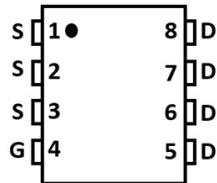
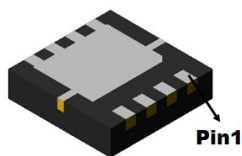
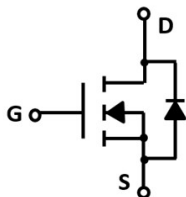


N-Channel Enhancement Mode Field Effect Transistor



DFN3.3X3.3



Product Summary

- V_{DS} 20 V
- I_D 47 A
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <6 mohm
- $R_{DS(ON)}$ (at $V_{GS}=2.5V$) <8 mohm
- $R_{DS(ON)}$ (at $V_{GS}=1.8V$) <14 mohm

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- DC-DC Converters
- Power management functions

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	20	V
Gate-source Voltage		V_{GS}	± 10	V
Drain Current	$T_A=25^\circ\text{C}$	I_D	47	A
	$T_A=70^\circ\text{C}$		38	
Pulsed Drain Current ^A		I_{DM}	188	A
Total Power Dissipation	$T_C=25^\circ\text{C}$	P_D	21	W
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	5.9	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		T_J, T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCQ47N02A	F1	Q47N02A	5000	10000	100000	13" reel

■ 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	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V,V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ± 10V, V _{DS} =0V			± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	0.45	0.62	1.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 4.5V, I _D =20A		4.5	6	mΩ
		V _{GS} = 2.5V, I _D =15A		5.7	8	
		V _{GS} = 1.8V, I _D =10A		7.6	14	
Diode Forward Voltage	V _{SD}	I _S =20A,V _{GS} =0V		0.8	1.2	V
Dynamic Parameters						
Input Capacitance	C _{iSS}	V _{DS} =10V,V _{GS} =0V,f=1MHZ		2250		pF
Output Capacitance	C _{oSS}			334		
Reverse Transfer Capacitance	C _{rSS}			271		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =4.5V,V _{DS} =10V,I _D =15A		27.9		nC
Gate-Source Charge	Q _{gs}			4.1		
Gate-Drain Charge	Q _{gd}			7.4		
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =15A,dI/dt=100A/μs		2.2		
Body Diode Reverse Recovery Time	T _{rr}			16.3		
Turn-on Delay Time	t _{D(on)}	V _{GS} =4.5V,V _{DD} =10V,I _D =10A, R _{GEN} =3Ω		13		ns
Turn-on Rise Time	t _r			53		
Turn-off Delay Time	t _{D(off)}			61		
Turn-off fall Time	t _f			76		

A. Pulse Test: Pulse Width≤300us, Duty cycle ≤2%.

B. R_{θJA} is the sum of the junction-to-Case and Case-to-ambient thermal resistance, where the Case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design, while R_{θJA} is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

