JHQ3052

SEMICONDUCTOR

N-Channel Fast Switching MOSFET

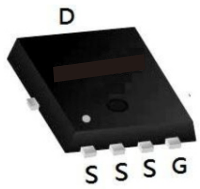
FEATURES

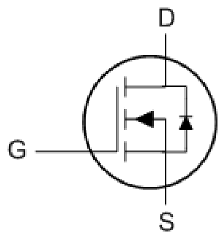
- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

BVDSS	RDS ON	ID
30V	6.3mΩ	30A

DFN 3X3 Pin Configuration





Genaral Description

The JHQ3052 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The JHQ3052 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Table1 Absolute Maximum Ratings (TC=25°C, unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V [1]	30	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V [1]	24	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V [1]	20	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V [1]	15	A
I_{DM}	Pulsed Drain Current [2]	100	A
EAS	Single Pulse Avalanche Energy [3]	28.8	mJ
I_{AS}	Avalanche Current	24	A
P_D@T_C=25℃	Total Power Dissipation [4]	24	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	60	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case [1]	---	5.2	℃/W

Electrical Characteristics (T_J =25 ℃ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance [2]	V_{GS}=10V , I_D=20A	---	5	6.3	mΩ
		V_{GS}=4.5V , I_D=15A	---	6.9	9	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=30A	---	43	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.7	---	Ω
Q_g	Total Gate Charge (4.5 V)	V_{DS}=15 V , V_{GS}=4.5V , I_D=15A	---	8	---	nC
Q_{gs}	Gate-Source Charge		---	2.4	---	
Q_{gd}	Gate-Drain Charge		---	3.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3 I_D=15A	---	7.1	---	ns
T_r	Rise Time		---	40	---	
$T_{d(off)}$	Turn-Off Delay Time		---	15	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	814	---	pF
C_{oss}	Output Capacitance		---	498	---	
C_{rss}	Reverse Transfer Capacitance		---	41	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current [1,6]	V_G=V_D=0V , Force Current	---	---	24	A
V_{SD}	Diode Forward Voltage [2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	I_F=15 A , di/dt=100A/?s , T_J=25℃	---	34	---	nS
Q_{rr}	Reverse Recovery Charge		---	15	---	nC

Note :

1.The data tested by surface mounted on a 1 inch ^{2} 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=0.1mH,I_{AS}=24A

4.The power dissipation is limited by 150 ℃ 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.

