AKT3080K 30V N-channel enhancement mode MOSFET

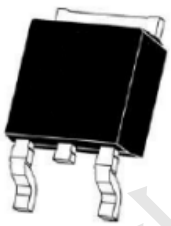
AKT3080K Features

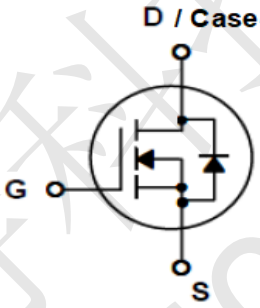
- Extremely Low RDS(on):
  Typ.RDS(on) = 4.0 mΩ @V_{GS}=10 V, Id=30 A
- Good stability and uniformity
- 100% avalanche tested
- Excellent package for good heat dissipation

AKT3080K General Description

The AKT3080K uses advanced trench technology to provide excellent RDS(ON), low gate charge This device is suitable for use in Load Switch,PWM Application, Power Management and general purpose applications.

TO-252-2L Package





Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous (TC= 25°C)	80	A
	- Continuous (TC= 100°C)	52*	A
I_{DM}	Drain Current - Pulsed (Note 1)	320*	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	131	mJ
P_D	Power Dissipation (TC = 25°C)	128	W
T_j , T_{stg}	Operating and Storage Temperature Range	-55 to +175	°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.973	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	47.13	°C/W

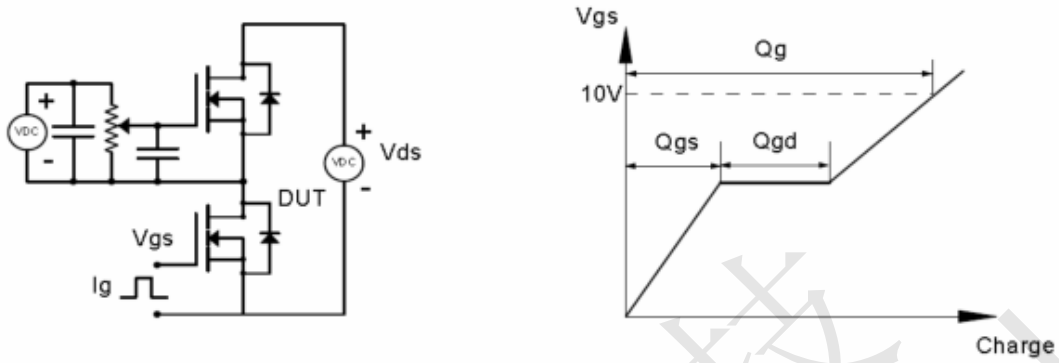
AKT3080K Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 29.5 V, V_{GS} = 0 V			1	μA
I_{GSSF}	Gate Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate Leakage Current, Reverse	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	1.5	2.2	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 30 A		4.0	5.5	mΩ
		V_{GS} = 4.5 V, I_D = 20 A		7.0	9.8	mΩ
Dynamic Characteristics						
C_{iss}	Input capacitance	VDS=15V, VGS=0V, F=1.0Mhz		1650		pF
C_{oss}	Output capacitance			245		pF
C_{rss}	Reverse transfer capacitance			225		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	VDD=15V, ID=30A, VGS=10V, RG=3Ohm (Note 3, 4)		5		ns
t_r	Rising Time			26		ns
$t_{d(off)}$	Turn Off Delay Time			18		ns
t_f	Fall Time			17		ns
Q_g	Total Gate Charge	VDD=15V, ID=30A, VGS=10V (Note 3, 4)		34		nC
Q_{gs}	Gate-Source Charge			4.0		nC
Q_{gd}	Gate-Drain Charge			7.1		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				80	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				320	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 30 A			1.2	V

