AKT2055Q

20V N-channel enhancement mode MOSFET

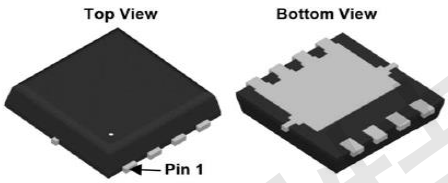
Features

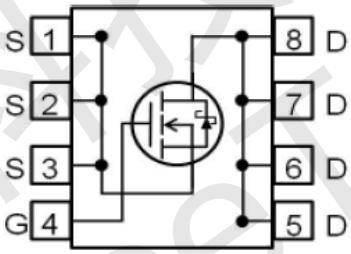
- Extremely Low RDS(on):
  Typ.RDS(on) = 3.1 mΩ @V_{GS}=4.5 V, Id=30 A
- Good stability and uniformity
- 100% avalanche tested
- Excellent package for good heat dissipation

General Description

The AKT2055Q 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.

PDFN 3.3*3.3 Package





Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	20	V
I_D	Drain Current - Continuous (TC= 25°C)	55	A
	- Continuous (TC= 100°C)	35	A
I_{DM}	Drain Current - Pulsed (Note 1)	220	A
V_{GS}	Gate-Source Voltage	± 12	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	88	mJ
P_D	Power Dissipation (TC = 25°C)	30	W
	- Derate above 25°C	0.54	W/°C
T_j , T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.2	°C/W

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	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 19.5 V, V_{GS} = 0 V			1	μA
I_{GSSF}	Gate Leakage Current, Forward	V_{GS} = 12 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate Leakage Current, Reverse	V_{GS} = -12 V, V_{DS} = 0 V			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 250 uA	0.5	0.7	0.9	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS} = 4.5 V, I_D = 30 A		3.1	4	mΩ
		V_{GS} = 2.5 V, I_D = 20 A		4	5.8	mΩ
Dynamic Characteristics						
C_{iss}	Input capacitance	V_{DS} =10V, V_{GS}=0V, F=1.0Mhz		2944		pF
C_{oss}	Output capacitance			423		pF
C_{rss}	Reverse transfer capacitance			409		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	V_{DS} =10V, I_D =30A, V_{GS} =4.5V, R_G =1.8Ω (Note 3, 4)		8.9		ns
t_r	Rising Time			34		ns
$t_{d(off)}$	Turn Off Delay Time			58		ns
t_f	Fall Time			48		ns
Q_g	Total Gate Charge	V_{DS} =10V, I_D =30A, V_{GS} =4.5V (Note 3, 4)		44.1		nC
Q_{gs}	Gate-Source Charge			3.3		nC
Q_{gd}	Gate-Drain Charge			17.5		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				55	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				220	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 30 A			1.2	V
T_{rr}	Reverse recovery time	I_F=30A, di/dt=100A/μS		21		ns
Q_{rr}	Reverse recovery charge			9		nC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.5 mH, V_G=4.5V, V_{DD} = 15V, R_G = 25 Ω, 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

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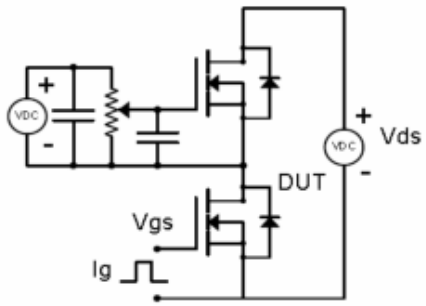
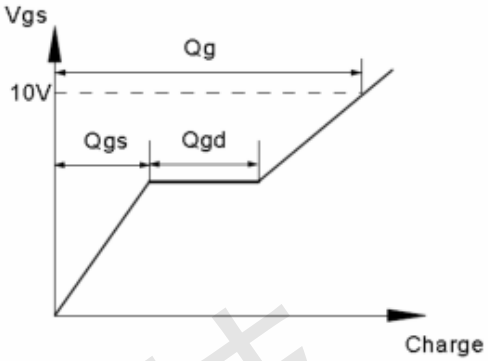
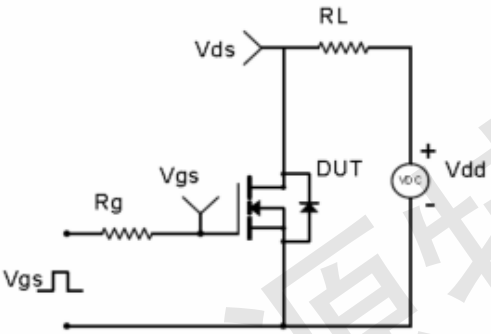
Test Circuit & Waveform