Typical Characteristics

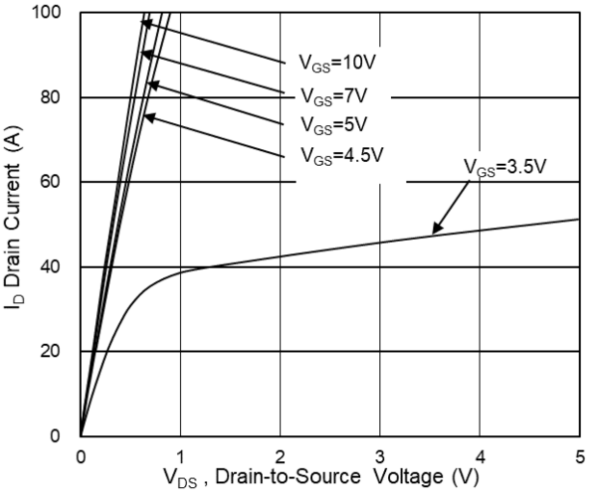


Fig.1 Typical Output Characteristics

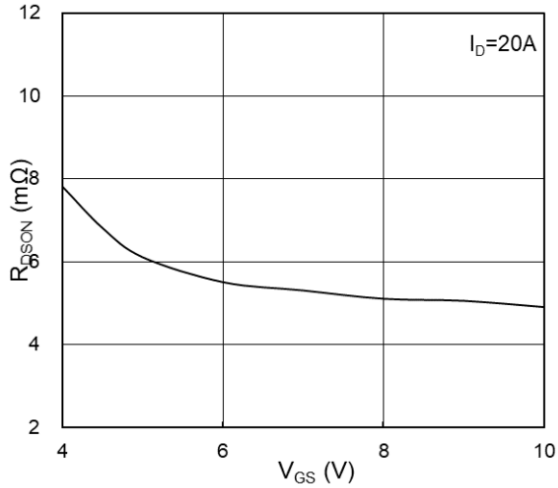


Fig.2 On -Resistance vs G -S Voltage

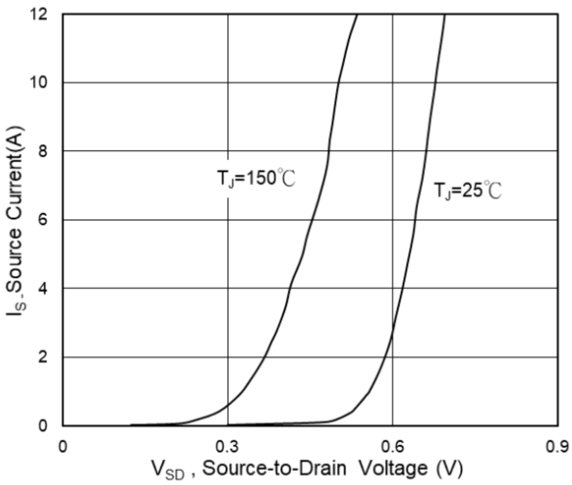


Fig. 3 Source Drain Forward Characteristics

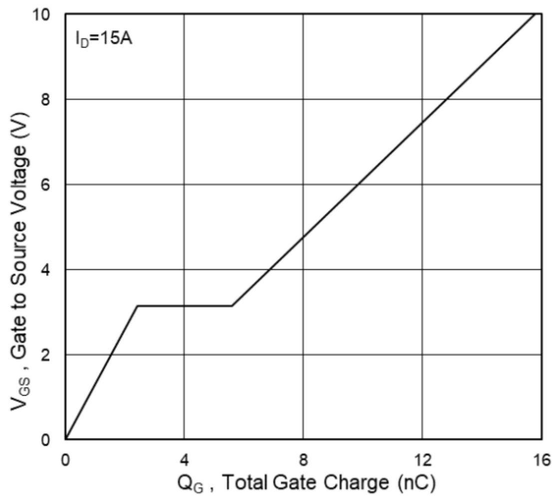


Fig. 4 Gate -Charge Characteristics

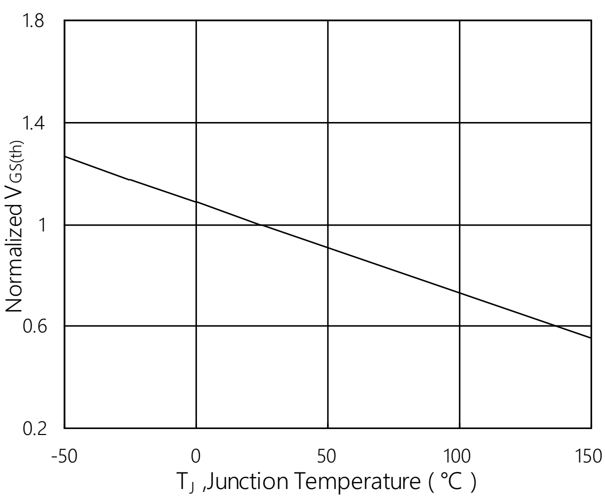


Fig. 5 Normalized $V_{GS(th)}$ vs T_J

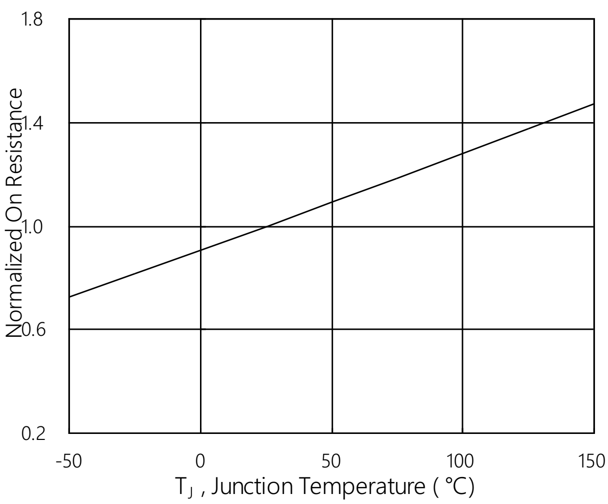


Fig. 6 Normalized R_{DSON} vs T_J

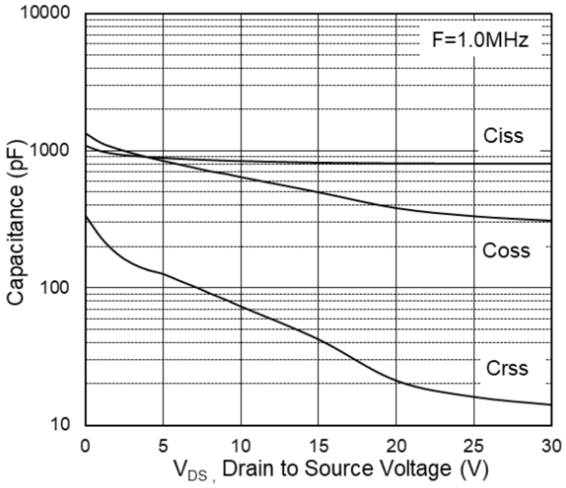


