AKT3090G 30V N-channel Enhancement Mode Power MOSFET

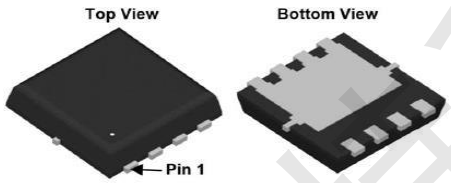
AKT3090G Features

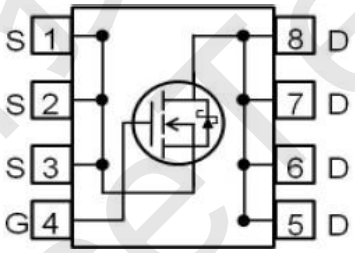
- Extremely Low RDS(on):
  Typ.R_{DS}(on) = 2.3 mΩ @V_{GS}=10 V, I_d=30 A
- Good stability and uniformity
- 100% avalanche tested
- Excellent package for good heat dissipation

AKT3090G General Description

The AKT3090G uses advanced trench technology to pro -vide excellent RDS(ON), low gate charge This device is suitable for use in UPS, power switching and general purpose applications.

PDFN 5*6 Package





AKT3090G Maximum Ratings(T_J=25℃ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous (TC= 25˚C)	90	A
	Drain Current - Continuous (TC= 100˚C)	58*	A
I_{DM}	Drain Current - Pulsed (Note 1)	360*	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	230	mJ
P_D	Power Dissipation (TC = 25˚C)	51.63	W
	- Derate above 25˚C		W/°C
T_j , T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C

* Drain current limited by maximum junction temperature

AKT3090G Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.421	˚C/W

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AKT3090G Electrical Characteristics TC = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 29.5 V, V_{GS} = 0 V			-1	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.1	1.6	2.1	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 30 A		2.3	3.1	mΩ
		V_{GS} = 4.5 V, I_D =20 A		4.2	5.8	mΩ
Dynamic Characteristics						
C_{iss}	Input capacitance	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz		3300		pF
C_{oss}	Output capacitance			480		pF
C_{rss}	Reverse transfer capacitance			433		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	VDD=15V, ID=30A, VGS=10V, RG=3Ohm (Note 3, 4)		4		ns
t_r	Rising Time			26		ns
$t_{d(off)}$	Turn Off Delay Time			58		ns
t_f	Fall Time			29		ns
Q_g	Total Gate Charge	VDD=15V, ID=30A, VGS=10V (Note 3, 4)		68.5		nC
Q_{gs}	Gate-Source Charge			9.6		nC
Q_{gd}	Gate-Drain Charge			12.4		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				90	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				360	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 30A			1.2	V
T_{rr}	Reverse recovery time	I_F=20 A, dI_F/dt = 100 A/us		20		ns
Q_{rr}	Reverse recovery charge			12		nC

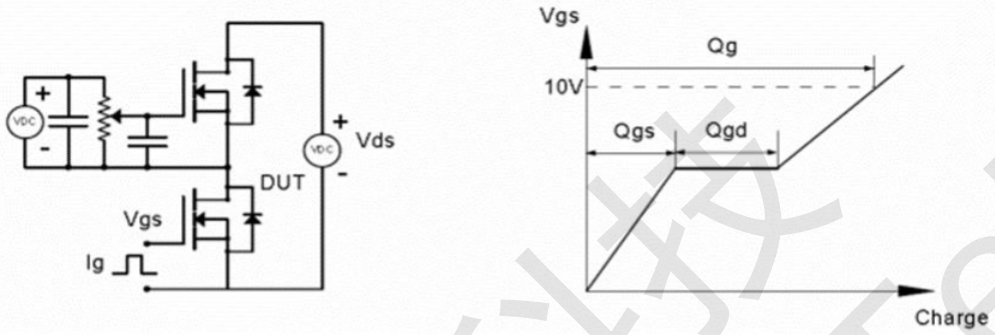
Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.5 mH, V_{DD} = -10 V, R_G = 25 Ω, Starting T_j =25°C
3. I_{SD} ≤ -20 A, di/dt = 100 A/us, V_{DD} ≤ BV_{DSS}, Staring T_j =25°C
4. Pulse Test : Pulse width ≤ 300 us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