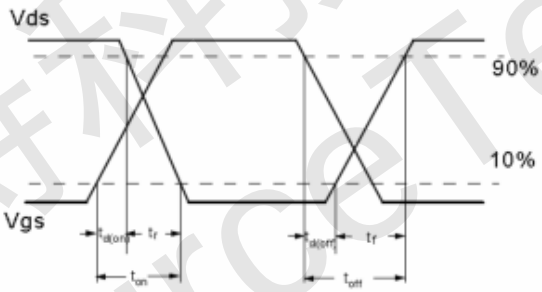
Gate Charge Test Circuit & Waveform



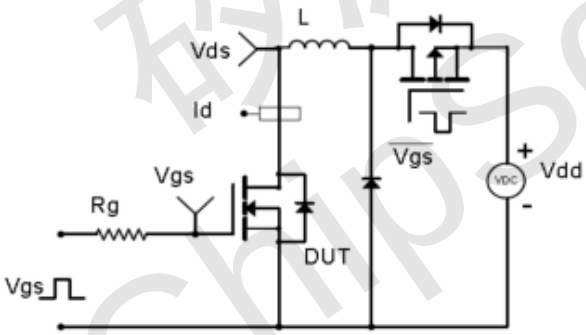


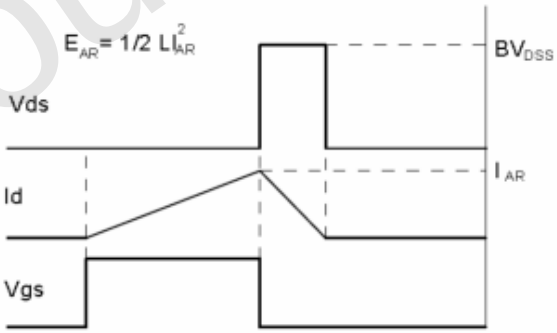
Resistive Switching Test Circuit & Waveforms



