



AKT2055Q

20V N-channel enhancement mode MOSFET

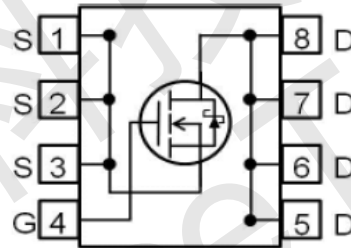
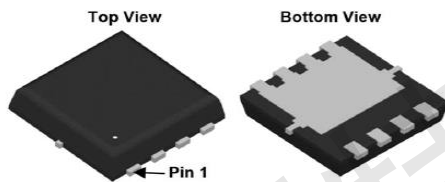
Features

- Extremely Low RDS(on):
Typ.RDS(on) = 3.1 mΩ @V_{GS}=4.5 V, I_d=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 _{θJC}	Thermal Resistance, Junction-to-Case	3.2	°C/W



Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 19.5\text{ V}, V_{GS} = 0\text{ V}$			1	μA
I_{GSSF}	Gate Leakage Current, Forward	$V_{GS} = 12\text{ V}, V_{DS} = 0\text{ V}$			100	nA
I_{GSSR}	Gate Leakage Current, Reverse	$V_{GS} = -12\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.5	0.7	0.9	V
$R_{DS(On)}$	Drain-Source on-state resistance	$V_{GS} = 4.5\text{ V}, I_D = 30\text{ A}$		3.1	4	$\text{m}\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 20\text{ A}$		4	5.8	$\text{m}\Omega$
Dynamic Characteristics						
C_{iss}	Input capacitance	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V},$ $F = 1.0\text{MHz}$		2944		pF
C_{oss}	Output capacitance			423		pF
C_{rss}	Reverse transfer capacitance			409		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	$V_{DS} = 10\text{V}, I_D = 30\text{A},$ $V_{GS} = 4.5\text{V}, R_G = 1.8\Omega$ (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			44.1		nC
Q_{gs}	Gate-Source Charge	$V_{DS} = 10\text{V}, I_D = 30\text{A},$ $V_{GS} = 4.5\text{V}$ (Note 3, 4)		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	$V_{GS} = 0\text{ V}, I_S = 30\text{ A}$			1.2	V
T_{rr}	Reverse recovery time	$I_F = 30\text{A}, di/dt = 100\text{A}/\mu\text{S}$		21		ns
Q_{rr}	Reverse recovery charge			9		nC

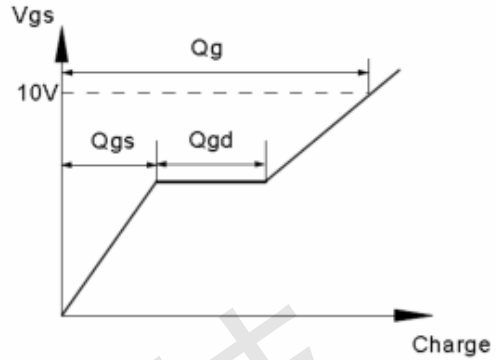
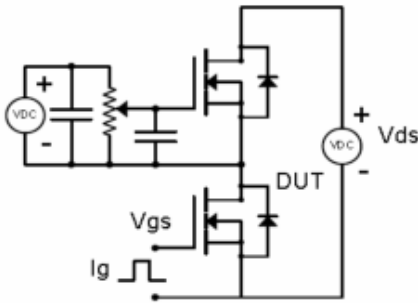
Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 0.5\text{ mH}, V_G = 4.5\text{V}, V_{DD} = 15\text{V}, R_G = 25\ \Omega$, Starting $T_j = 25^\circ\text{C}$
3. $I_{SD} \leq 30\text{A}, di/dt = 100\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_j = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