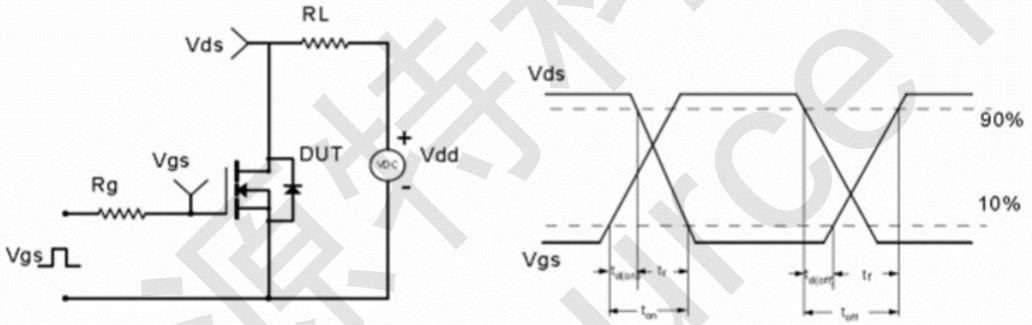
AKT3090G 30V N-channel Enhancement Mode Power MOSFET

AKT3090G Test Circuit & Waveform

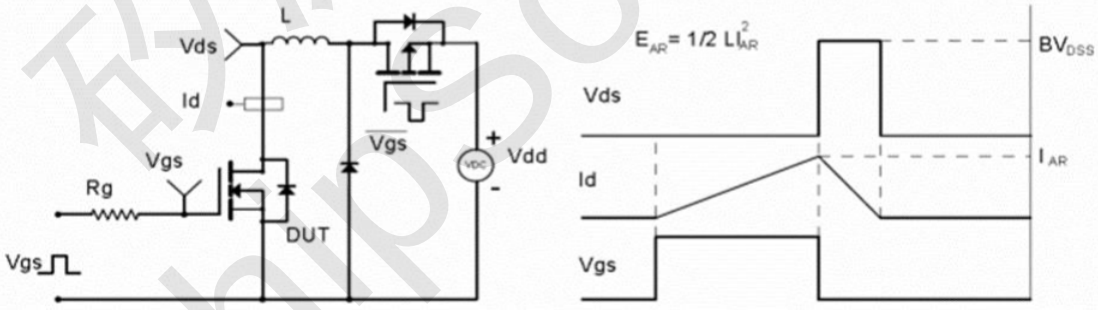
Gate Charge Test Circuit & Waveform



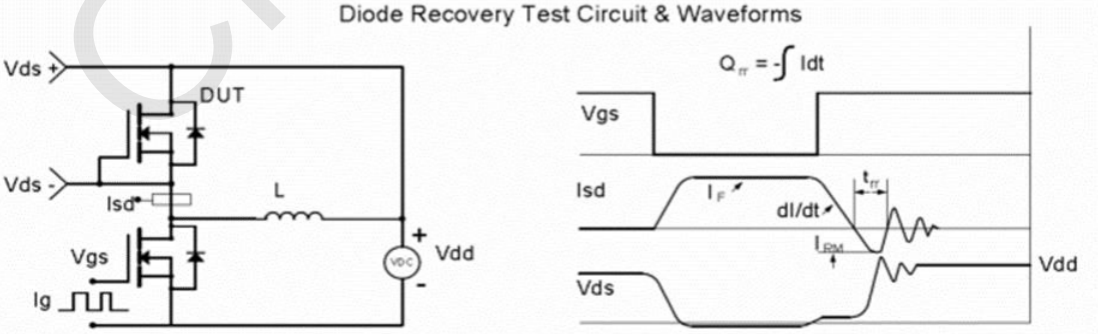
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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AKT3090G Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