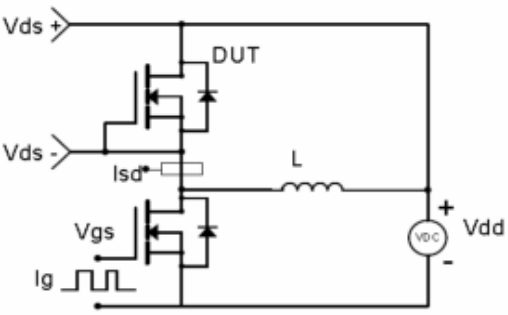


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms



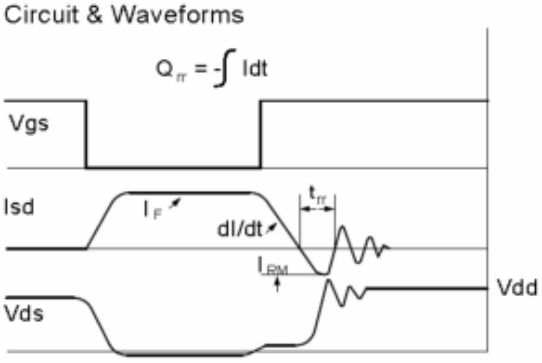


Figure1: Output Characteristics

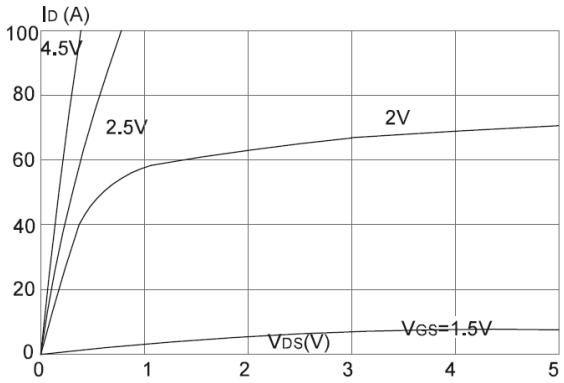


Figure 2: Typical Transfer Characteristics

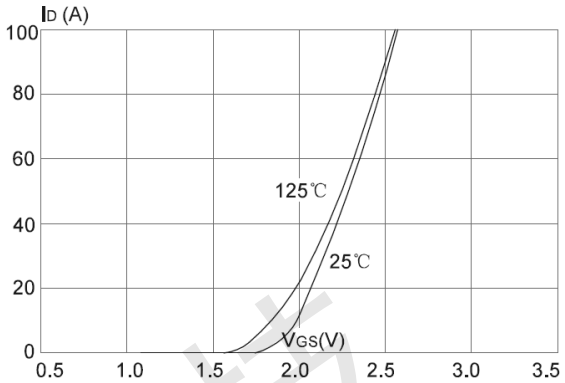


Figure 3: On-resistance vs. Drain Current

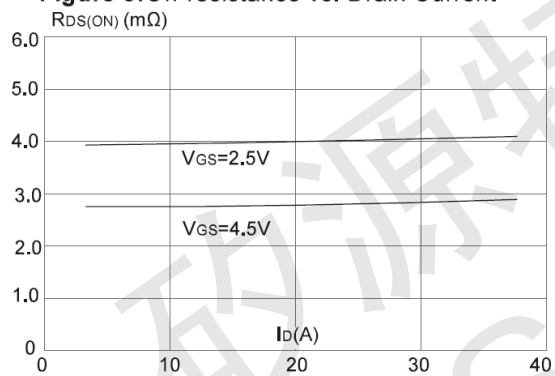


Figure 4: Body Diode Characteristics

