1. Features
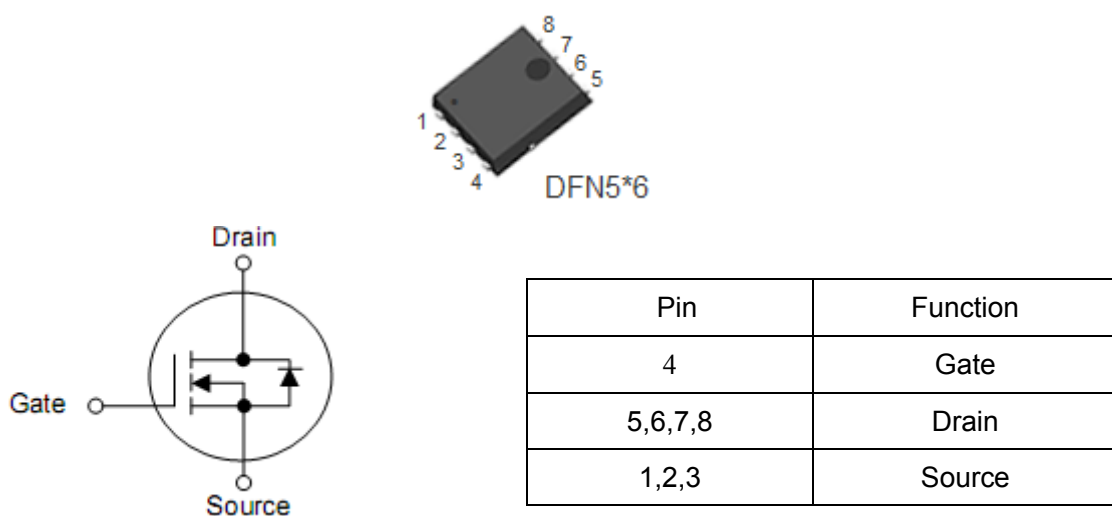
- $R_{DS(ON)}=4.0m\Omega(typ.)@V_{GS}=10V$
- Very Low On-resistance $R_{DS(ON)}$
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

2. Application

- PWM Application
- Load Switch
- Power Management

3. Pin configuration

DFN5*6

Pin	Function
4	Gate
5,6,7,8	Drain
1,2,3	Source

4. Ordering Information

Part Number	Package	Brand
KNY3903A	DFN5*6	KIA

5. Absolute maximum ratings

T_C=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	30	V
Continuous drain current	T_C=25°C	I_D	85	A
	T_C=100°C	I_D	55	A
Pulsed drain current -Pulsed [1]		I_{DM}	360	A
Gate-source voltage		V_{GS}	±20	V
Single pulse avalanche energy [2]		E_{AS}	90	mJ
Power dissipation (T_C=25°C)		P_D	90	W
Operating junction and storage temperature range		T_J ,T_{STG}	-55 to150	°C
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		T_L	300	°C

*Drain current limited by maximum junction temperature.

6. Thermal Data

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	$R_{\theta JC}$	1.67	°C/W

7. Electrical characteristics

(T_C=25°C,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	30	-	-	V
Drain-source leakage current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	uA
		V_{DS}=24V, T_C=125°C	-	-	10	uA
Gate-source forward leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	1.0	1.5	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=30A	-	4.0	5.5	mΩ
		V_{GS}=4.5V,I_D=30A	-	6.0	7.5	mΩ
Input capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V f=1MHz	-	1951	-	pF
Output capacitance	C_{oss}		-	322	-	pF
Reverse transfer capacitance	C_{rss}		-	240	-	pF
Turn-on delay time	$t_{d(on)}$	V_{GS}=10V, V_{DS}=15V R_L=3Ω, I_D=30A [3]	-	12	-	ns
Rise time	t_r		-	35	-	ns
Turn-off delay time	$t_{d(off)}$		-	42	-	ns
Fall time	t_f		-	15	-	ns
Total gate charge(10V)	Q_g	V_{DS}=15V, I_D=30A V_{GS}=10V [3]	-	40	-	nC
Gate-source charge	Q_{gs}		-	4	-	nC
Gate-drain charge	Q_{gd}		-	12	-	nC
Maximum Continuous Drain-Source Diode Forward Current	I_S	—	-	-	90	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	—	-	-	360	A
Diode forward voltage	V_{SD}	I_{SD}=30A,V_{GS}=0V, T_J=25°C	-	-	1.2	V
Reverse recovery time	T_{rr}	I_F=20A dI/dt=100A/µs	-	16	-	ns
Reverse recovery charge	Q_{rr}	I_F=20A dI$_F$/dt=100A//µs	-	5	-	nC