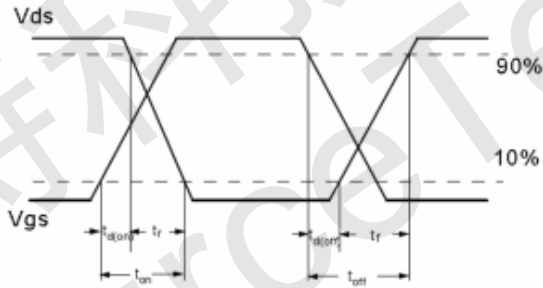
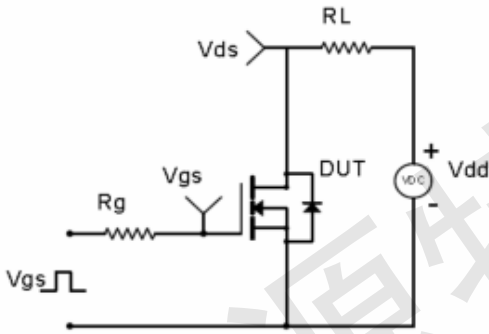


Test Circuit & Waveform

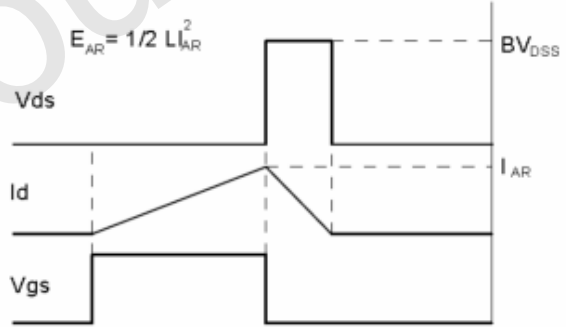
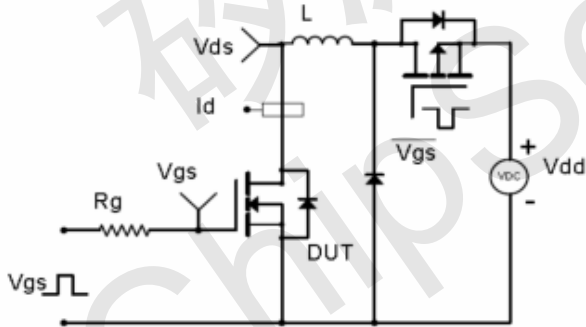
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

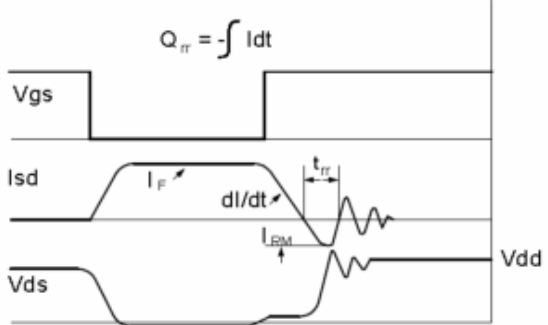
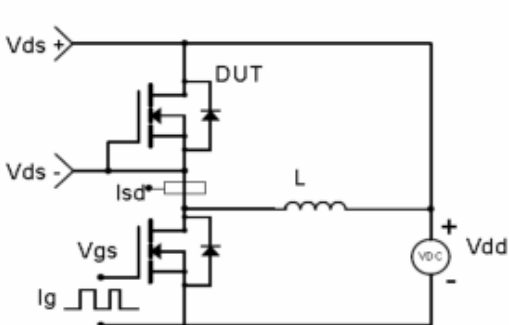