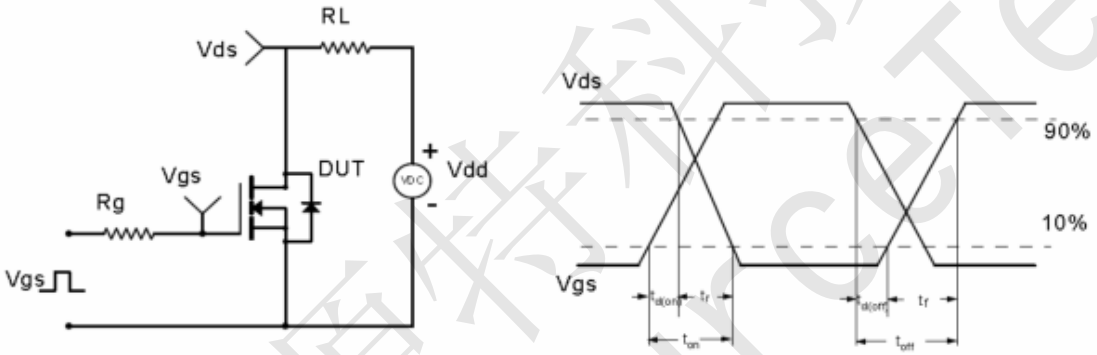
Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.5 mH,V_{DD} = 15 V, R_G = 25 Ω, V_{GS} = 10 V, Starting T_j = 25°C
3. I_{SD} ≤ 30A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_j =25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Test Circuit & Waveform

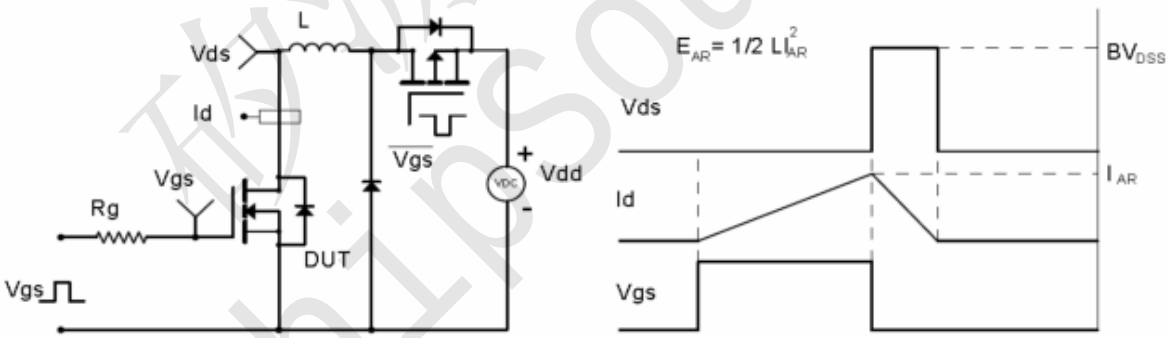
Gate Charge Test Circuit & Waveform



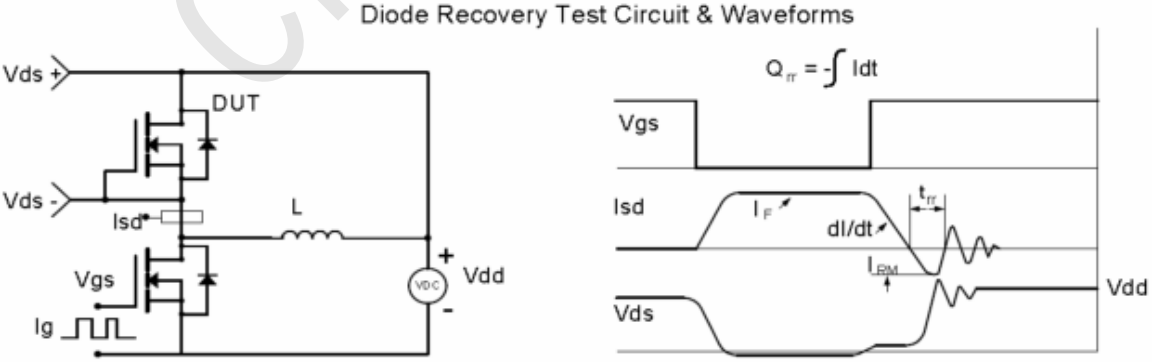
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