Note:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J=25°C, V_{DD}=15V, V_G=10V,R_G=25Ω,L=0.5mH,I_{AS}=19A
3. Pulse Test: Pulse Width≤300us, Duty Cycle≤0.5%

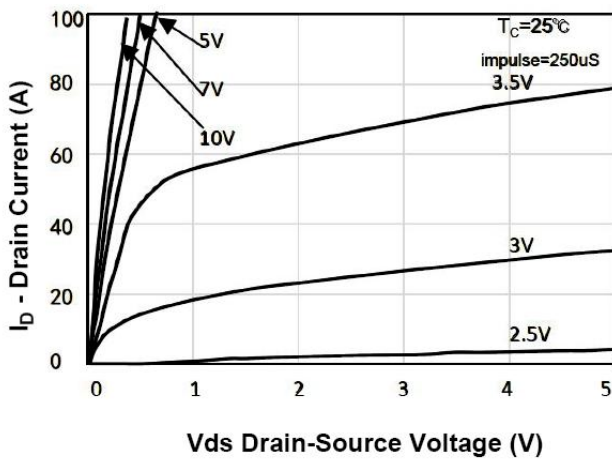## 8. Typical Electrical Characteristics
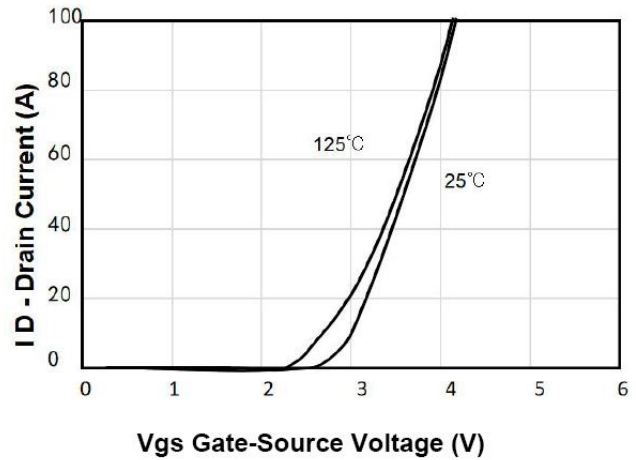

Figure 1. On-Region Characteristics
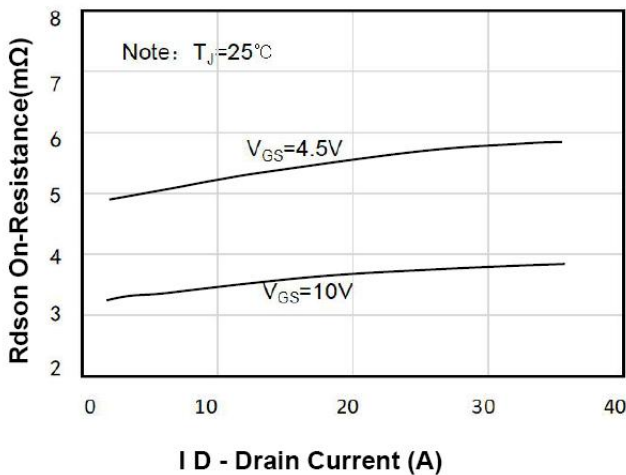

Figure 2. Transfer Characteristics

Figure 3. On-Resistance Variation vs
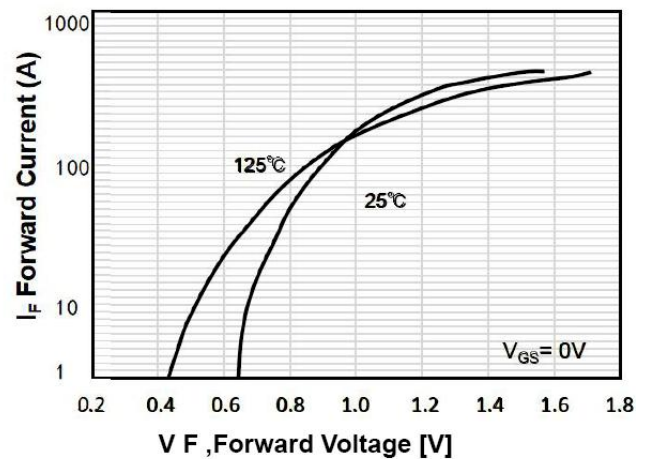Drain Current and Gate Voltage

