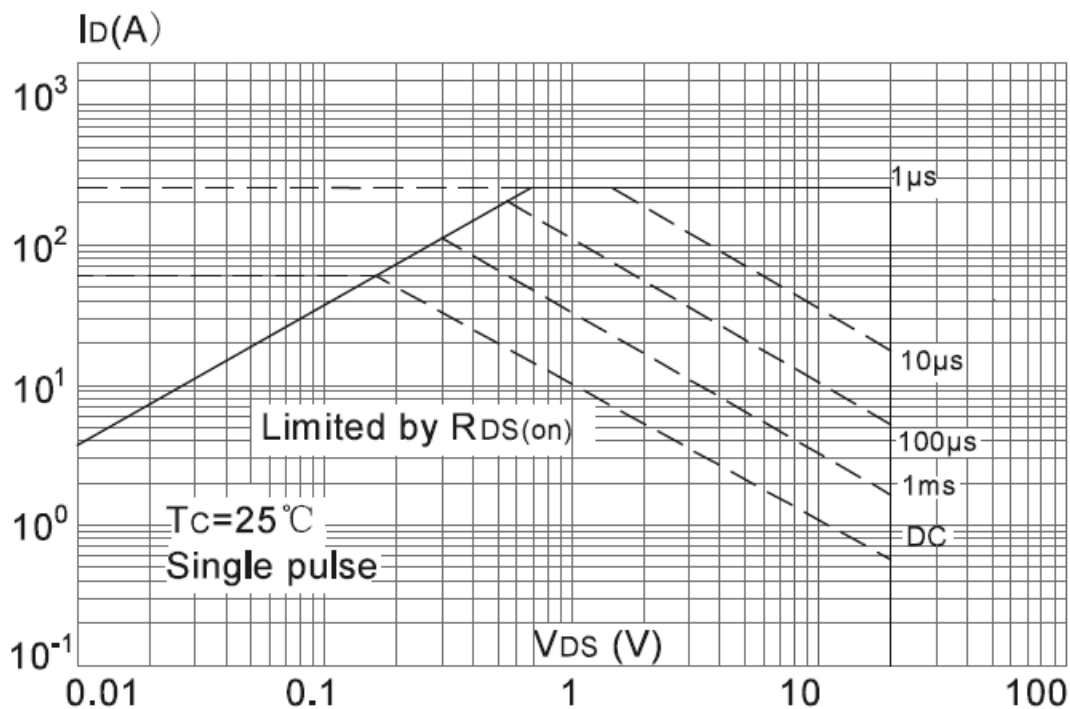
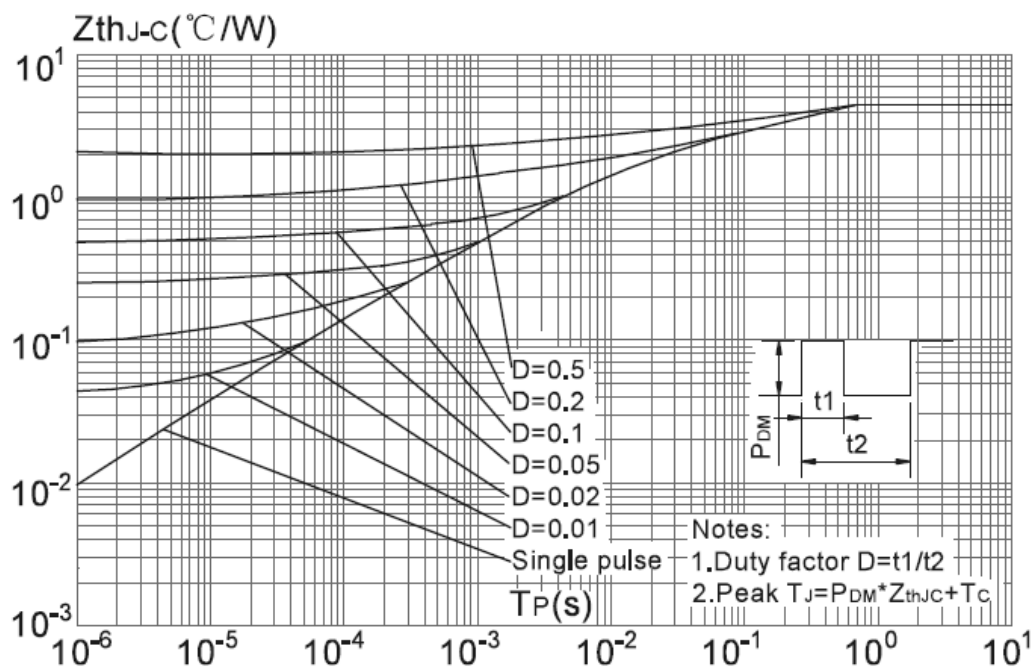
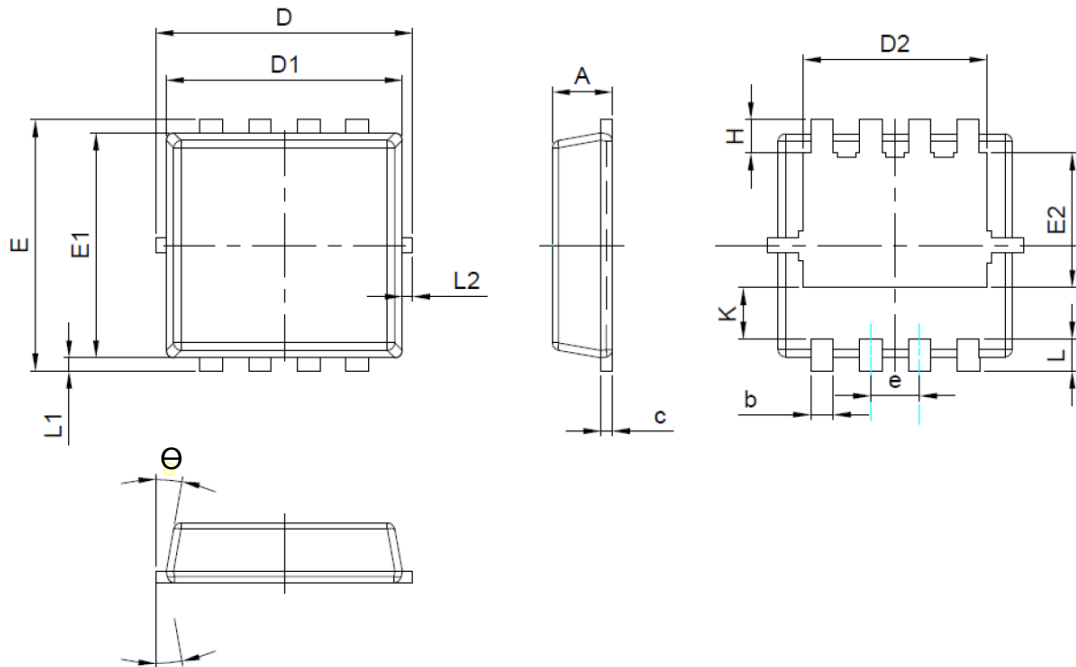


Fig. 11 Transient Thermal Response Curve



**PDFN3X3-8L Package Information**

**COMMON DIMENSIONS**  
( UNITS OF MEASURE = MILLIMETER )

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
b	0.25	0.30	0.39
c	0.14	0.15	0.25
D	3.20	3.30	3.40
D1	3.00	3.15	3.30
D2	2.35	2.45	2.55
e	0.65 BSC		
E	3.25	3.35	3.45
E1	2.85	3.00	3.15
E2	1.635	1.735	1.835
H	0.33	0.48	0.63
K	0.585	0.685	0.785
L	0.30	0.40	0.50
L1	0.05	0.15	0.25
L2	-	-	0.15
θ	8°	10°	12°