AKT3080K Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

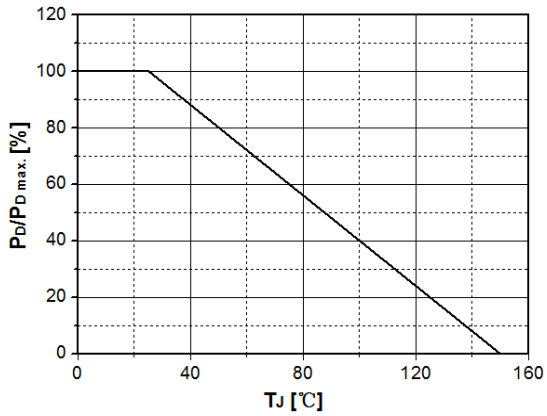


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

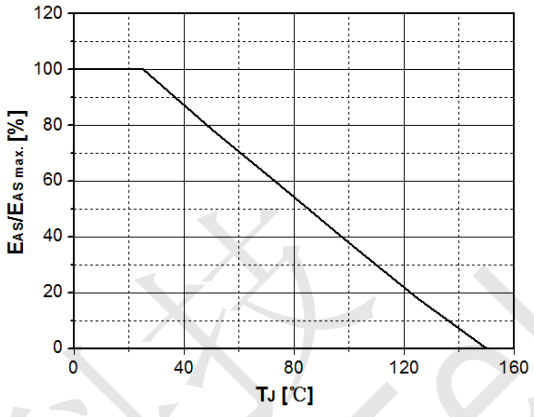


Fig.3 Typical Output Characteristics

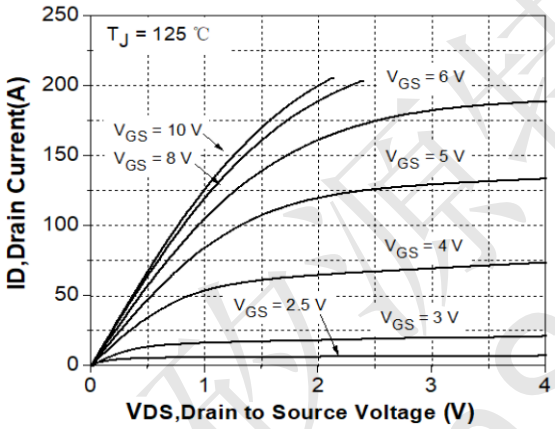


Fig. 4 Transconductance vs. Drain Current

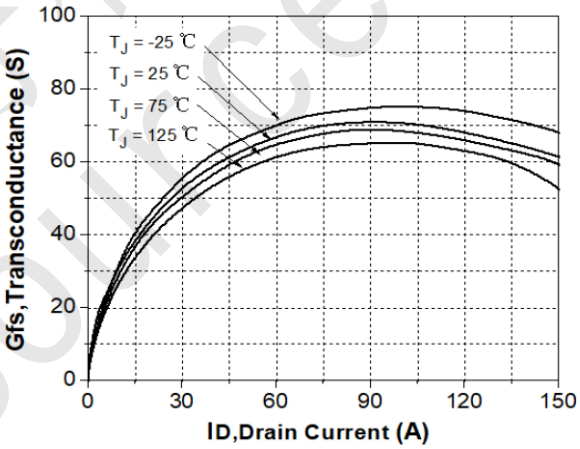


Fig.5 Typical Transfer Characteristics