■ Typical Performance Characteristics

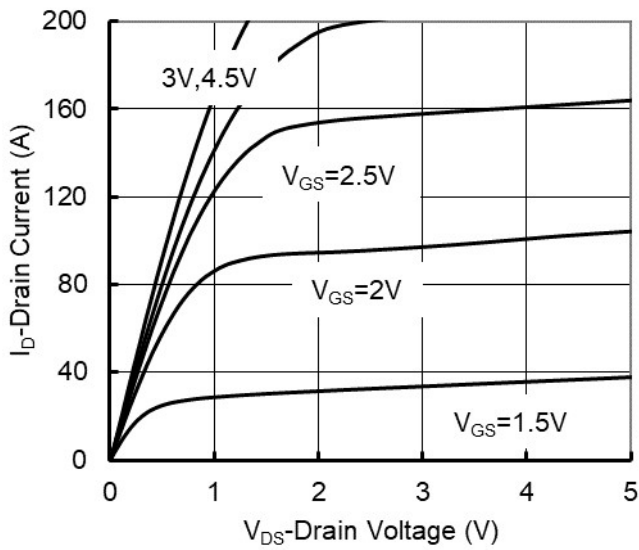


Figure1. Output Characteristics

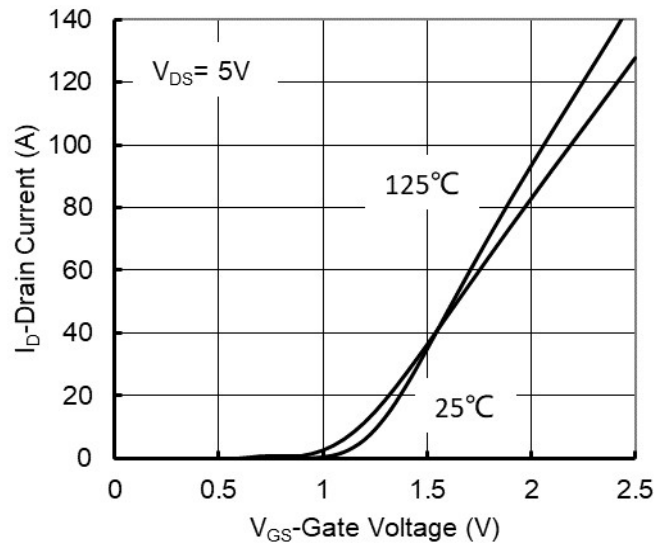


Figure2. Transfer Characteristics

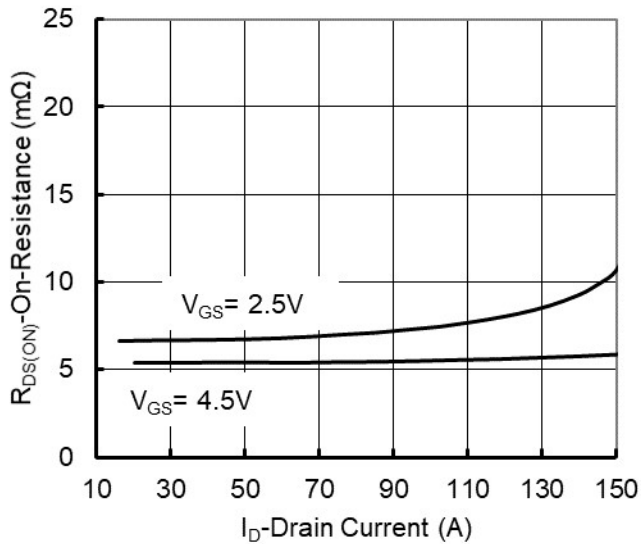


Figure3. On-Resistance vs. Drain Current

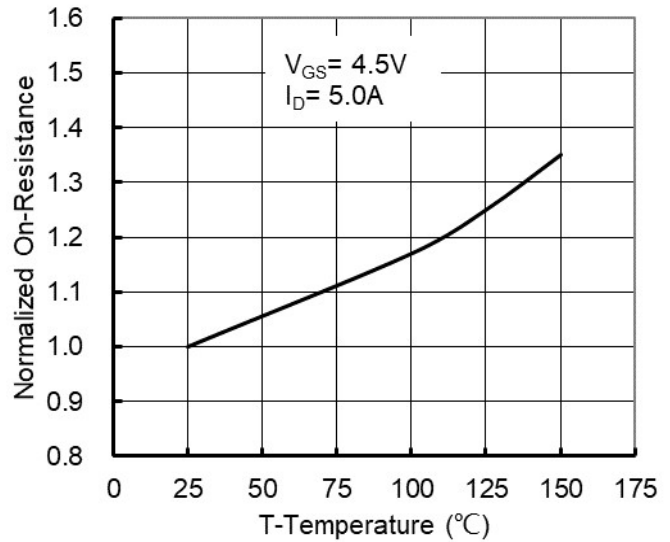


Figure4. On-Resistance vs. Junction Temperature

