

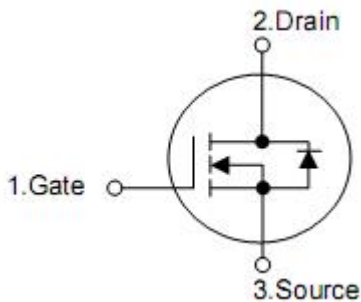
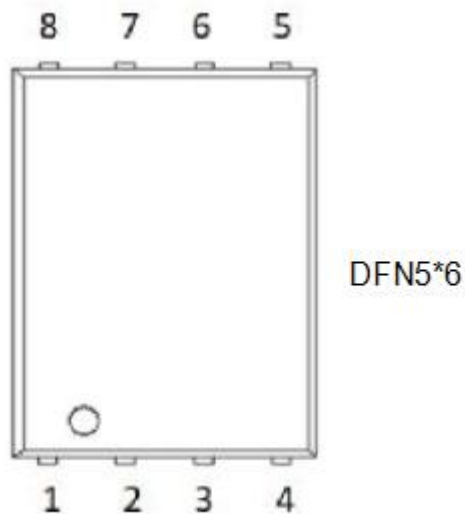
1. Features

- n $R_{DS(on)}=1.5m\Omega(\text{typ.})@ V_{GS}=10V$
- n Advanced Trench Technology
- n Low Gate Charge
- n High Current Capability
- n RoHS and Halogen-Free Compliant

2. Description

- n SMPS Synchronous Rectification
- n DC/DC Converters
- n Or-ing

3. Symbol



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

4. Ordering Information

Part Number	Package	Brand
KCY3104S	DFN5*6	KIA

5. Absolute maximum ratings

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current $V_{GS}@10V^{1,6}$	I_D	$T_C=25^\circ C$	110
		$T_C=100^\circ C$	93
Pulsed drain current ²	I_{DM}	400	A
Single pulse avalanche energy ³	EAS	400	mJ
Avalanche current	I_{AS}	40	A
Total power dissipation ⁴	P_D	125	W
Junction and storage temperature range	T_J, T_{STG}	-55 to 150	$^\circ C$

6. Thermal Data

Parameter	Symbol	Ratings	Units
Thermal resistance, junction-ambient ¹	$R_{\theta JA}$	50	$^\circ C/W$
Thermal resistance, Junction-case ¹	$R_{\theta Jc}$	1	

7. Electrical characteristics

(T_J=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	40	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V, T _J =25°C	-	-	1	μA
		V _{DS} =32V, V _{GS} =0V, T _J =55°C	-	-	5	
Gate-source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.6	2.5	V
Static drain-source on- resistance ²	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	1.5	2.0	mΩ
		V _{GS} =4.5V, I _D =20A	-	2.0	2.8	
Forward transconductance	g _{FS}	V _{DS} =5V, I _D =20A	-	50	-	S
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V F=1MHZ	-	1.0	-	Ω
Total gate charge(4.5V)	Q _g	V _{DS} =15V, V _{GS} =10V I _D =20A	-	45	-	nC
Gate-source charge	Q _{gs}		-	12	-	
Gate-drain charge	Q _{gd}		-	18	-	
Turn-on delay time	t _{d(on)}	V _{DD} =15V, R _G =3.3Ω, V _{GS} =10V I _D =20A	-	19	-	ns
Rise time	t _r		-	10	-	
Turn-off delay time	t _{d(off)}		-	58	-	
Fall time	t _f		-	32	-	
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =20V F=1.0MHZ	-	3950	-	pF
Output capacitance	C _{oss}		-	1100	-	
Reverse transfer capacitance	C _{rss}		-	80	-	
Diode characteristics						
Continuous source current ^{1,6}	I _S	V _G =V _D =0V, Force current	-	-	110	A
Diode forward voltage ²	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C	-	-	1.4	V

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=40A
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
6. Package limitation current is 100A.

