



YJQ45G06A

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} 60V
- I_D 45A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) 9.5m Ω
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) 13.5m Ω
- 100% EAS Tested

General Description

- Split gate trench MOSFET technology
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
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Applications

- Switching application
- UPS power supply
- DC-DC convertor

Absolute Maximum Ratings (T_c=25°C unless otherwise noted)

Symbol	Parameter	Value
V _{DS}	Drain-source Voltage	60V
	Drain-source Voltage	60V
I _D	Drain Current	45A
	Drain Current	45A
	Drain Current	45A
I _{DM}	Maximum Pulsed Drain Current	45A
	Maximum Pulsed Drain Current	45A
P _D	Total Power Dissipation	10W
	Total Power Dissipation	10W



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■ Electrical Characteristics (T_J=25 unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
		V _{DS} =60V, V _{GS} =0V, T _J =150°C	-	-	100	
Gate-Body 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	1.85	3	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =22.5A	-	7.5	9.5	mΩ
		V _{GS} =4.5V, I _D =8A	-	10	13.5	
Diode Forward Voltage	V _{SD}	I _S =22.5A, V _{GS} =0V	-	0.85	1.2	V
Gate resistance	R _G	f=1MHz	-	1.8	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	45	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1MHz	-	1390	-	pF
Output Capacitance	C _{oss}		-	315	-	
Reverse Transfer Capacitance	C _{rss}		-	25	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =30V, I _D =22.5A	-	26	-	nC
Gate-Source Charge	Q _{gs}		-	7	-	
Gate-Drain Charge	Q _{gd}		-	5	-	
Reverse Recovery Charge	Q _{rr}	I _F =22.5A, di/dt=100A/us	-	25	-	nC
Reverse Recovery Time	t _{rr}		-	33	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =30V, I _D =22.5A R _{GEN} =3Ω	-	11	-	ns
Turn-on Rise Time	t _r		-	26	-	
Turn-off Delay Time	t _{D(off)}		-	30	-	
Turn-off fall Time	t _f		-	27	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T_J=25°C, V_{DD}=50V, V_G=10V, R_G=25Ω, L=1mH, I_{AS}=12.5A.

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T_A =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