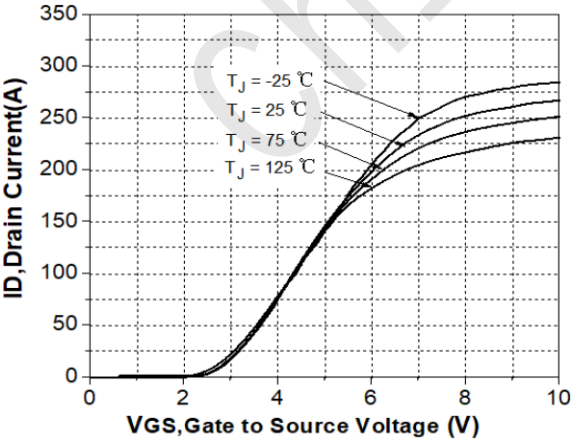


Fig. 6 State Resistance vs. Drain Current @-25℃

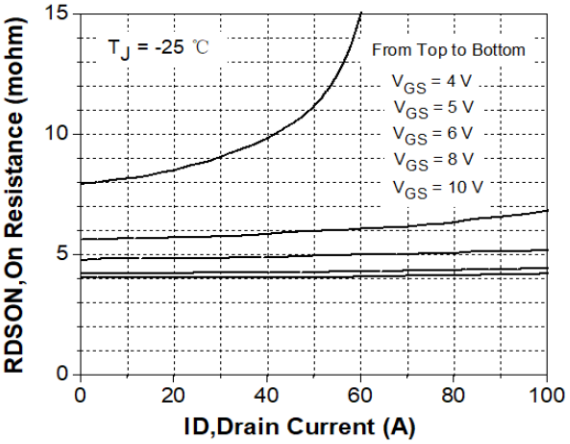


Fig.7 State Resistance vs. Drain Current @25℃

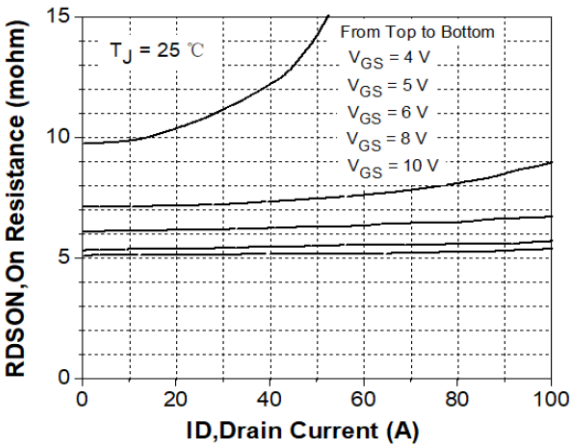


Fig. 8 State Resistance vs. Drain Current @125℃

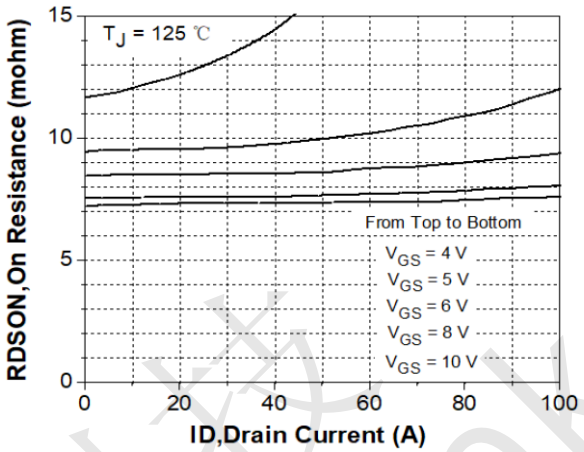


Fig.9 Typical Capacitance vs. Drain Source Voltage

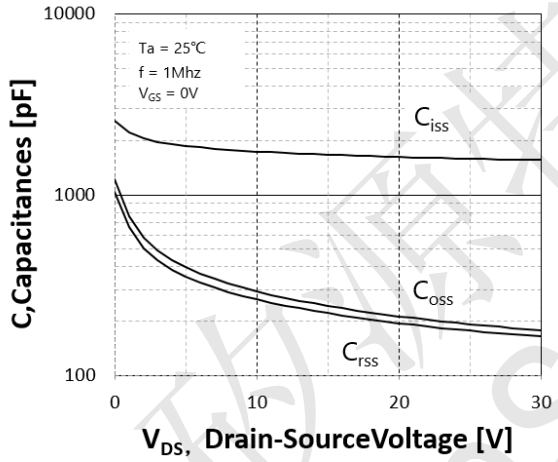


Fig.10 Dynamic Input Characteristics