Figure 4. Body Diode Forward Voltage
Variation with Source Current
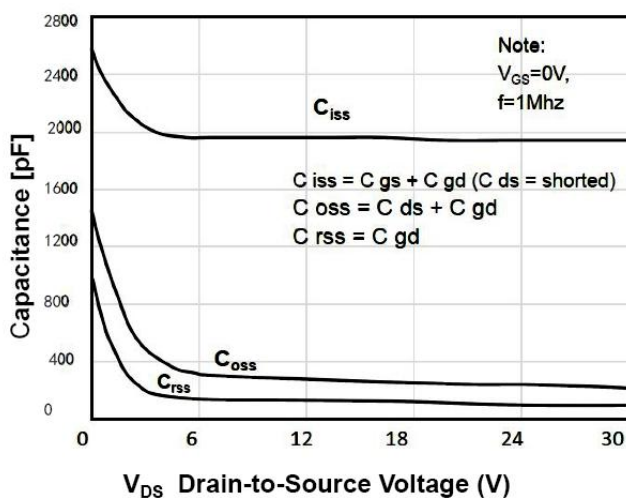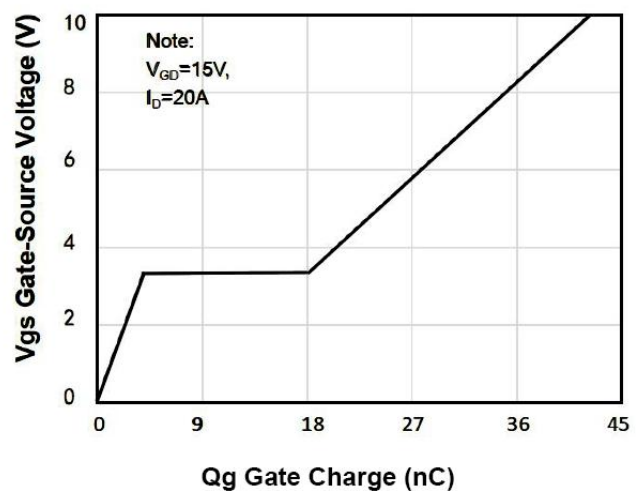and Temperature

Figure 5. Capacitance Characteristics
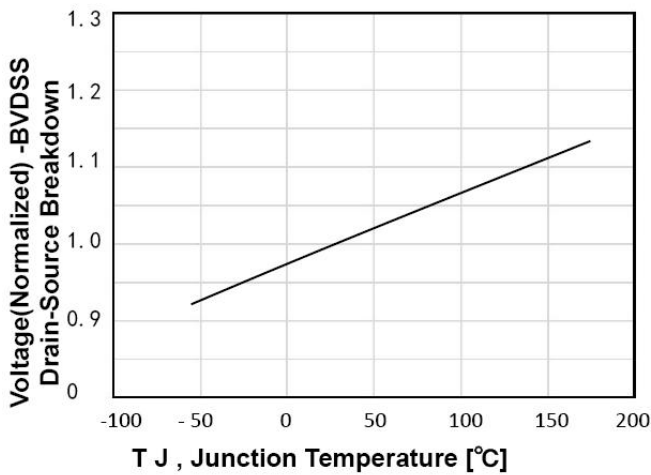

Figure 6. Gate Charge Characteristics
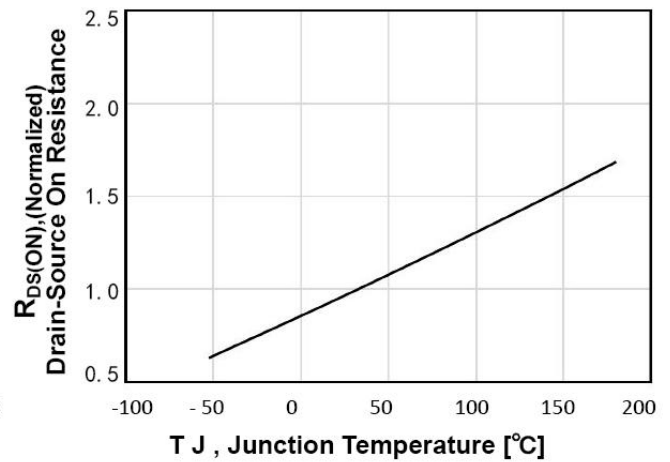
Figure 7. Breakdown Voltage Variation vs Temperature
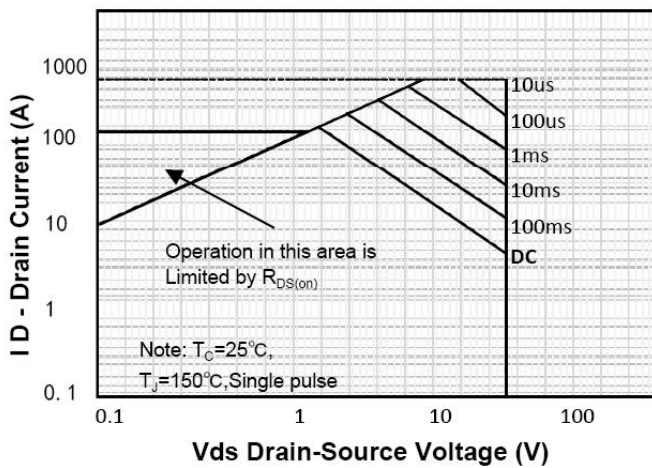