8. Test circuits and waveforms

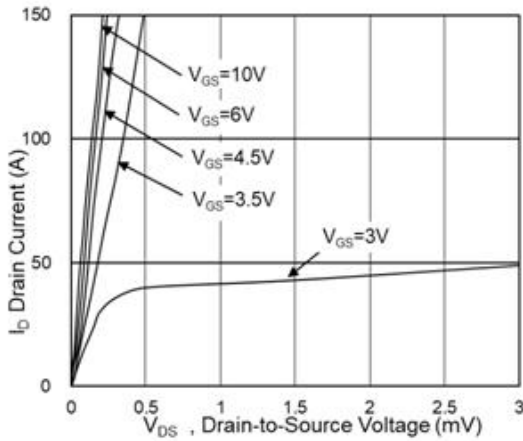


Fig.1 Typical Output Characteristics

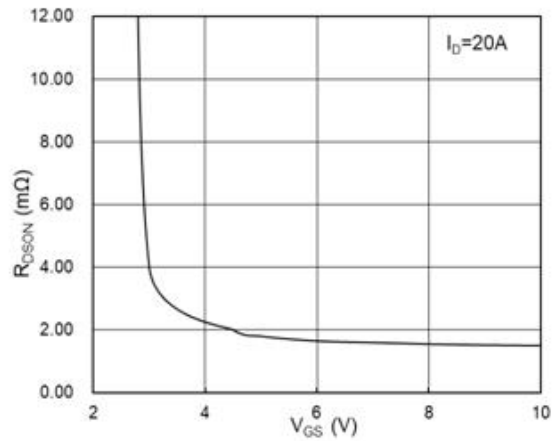


Fig.2 On-Resistance vs G-S Voltage

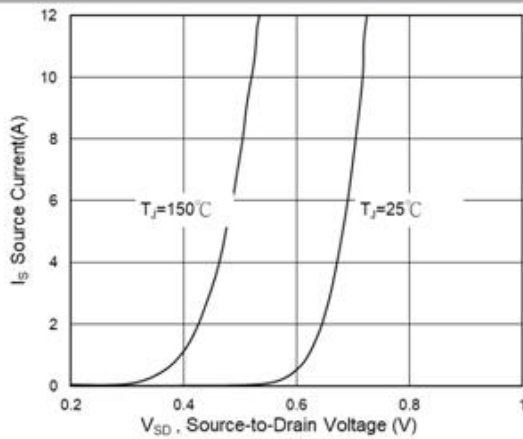


Fig.3 Source Drain Forward Characteristics

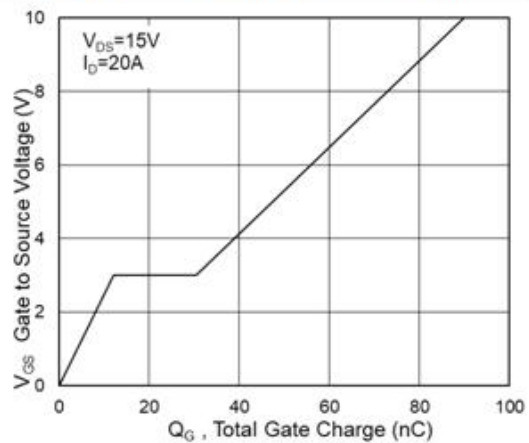


Fig.4 Gate-Charge Characteristics

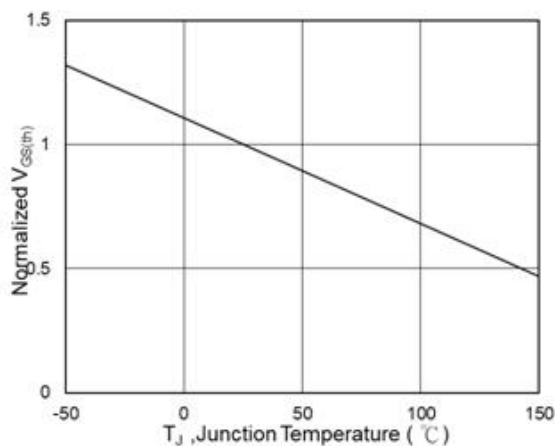


Fig.5 Normalized $V_{GS(th)}$ vs T_J