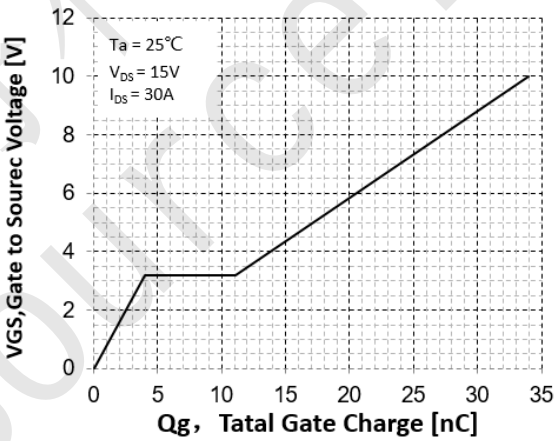


Fig.11 Breakdown Voltage
vs. Junction Temperature

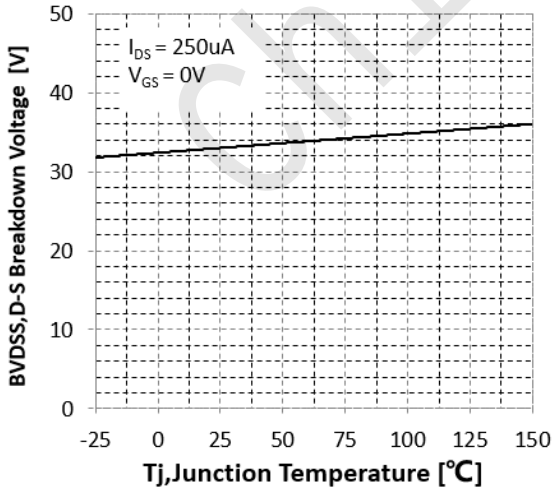


Fig. 12 Gate Threshold Voltage
vs. Junction Temperature

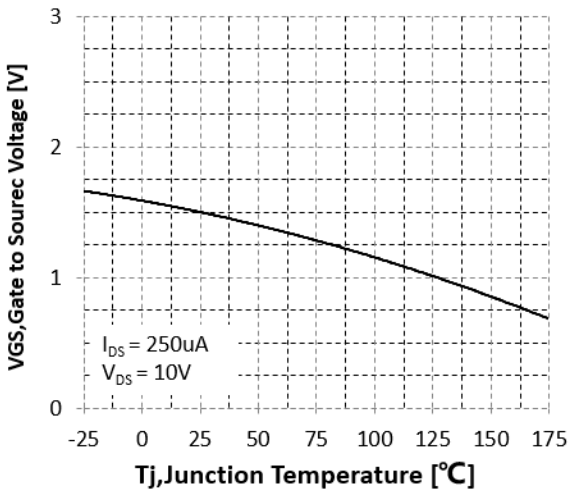


Fig.13 On-Resistance Variation vs. Junction Temperature

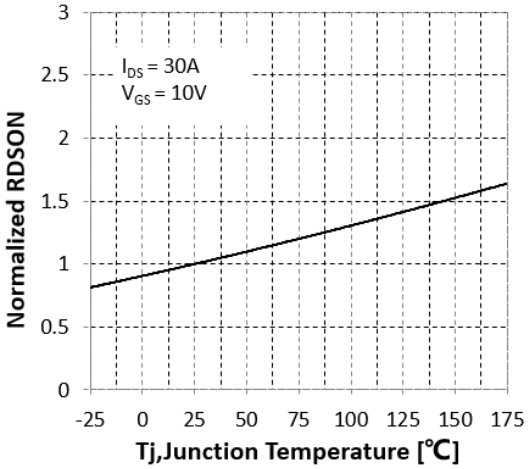


Fig.14 Maximum Drain Current vs. Case Temperature

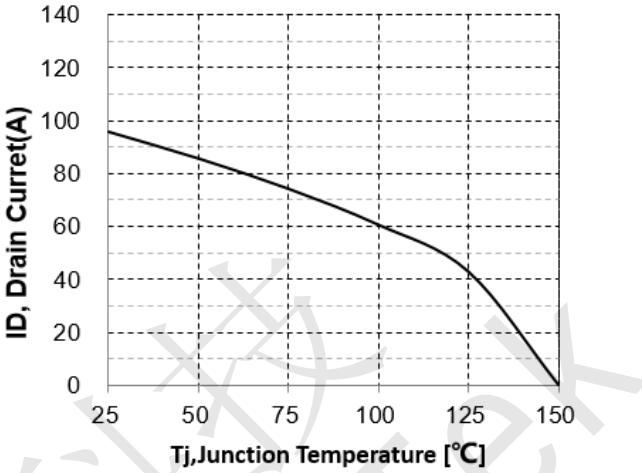