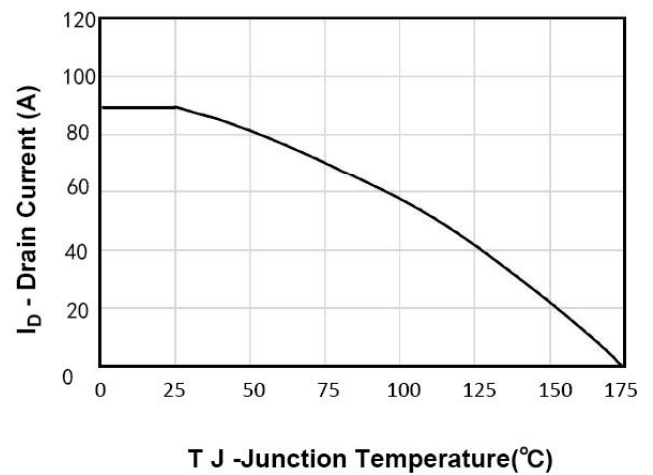Figure 8. On-Resistance Variation vs Temperature

Figure 9. Maximum Safe Operating Area

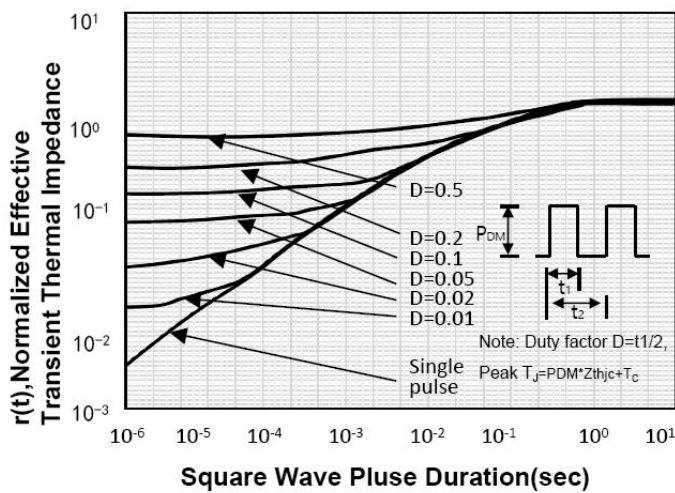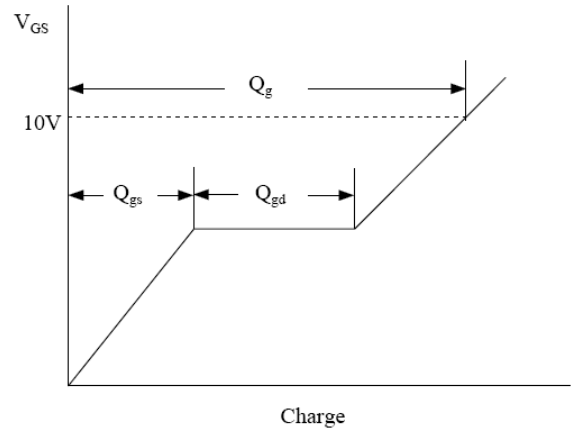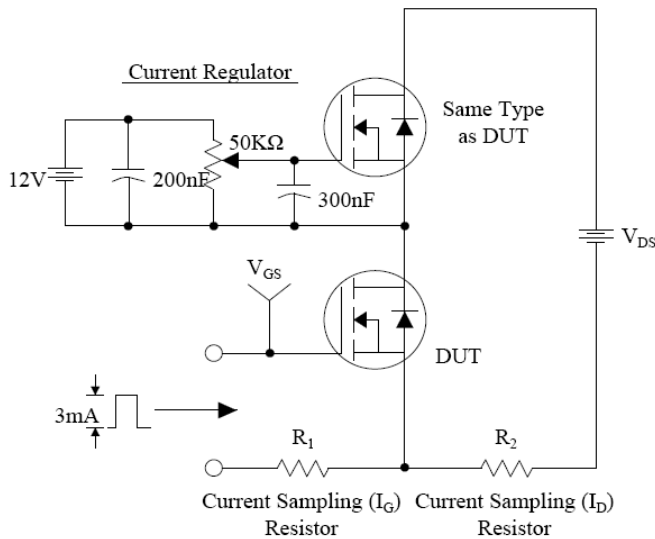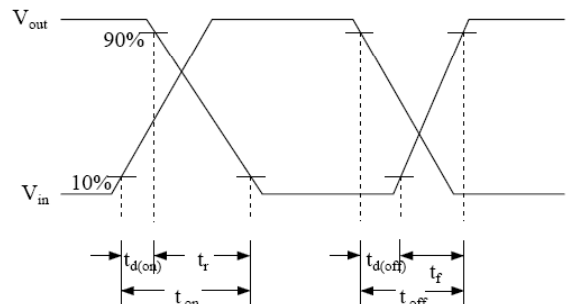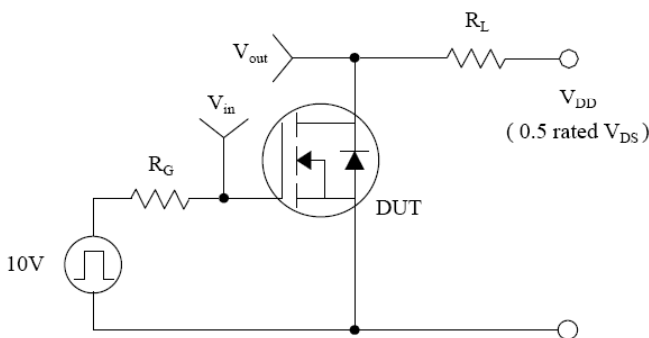Figure 10. Maximum PContinuous Drain Currentvs Case Temperature