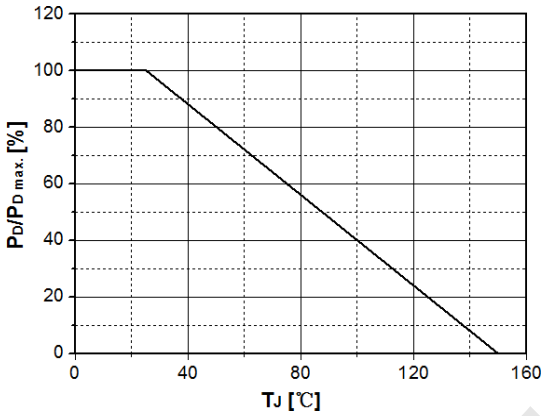

Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

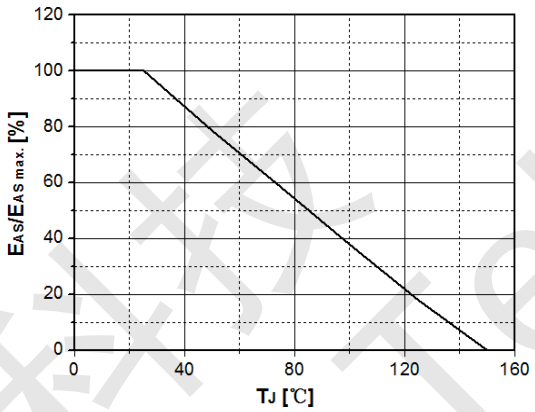

Fig.3 Typical Output Characteristics

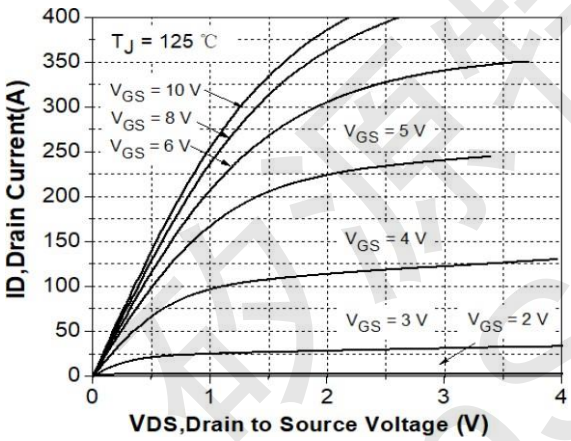

Fig. 4 Transconductance vs. Drain Current

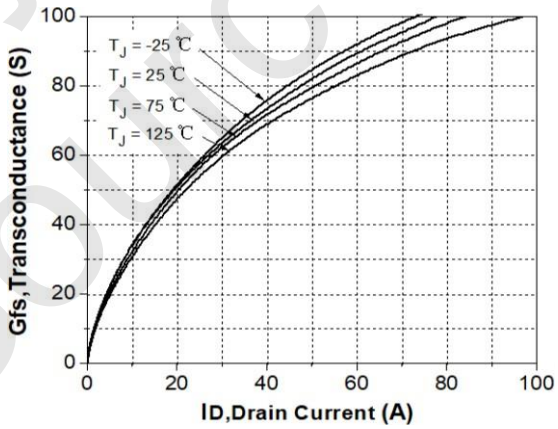

Fig.5 Typical Transfer Characteristics

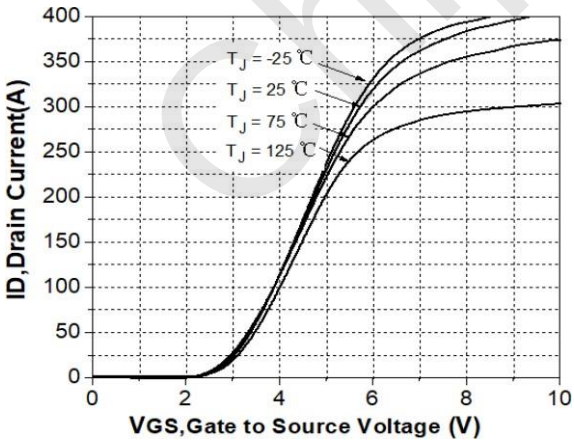

Fig. 6 State Resistance vs. Drain Current @-25℃

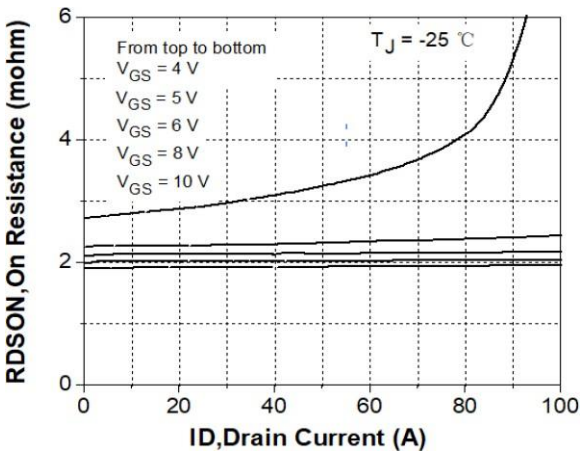

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Fig.7 State Resistance vs. Drain Current @25℃