Figure 1: Output Characteristics

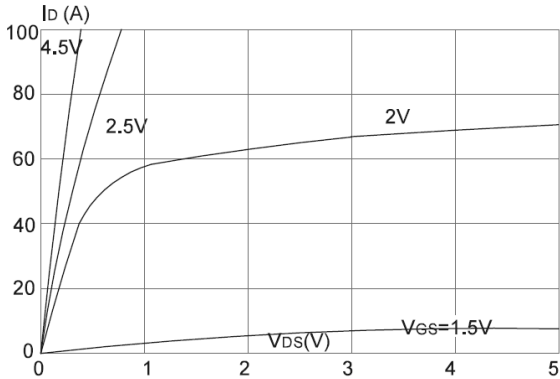


Figure 2: Typical Transfer Characteristics

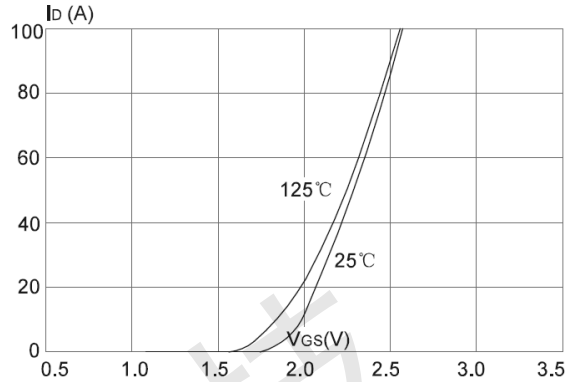


Figure 3: On-resistance vs. Drain Current

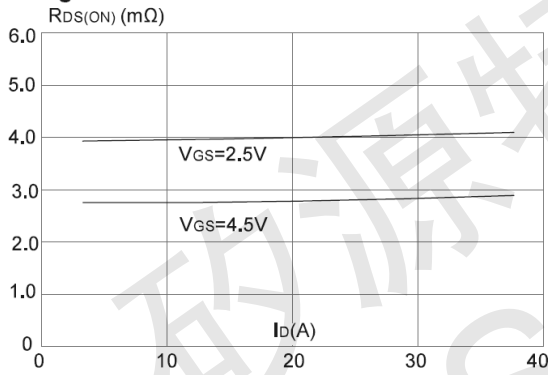


Figure 4: Body Diode Characteristics

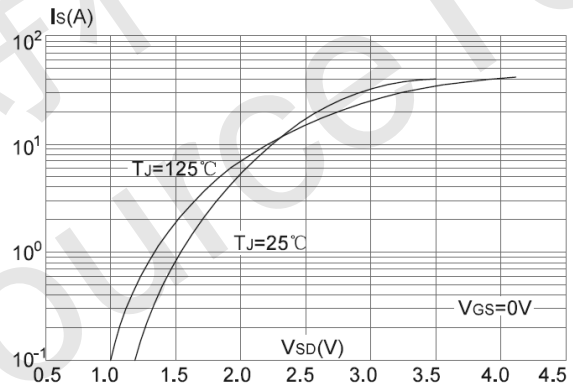