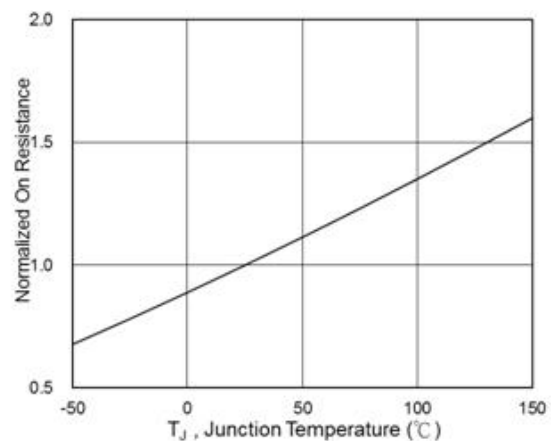


Fig.6 Normalized $R_{DS(on)}$ vs T_J

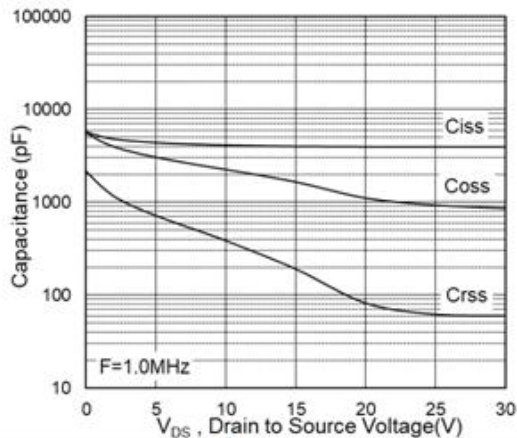


Fig.7 Capacitance

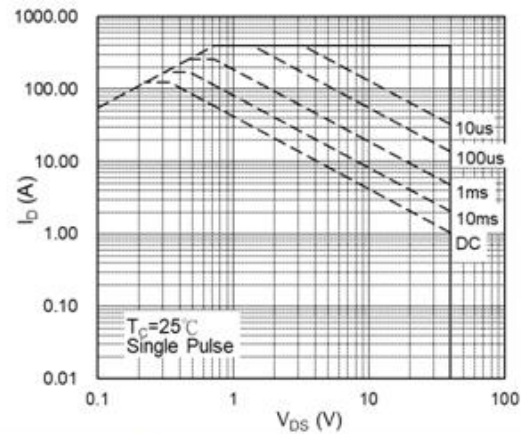


Fig.8 Safe Operating Area

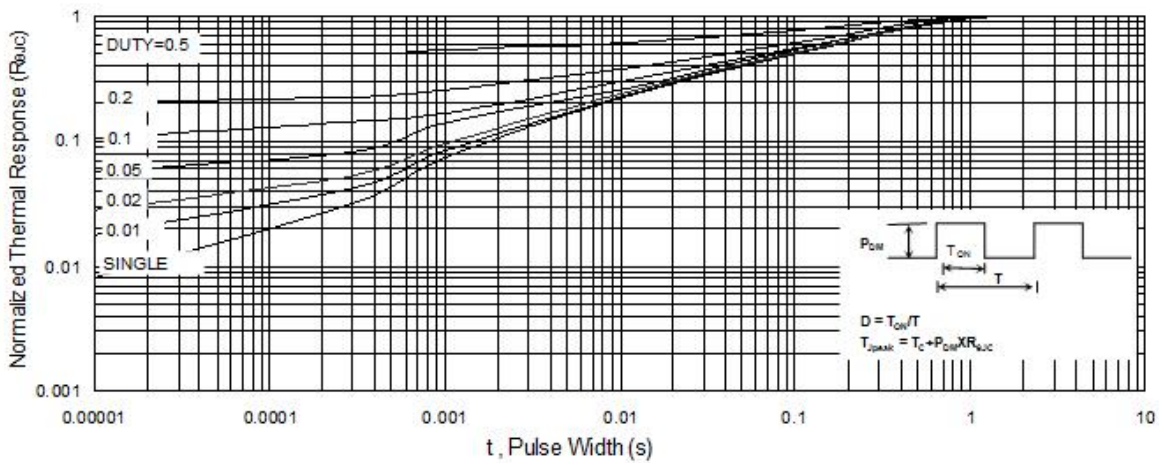


Fig.9 Normalized Maximum Transient Thermal Impedance

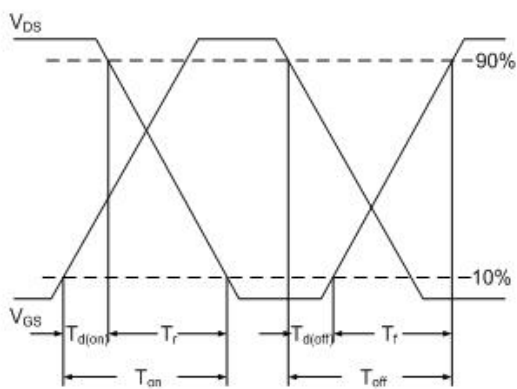


Fig.10 Switching Time Waveform

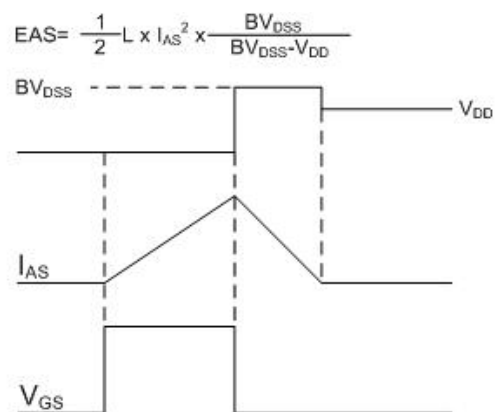


Fig.11 Unclamped Inductive Switching Waveform