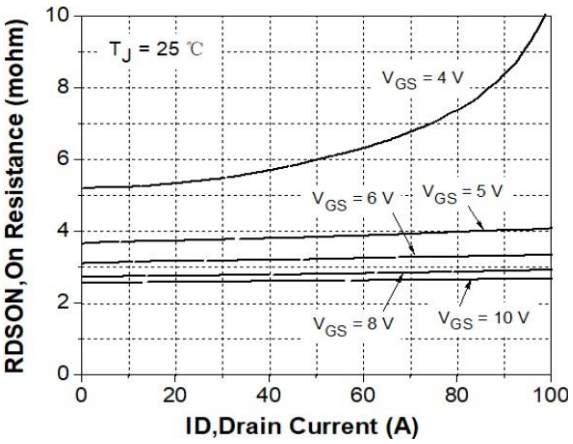

Fig. 8 State Resistance vs. Drain Current @125℃

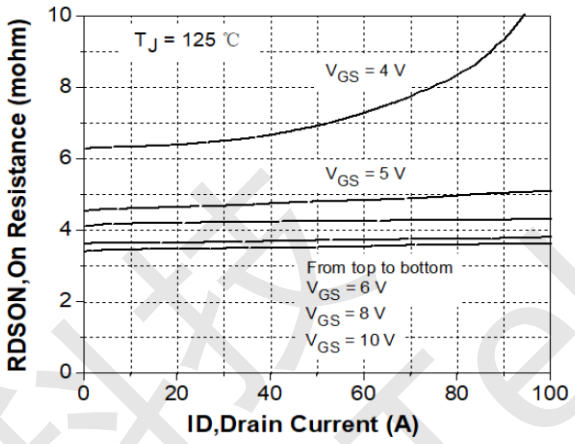

Fig.9 Typical Capacitance vs. Drain Source Voltage

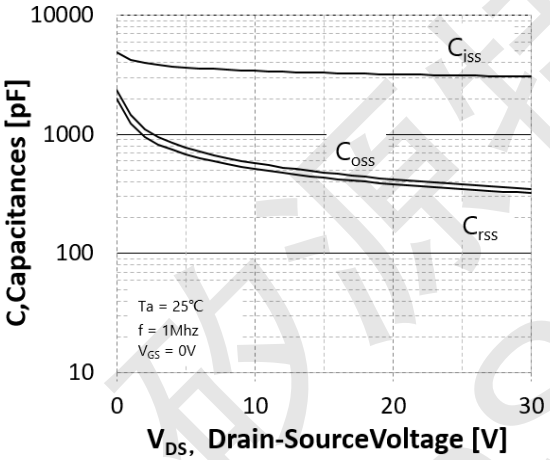

Fig.10 Dynamic Input Characteristics

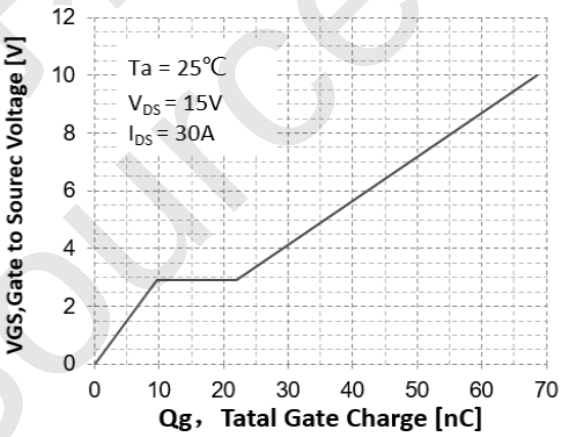

Fig.11 Breakdown Voltage vs. Junction Temperature

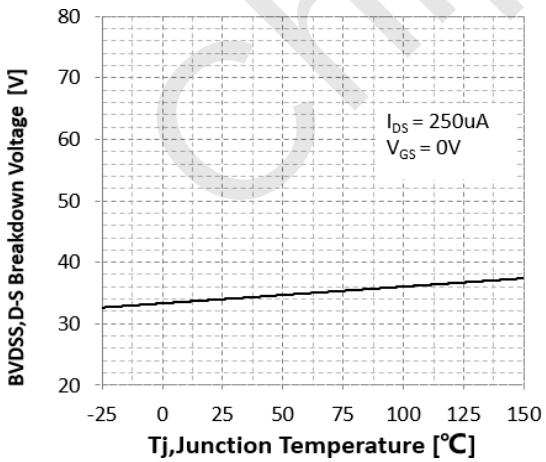

Fig. 12 Gate Threshold Voltage vs. Junction Temperature

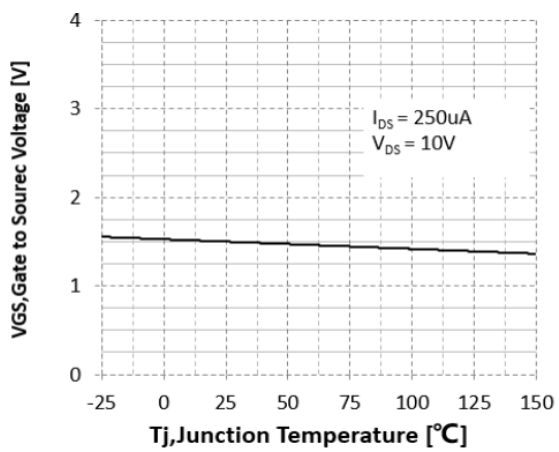

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Fig.13 On-Resistance Variation vs. Junction Temperature