Figure 5: Gate Charge Characteristics

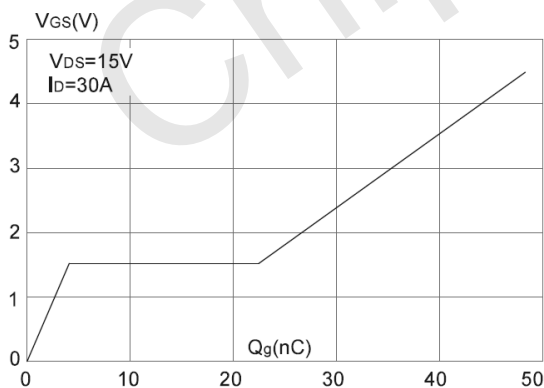


Figure 6: Capacitance Characteristics

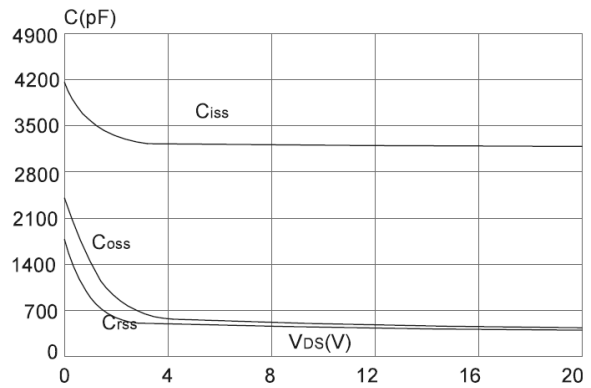




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

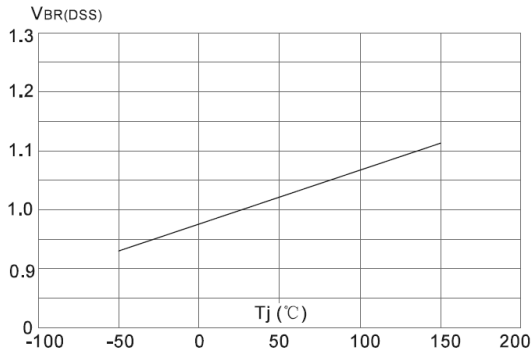


Figure 8: Normalized on Resistance vs. Junction Temperature

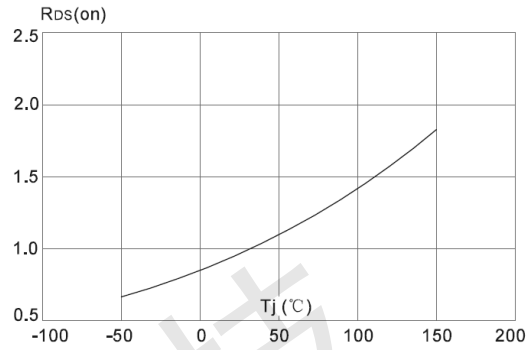