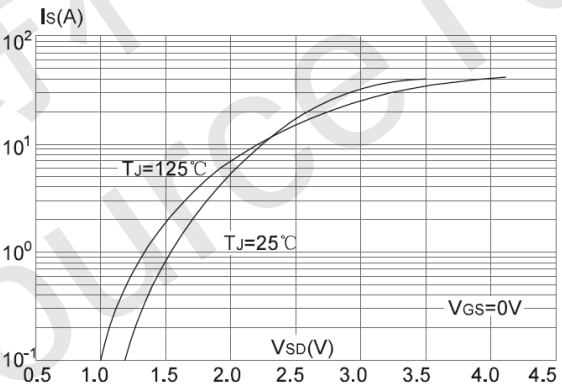


Figure 5: Gate Charge Characteristics

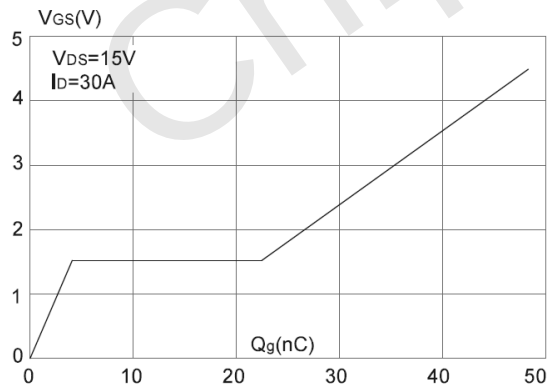


Figure 6: Capacitance Characteristics

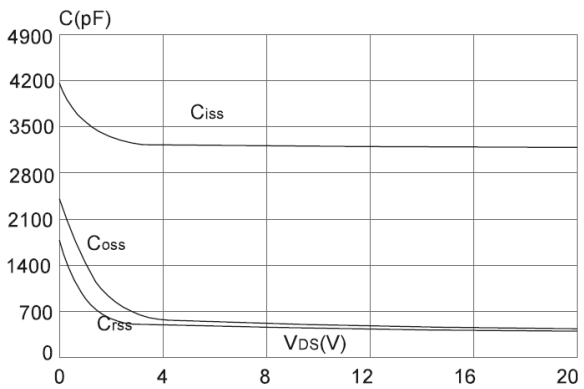


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

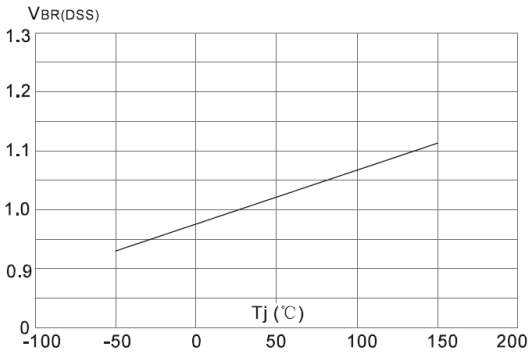


Figure 8: Normalized on Resistance vs. Junction Temperature

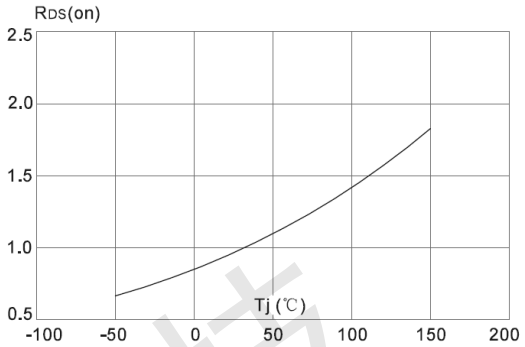