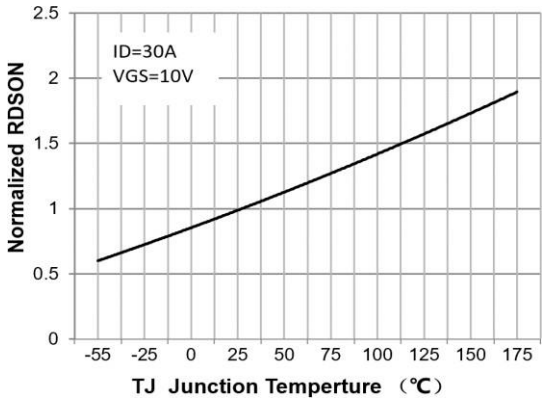

Fig.14 Maximum Drain Current vs. Case Temperature

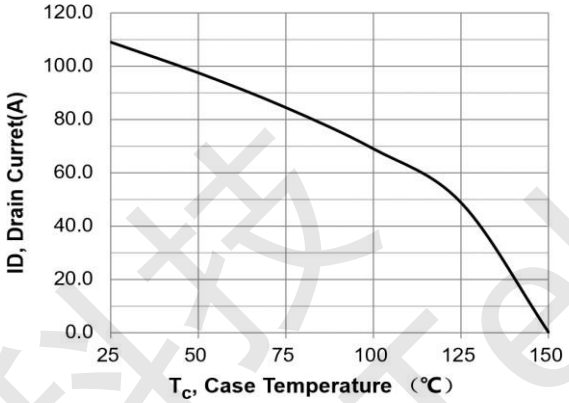

Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current

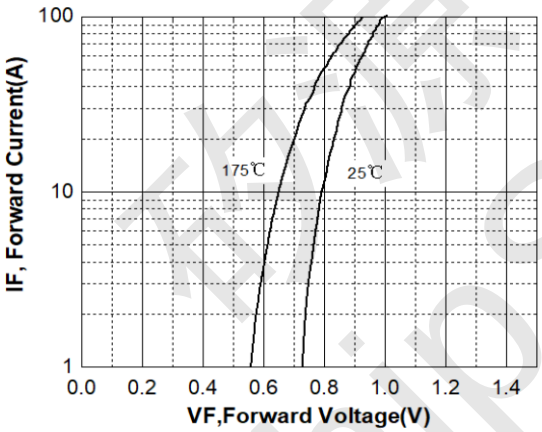

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Fig.16 Safe Operating Area