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current

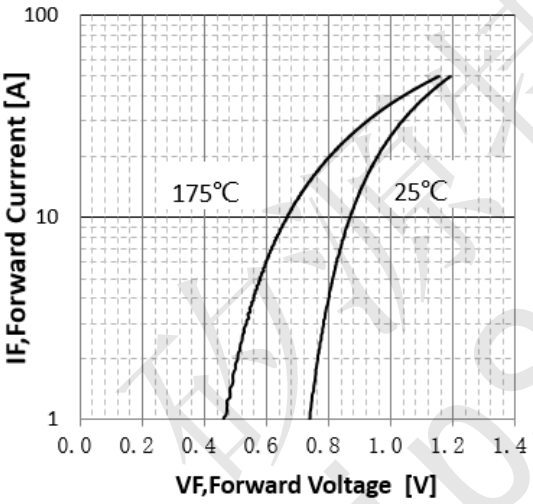


Fig.16 Safe Operating Area

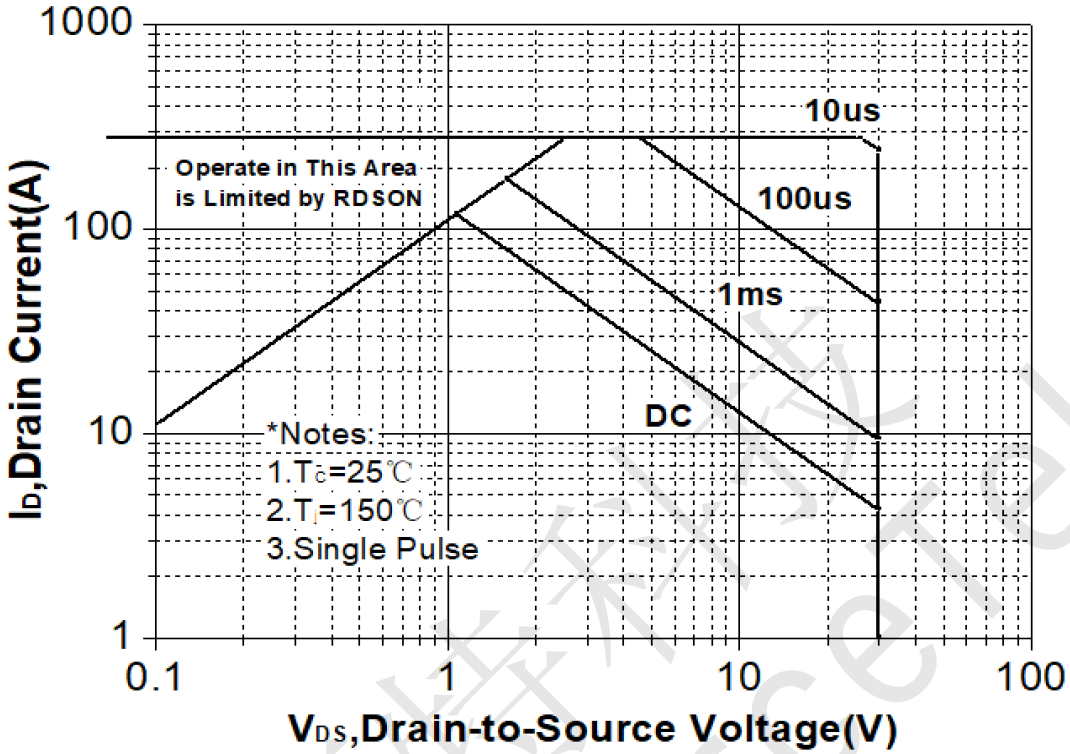
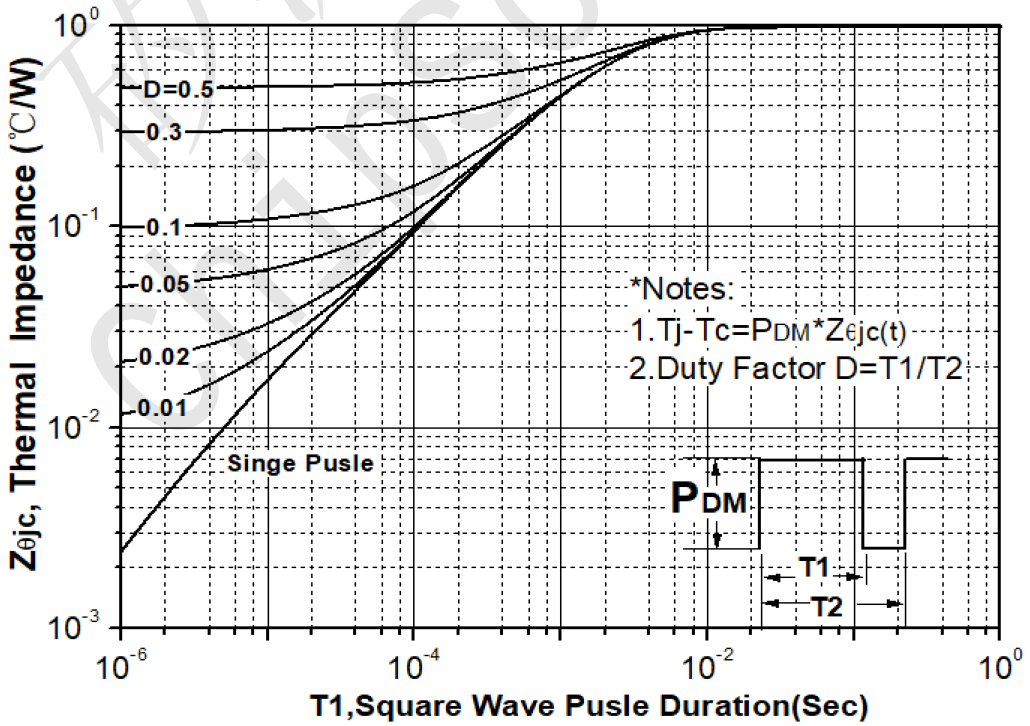
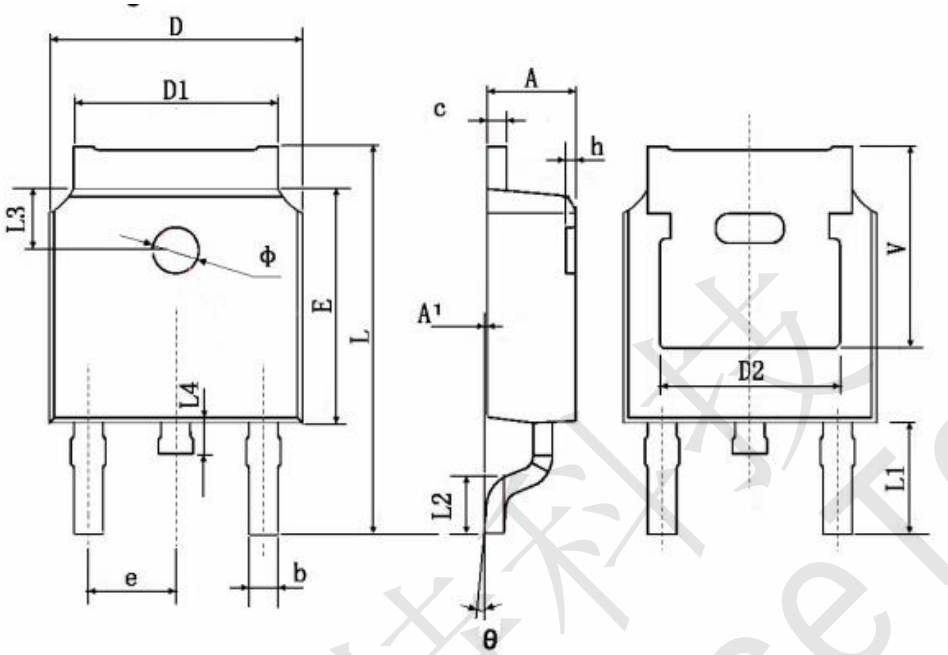


Fig. 17 Transient Thermal Response Curve



AKT3080 Package Dimensions： TO-252-2L PACKAGE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.250	2.350	0.089	0.093
A1	0.050	0.150	0.002	0.006
b	0.660	0.860	0.026	0.034
c	0.458	0.558	0.018	0.022
D	6.550	6.650	0.259	0.263
D1	5.234	5.434	0.207	0.215
D2	4.826 TYP.		0.191 TYP.	
E	6.050	6.150	0.239	0.243
e	2.236	2.336	0.088	0.092
L	9.820	10.220	0.388	0.404
L1	3.000 TYP.		0.119 TYP.	
L2	1.400	1.600	0.055	0.063
L3	1.800 TYP.		0.071 TYP.	
L4	0.700	0.900	0.028	0.036
Φ	1.150	1.250	0.045	0.049
θ	0°	3°	0°	3°
h	0.000	0.300	0.000	0.012
V	5.399 TYP		0.213 TYP	