Fig. 7 Capacitance

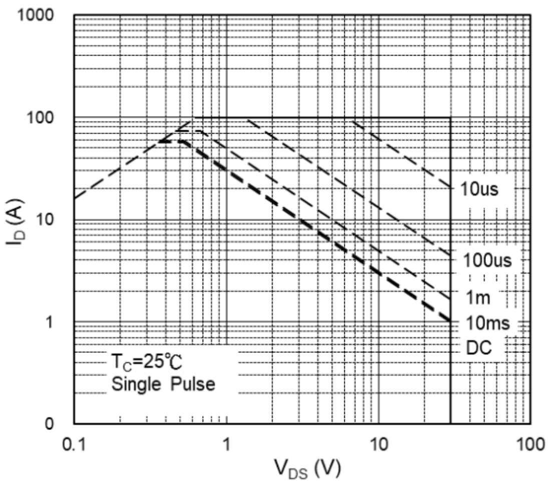


Fig .8 Safe Operating Area

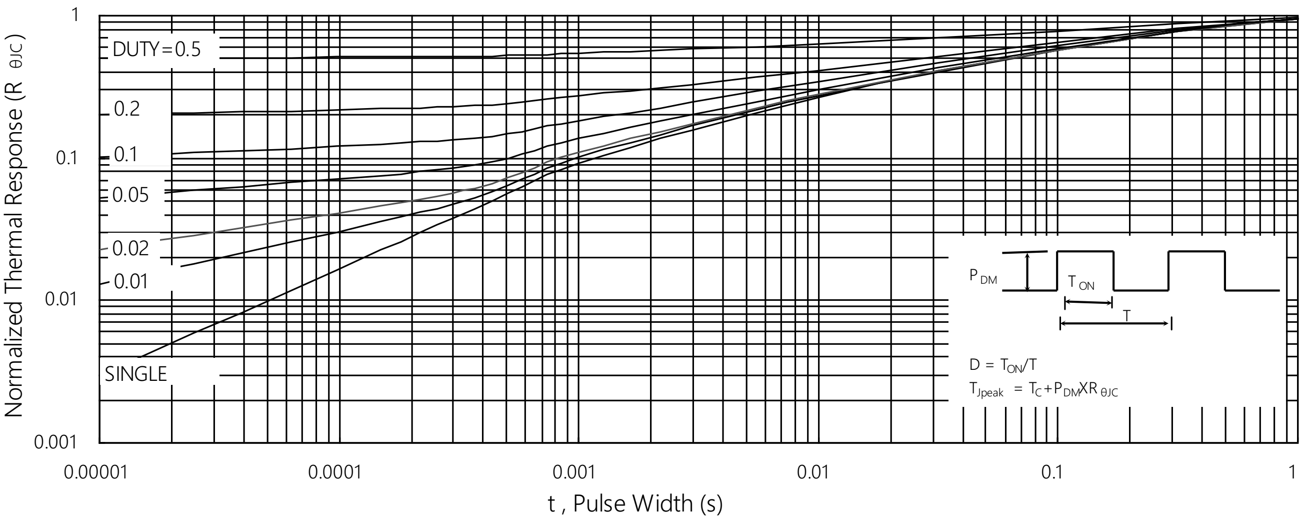


Fig. 9 Normalized Maximum Transient Thermal Impedance

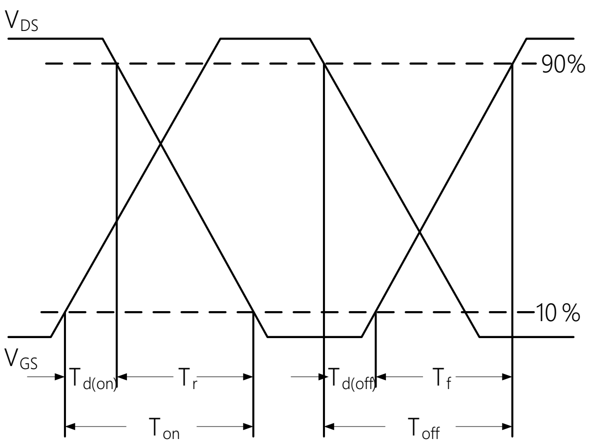


Fig. 10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

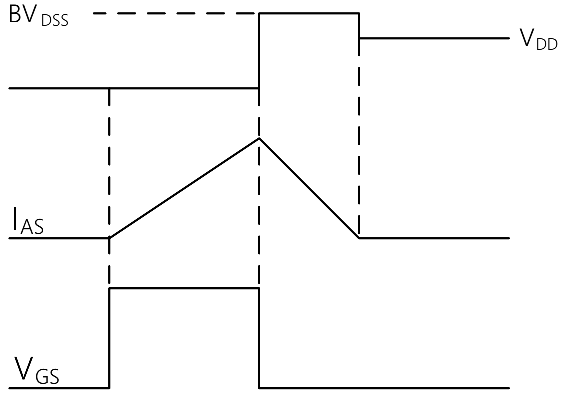
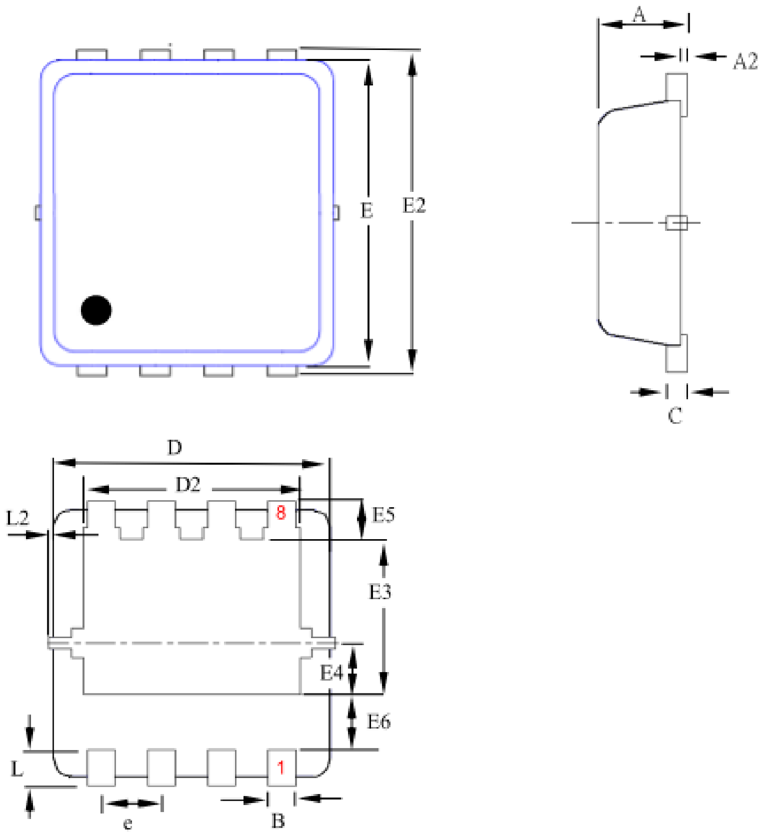


Fig. 11 Unclamped Inductive Switching Waveform

DFN3*3 Package Outline Dimensions



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035
A2	0.00	--	0.05	0.000	--	0.002
B	0.24	0.30	0.35	0.009	0.012	0.014
C	0.10	0.15	0.25	0.004	0.006	0.010
D	2.90	3.00	3.20	0.114	0.118	0.126
D2	2.15	2.35	2.59	0.085	0.093	0.102
E	2.90	3.00	3.12	0.114	0.118	0.123
E2	3.05	3.20	3.45	0.120	0.126	0.136
E3	1.55	1.75	1.95	0.061	0.069	0.077
E4	0.48	0.58	0.68	0.019	0.023	0.027
E5	0.28	0.43	0.58	0.011	0.017	0.023
E6	0.43	0.63	0.87	0.017	0.025	0.034
L	0.30	0.40	0.50	0.012	0.016	0.020
L2	0.00	--	0.10	0.000	--	0.004
e	--	0.65	--	--	0.026	--

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