Figure.9:Maximum Drain Current vs. Case Temperature

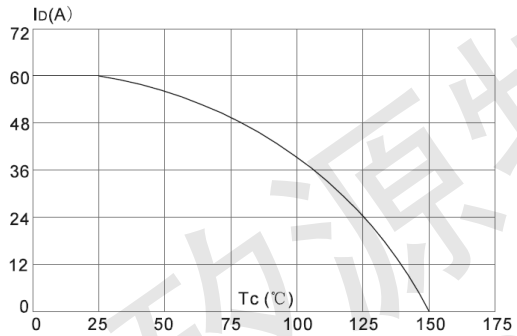


Fig.10 Safe Operating Area

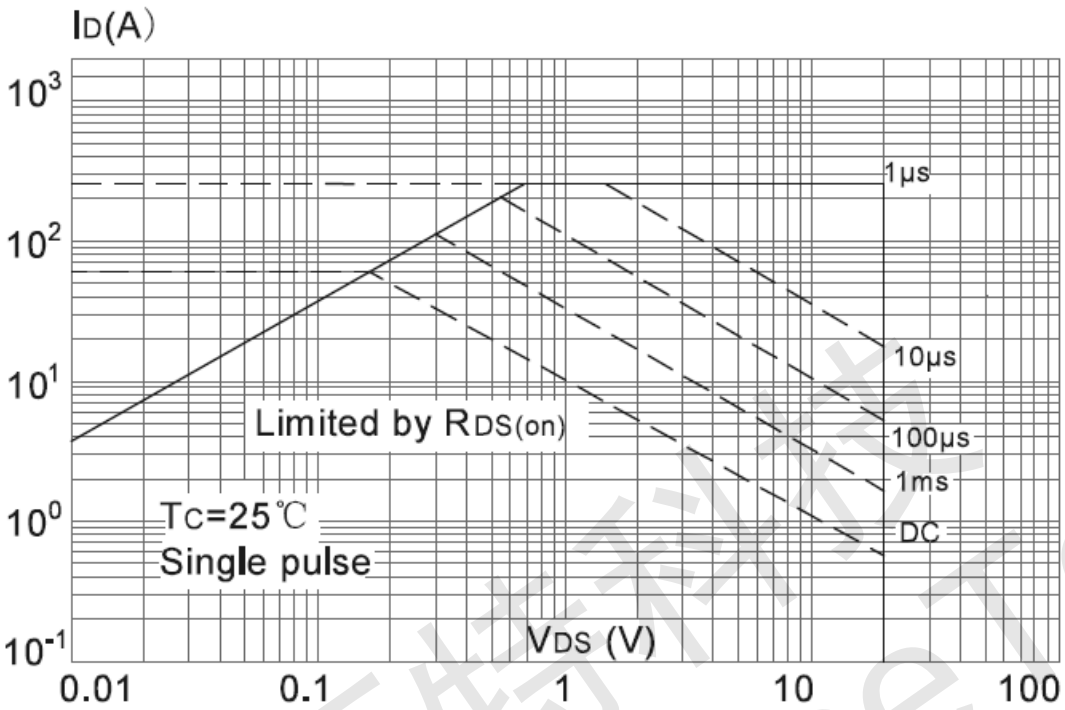
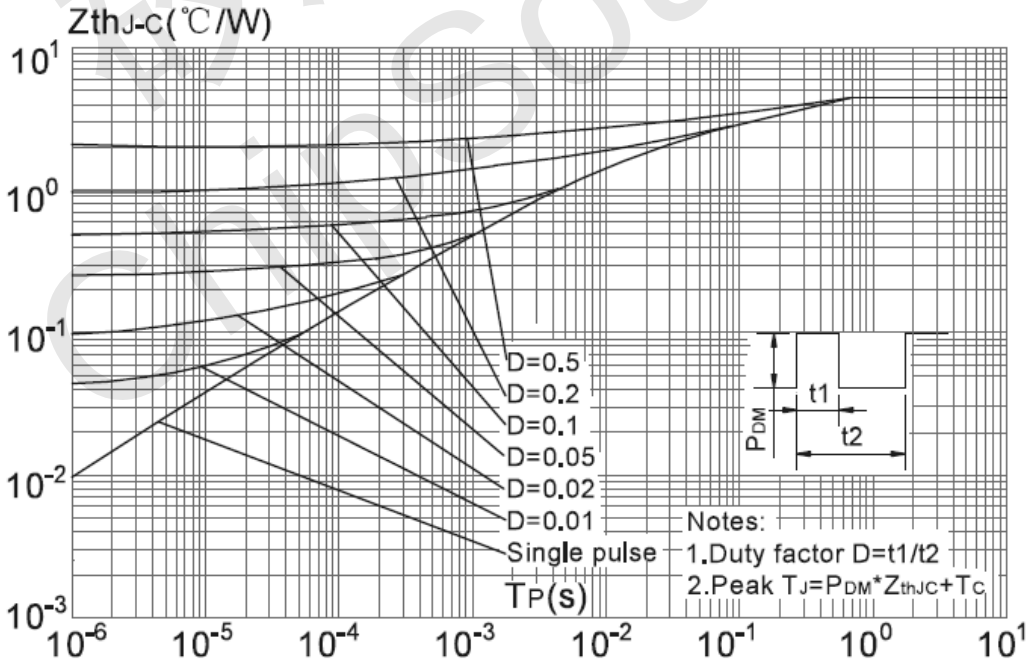
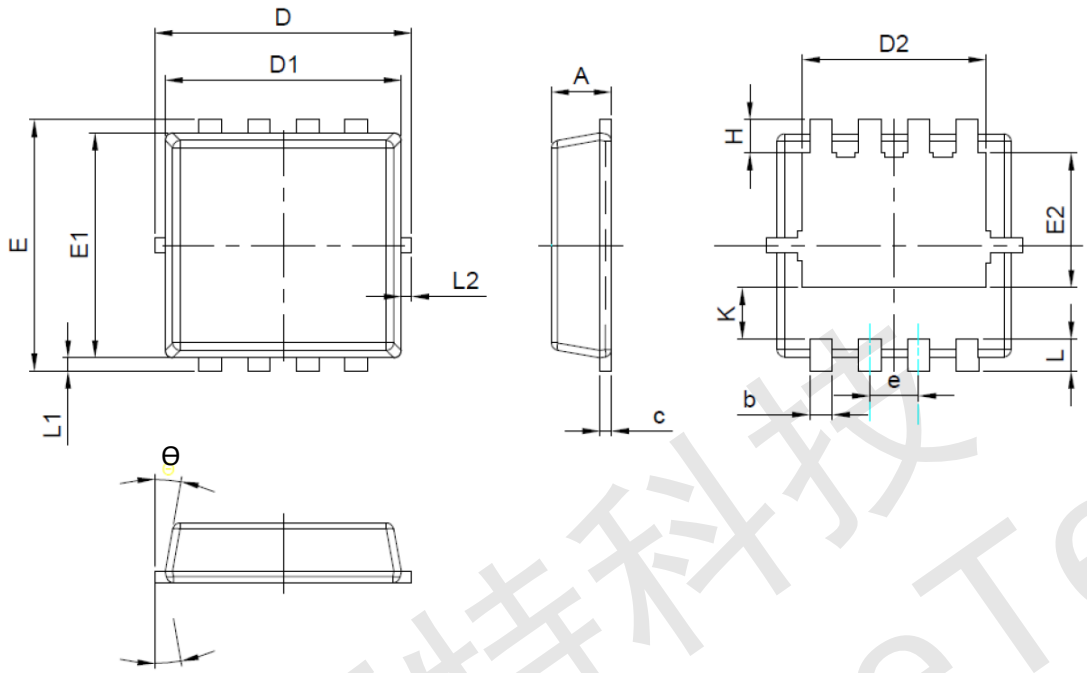


Fig. 11 Transient Thermal Response Curve



Package Dimensions： PDFN 3.3*3.3 PACKAGE



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°

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