Typical Electrical and Thermal Characteristics Diagrams

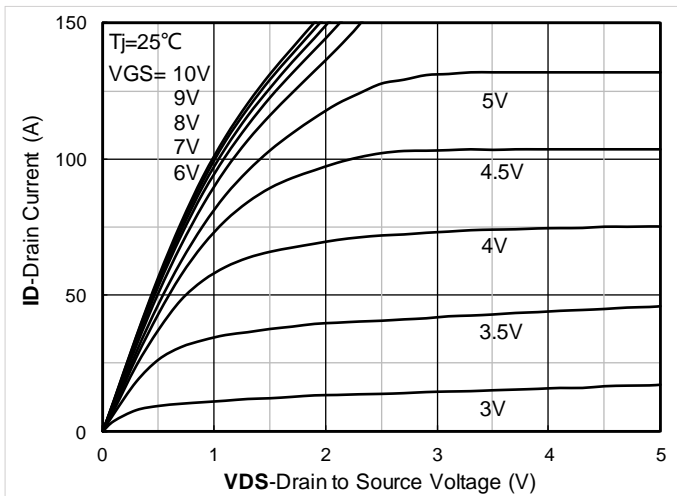


Figure 1. Output Characteristics

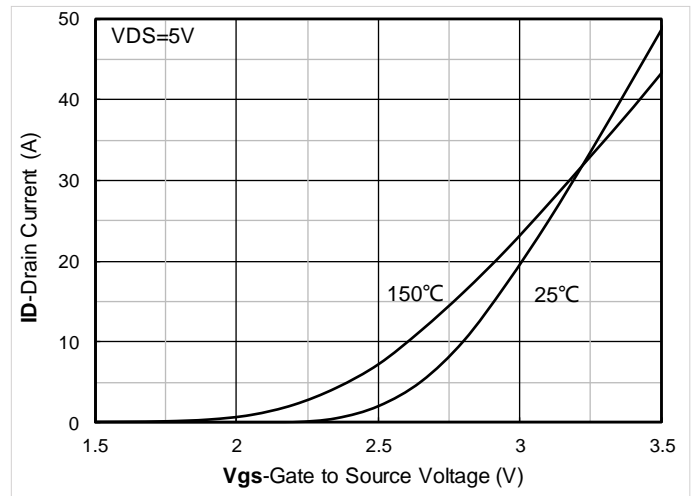


Figure 2. Transfer Characteristics

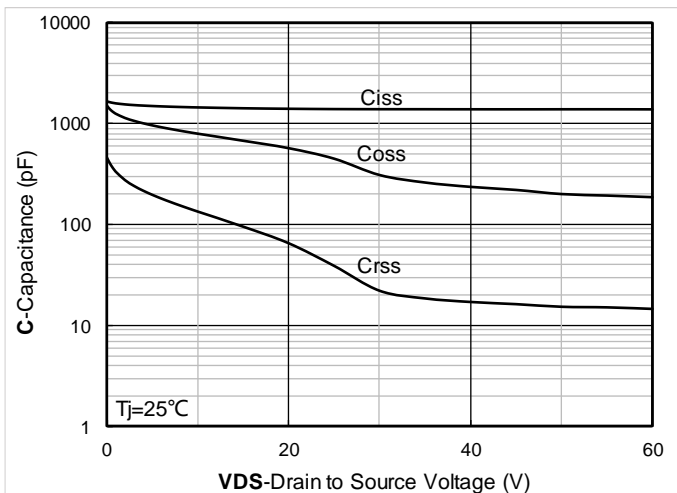


Figure 3. Capacitance Characteristics

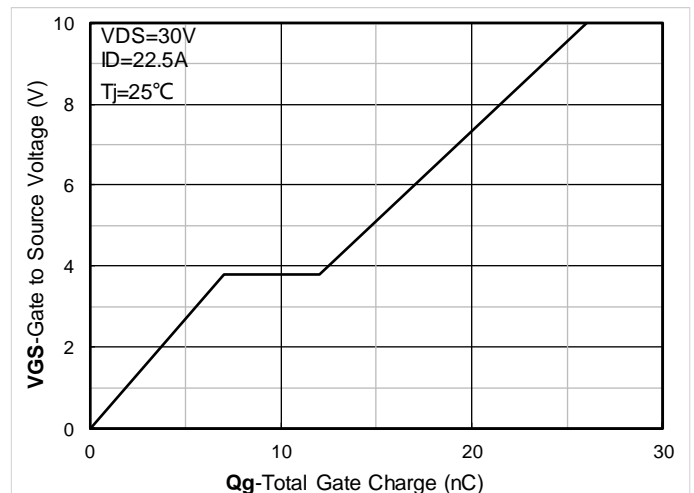


Figure 4. Gate Charge



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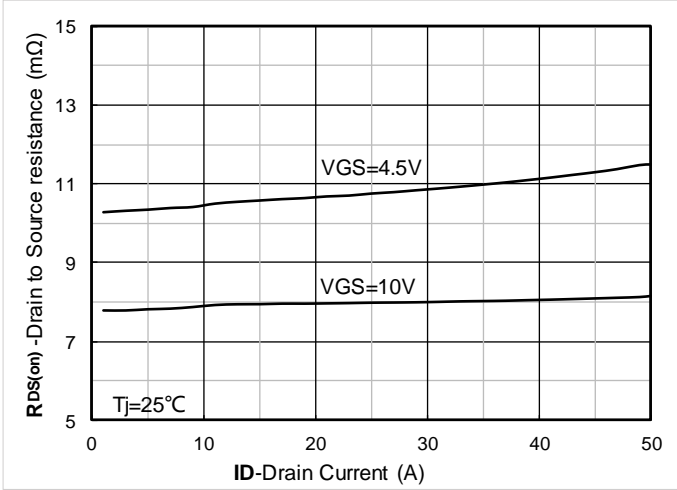