Figure 11. Transient Thermal Response Curve

9. Test Circuits and Waveforms

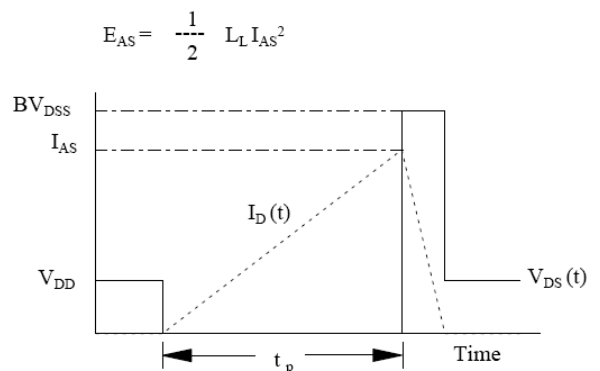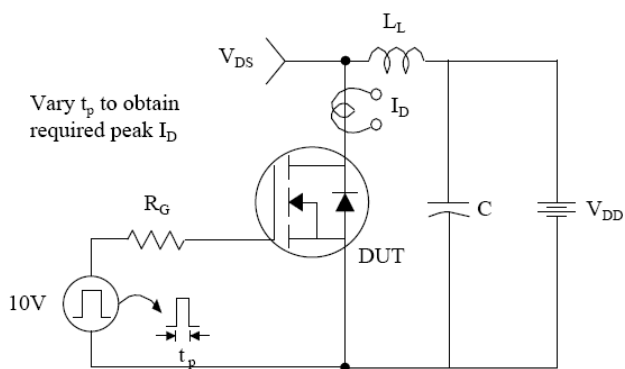### Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching Test Circuit & Waveforms

$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$

Peak Diode Recovery dv/dt Test Circuit & Waveforms

DUT

V_{DS}

I_S

L

Driver

V_{GS}

R_G

Same Type
as DUT

V_{DD}

V_{GS}

• dv/dt controlled by R_G
• I_{SD} controlled by pulse period

V_{GS}
(Driver)

$$D = \frac{\text{Gate Pulse Width}}{\text{Gate Pulse Period}}$$

10V

I_S
(DUT)

I_{FM} , Body Diode Forward Current

di/dt

I_{RM}

Body Diode Reverse Current

V_{DS}
(DUT)

Body Diode Recovery dv/dt

V_f

V_{DD}

Body Diode
Forward Voltage Drop