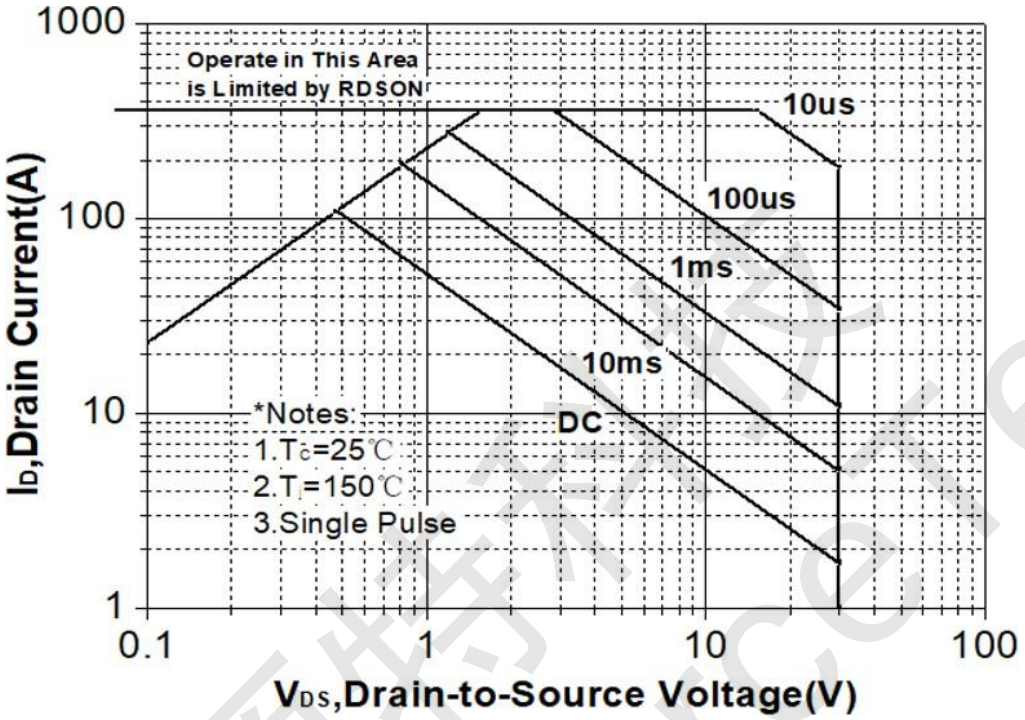
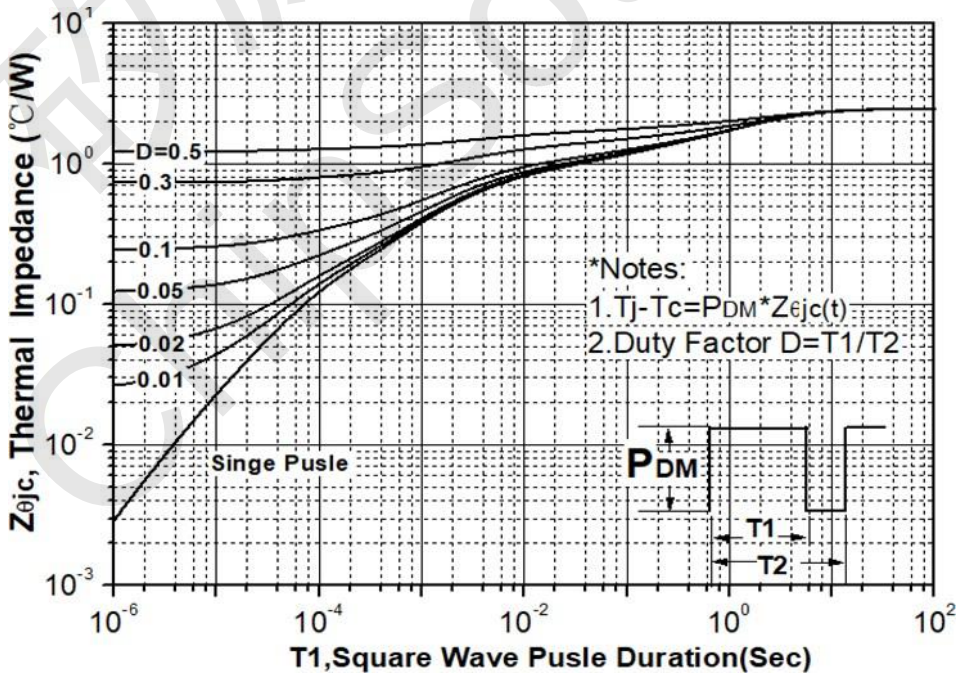
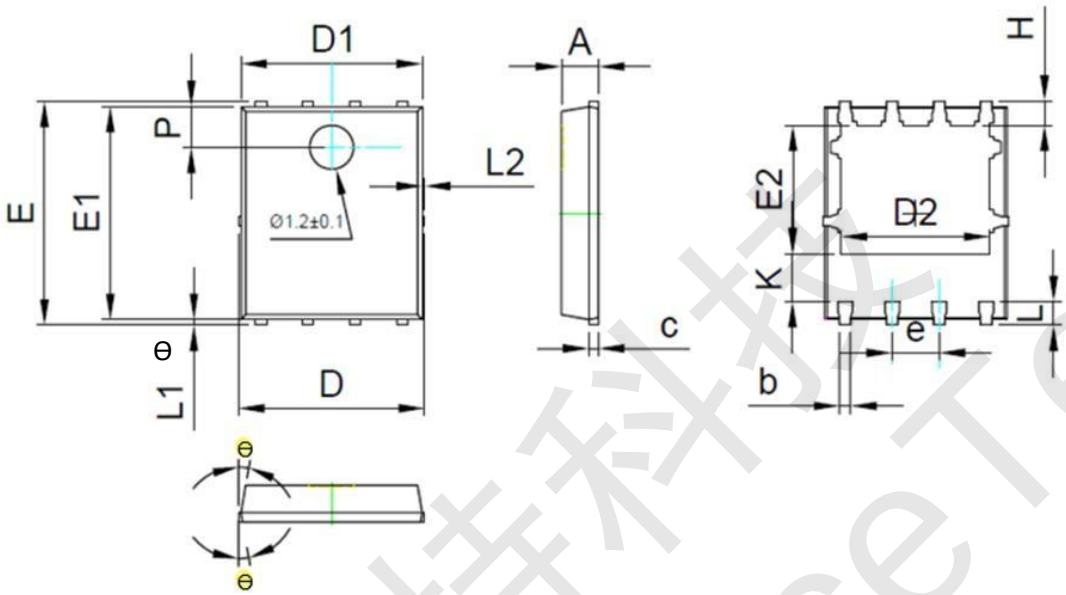


Fig. 17 Transient Thermal Response Curve



AKT3090G 30V N-channel Enhancement Mode Power MOSFET

AKT3090G Package Dimensions： PDFN 5*6 PACKAGE



COMMON DIMENSIONS

(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	-	-	5.1
D1	4.85	4.90	4.95
D2	3.96	4.01	4.06
e	1.27 BSC		
E	5.95	6.00	6.05
E1	5.70	5.75	5.80
E2	3.425	3.475	3.525
H	0.60	0.65	0.70
K	1.29	-	-
L	0.60	0.65	0.70
L1	0.05	0.15	0.25
L2	-	-	0.12
θ	8°	10°	12°
P	1.05	1.10	1.15