Figure 7. $R_{DS(on)}$ VS Drain Current

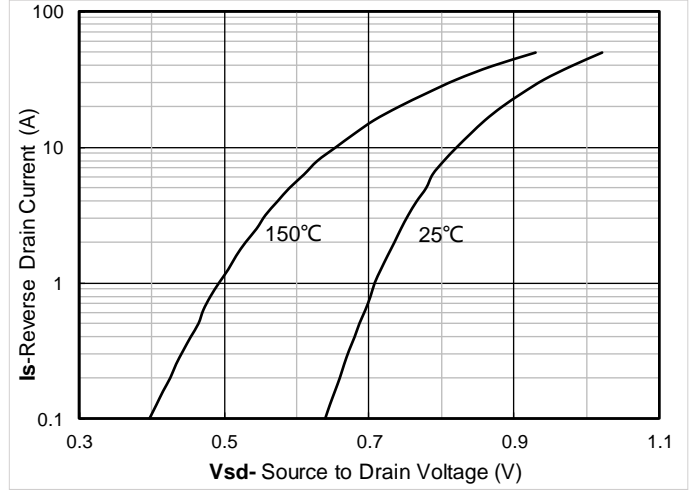


Figure 8. Forward characteristics of reverse diode

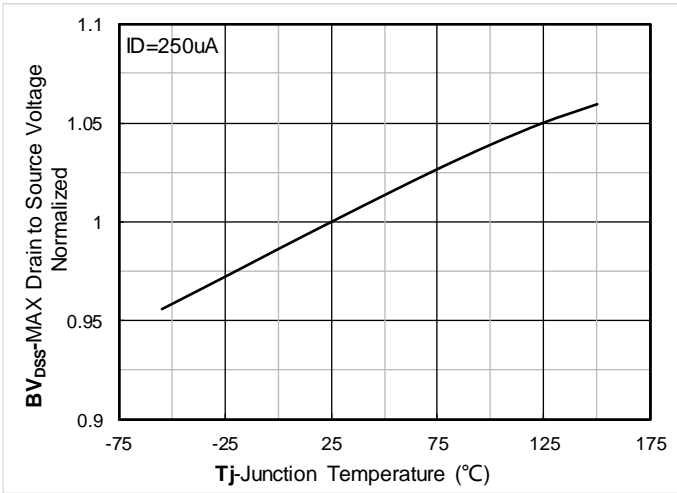


Figure 9. Normalized breakdown voltage

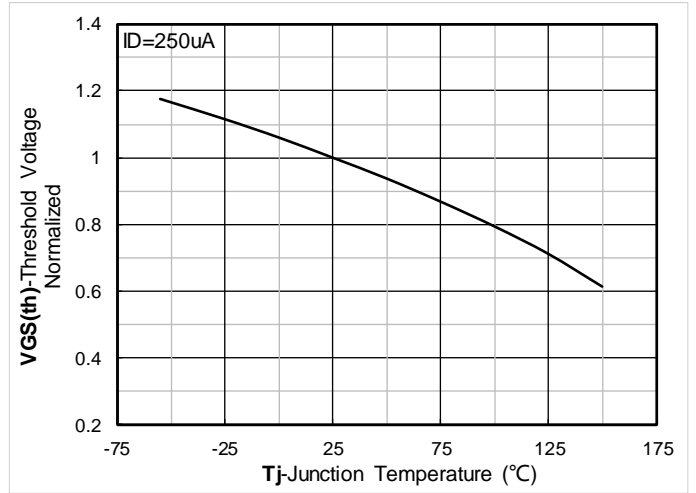


Figure 10. Normalized Threshold voltage

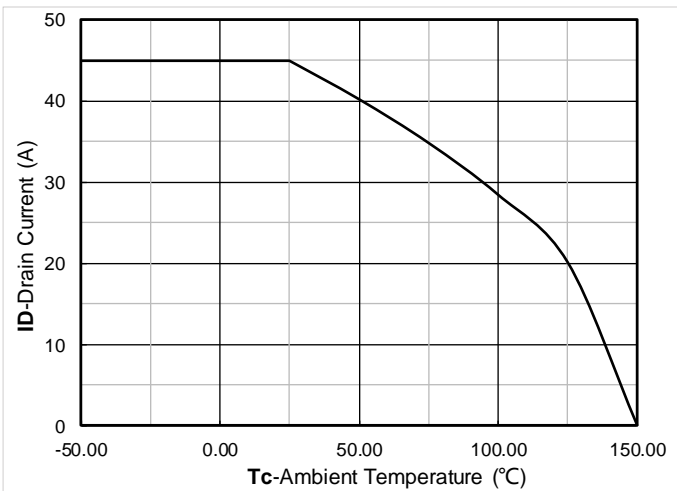


Figure 11. Current dissipation

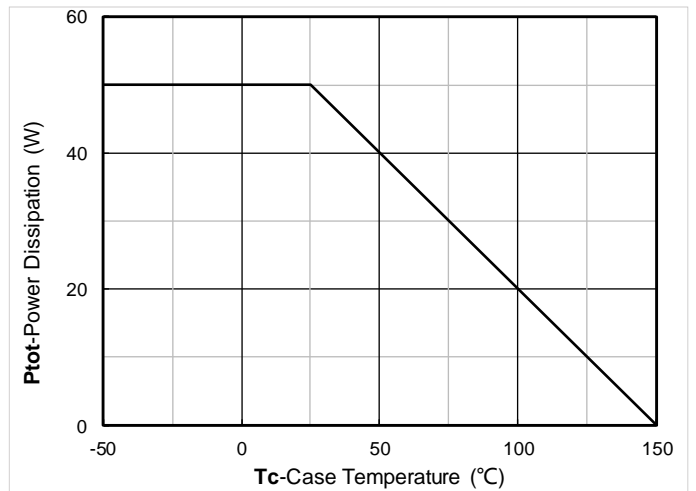


Figure 12. Power dissipation

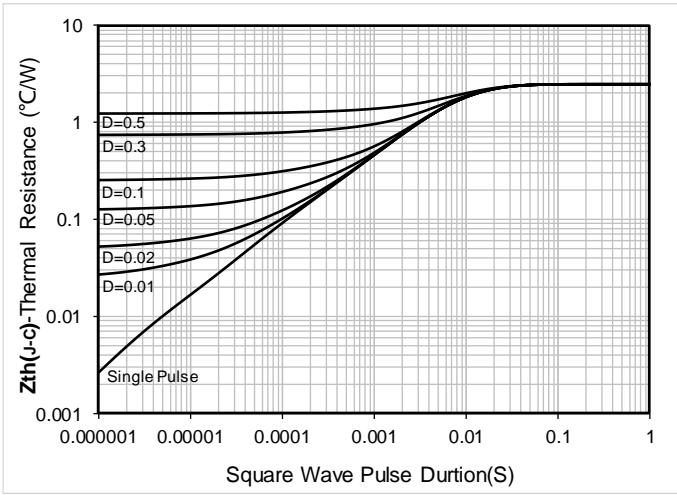


Figure 13. Maximum Transient Thermal Impedance