Figure.9: Maximum Drain Current vs. Case Temperature

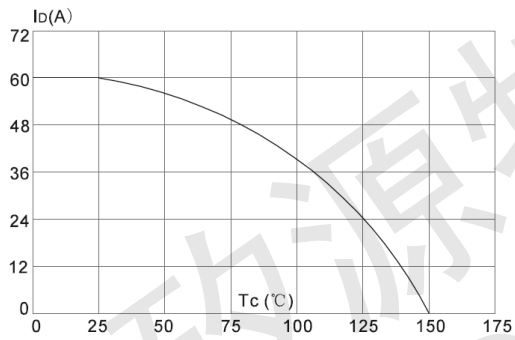




Fig.10 Safe Operating Area

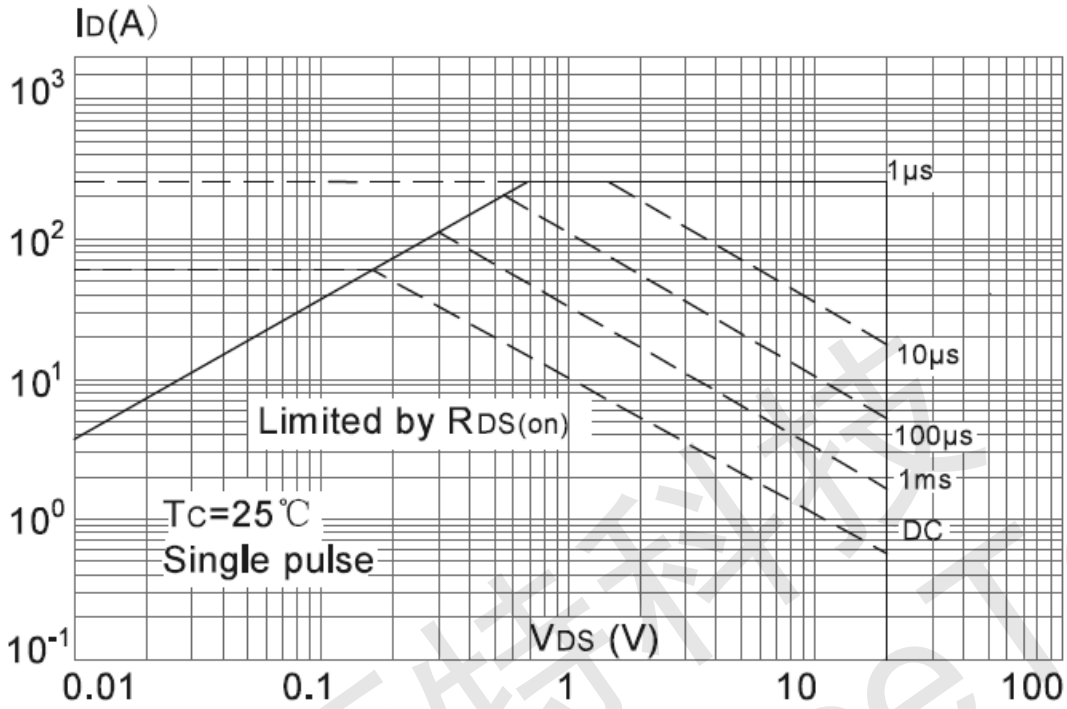
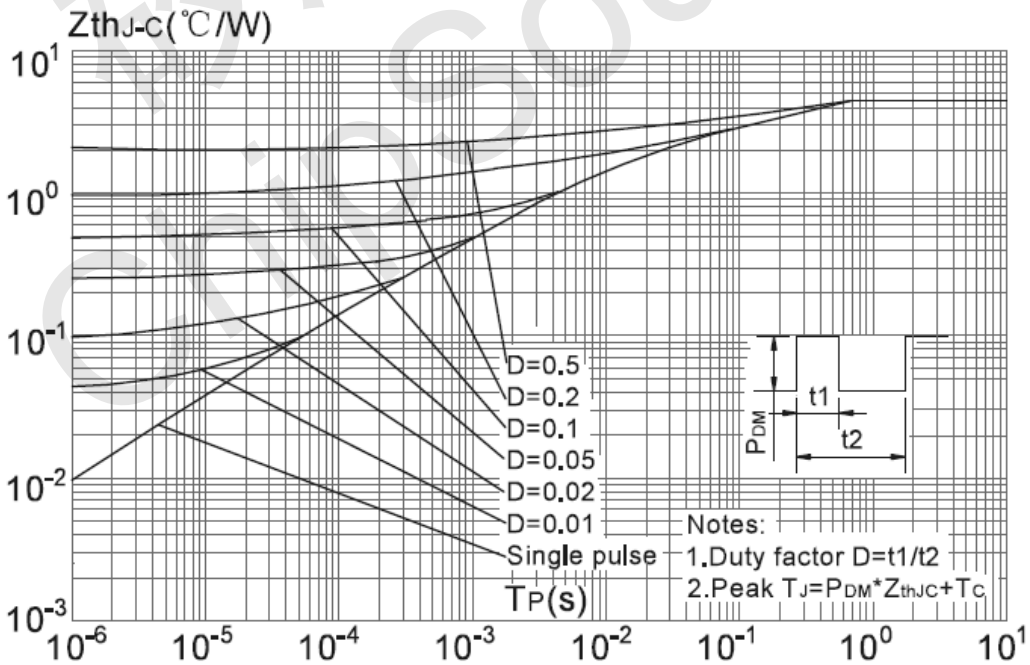
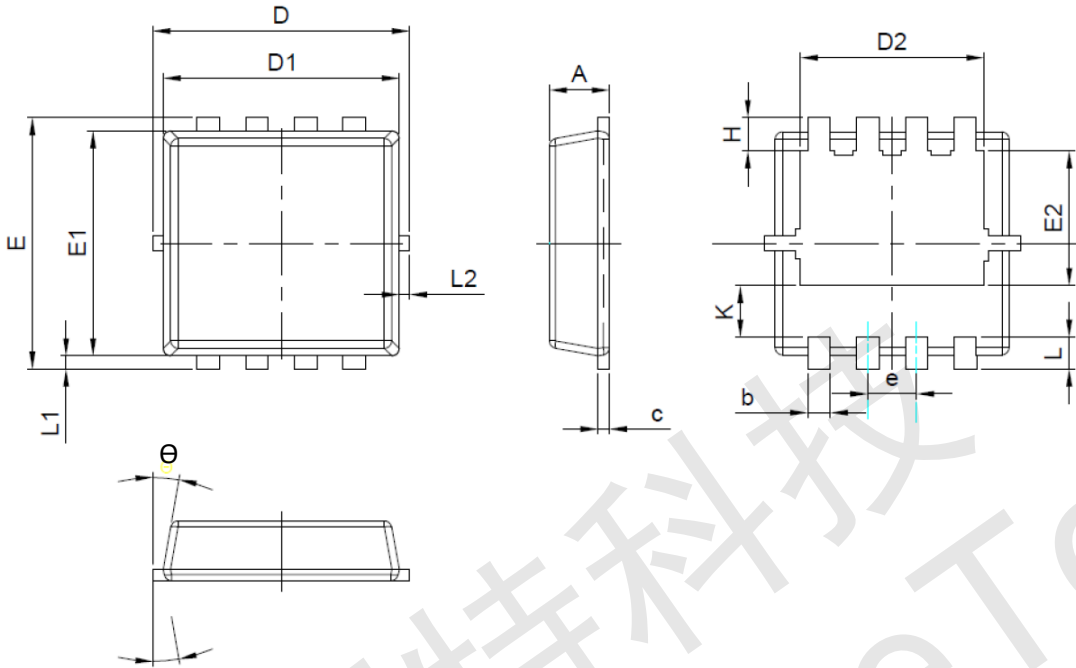


Fig. 11 Transient Thermal Response Curve





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°