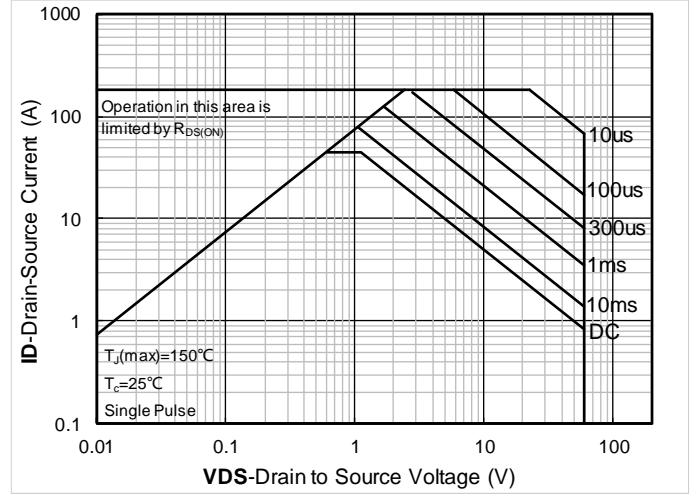


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

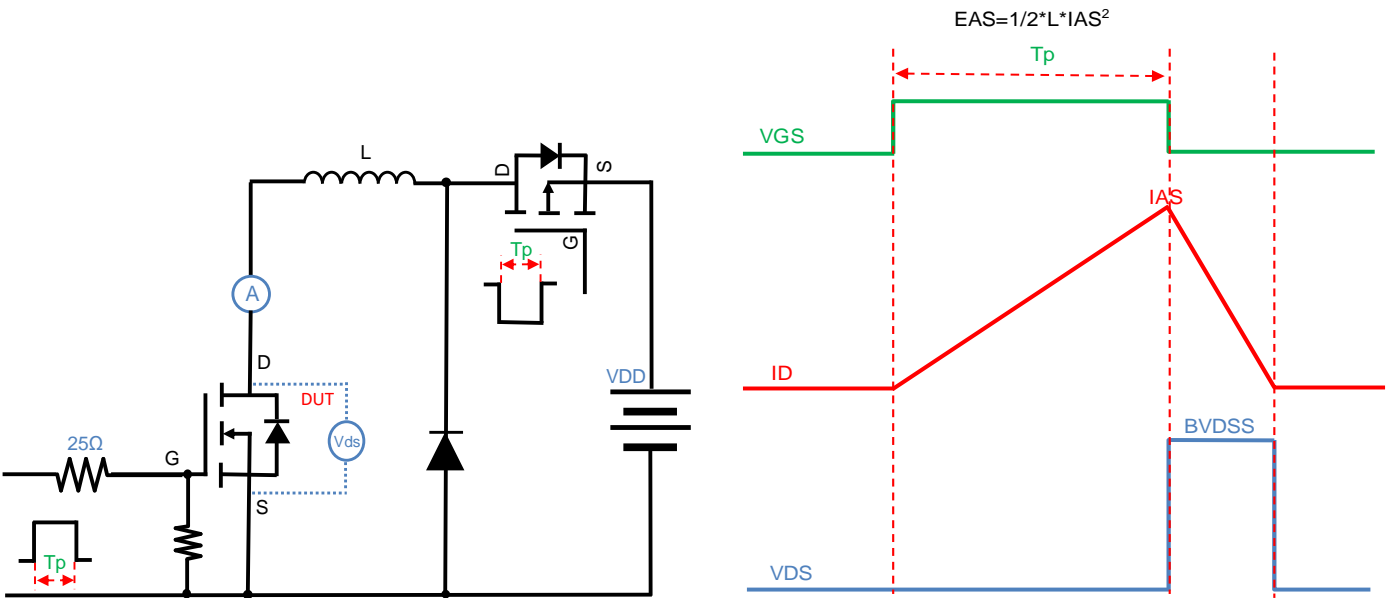


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Figure B. Gate Charge Test Circuit & Waveform

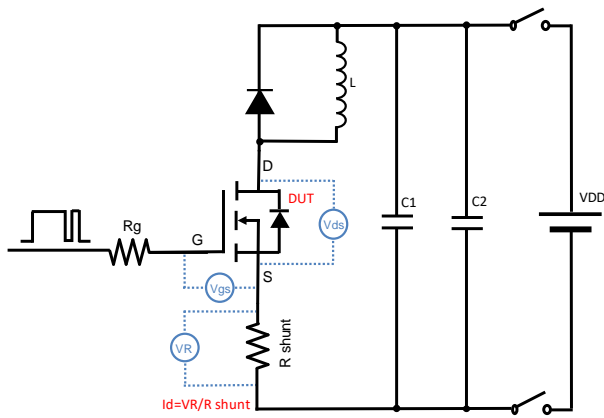


Figure C. Resistive Switching Test Circuit & Waveform

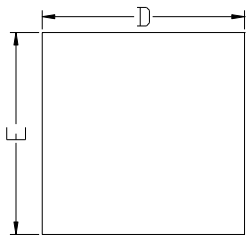


Figure D. Diode Recovery Test Circuit & Waveform

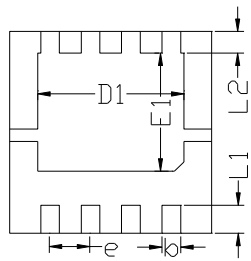


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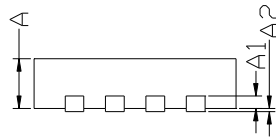
■ DFN3333-8L Package information



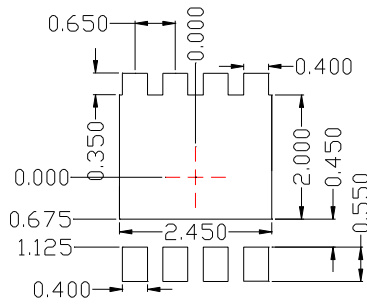
Top View



Bottom View



Side View



Suggested Solder Pad Layout
Top View

SYMBOL	MILLIMETER		
	MIN	NDM	MAX
D	3.15	3.25	3.35
E	3.15	3.25	3.35
A	0.70	0.80	0.90
A1	0.20 BSC		
A2			0.10
D1	2.20	2.35	2.50
E1	1.80	1.90	2.00
L1	0.35	0.45	0.55
L2	0.35 BSC		
b	0.20	0.30	0.40
e	0.65 BSC		

Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.10 mm.
3. The pad layout is for reference purposes only.



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