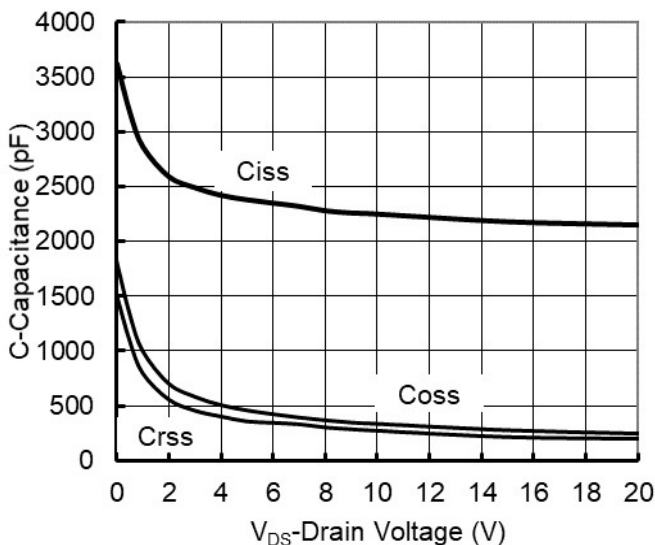


Figure5. Capacitance Characteristics

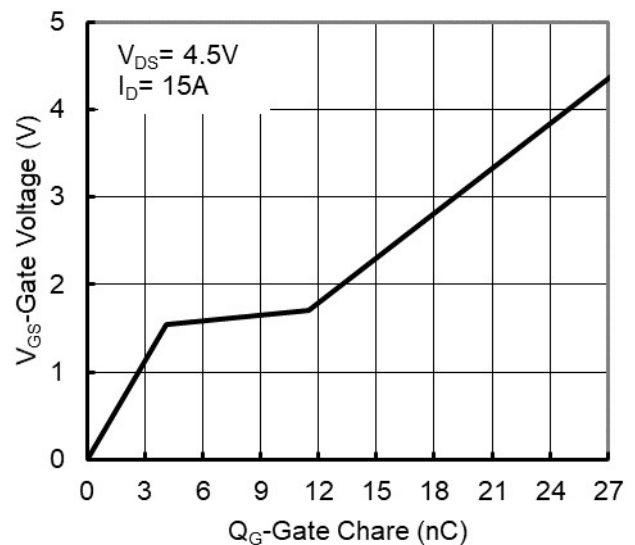


Figure6. Gate Charge

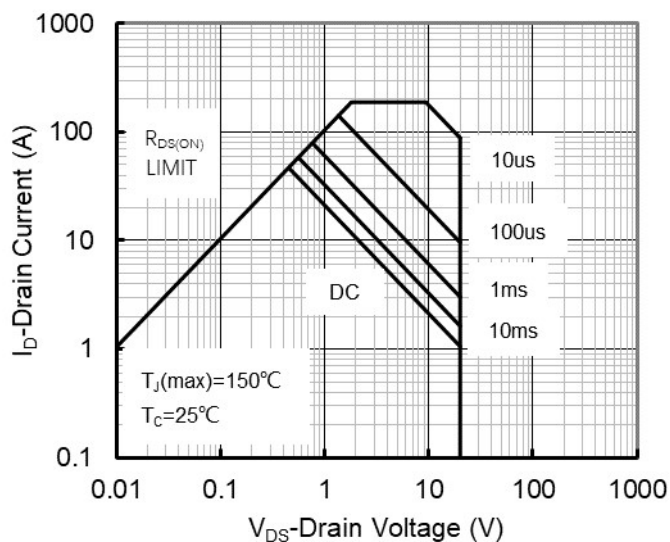


Figure7. Safe Operation Area

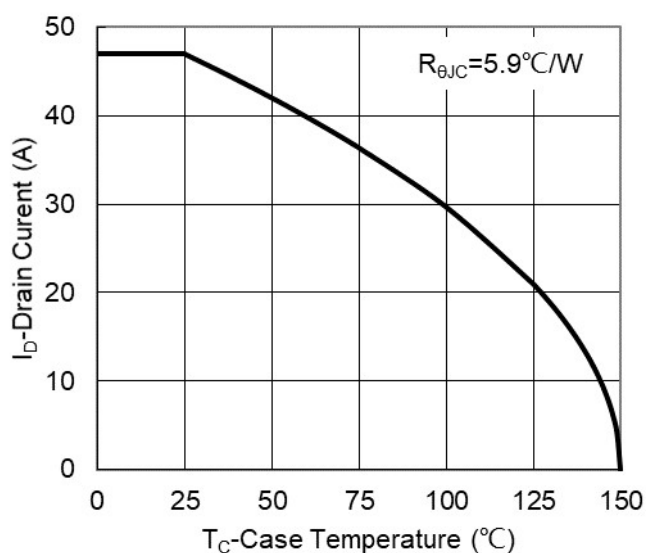


Figure8. Maximum Continuous Drain Current vs Case Temperature

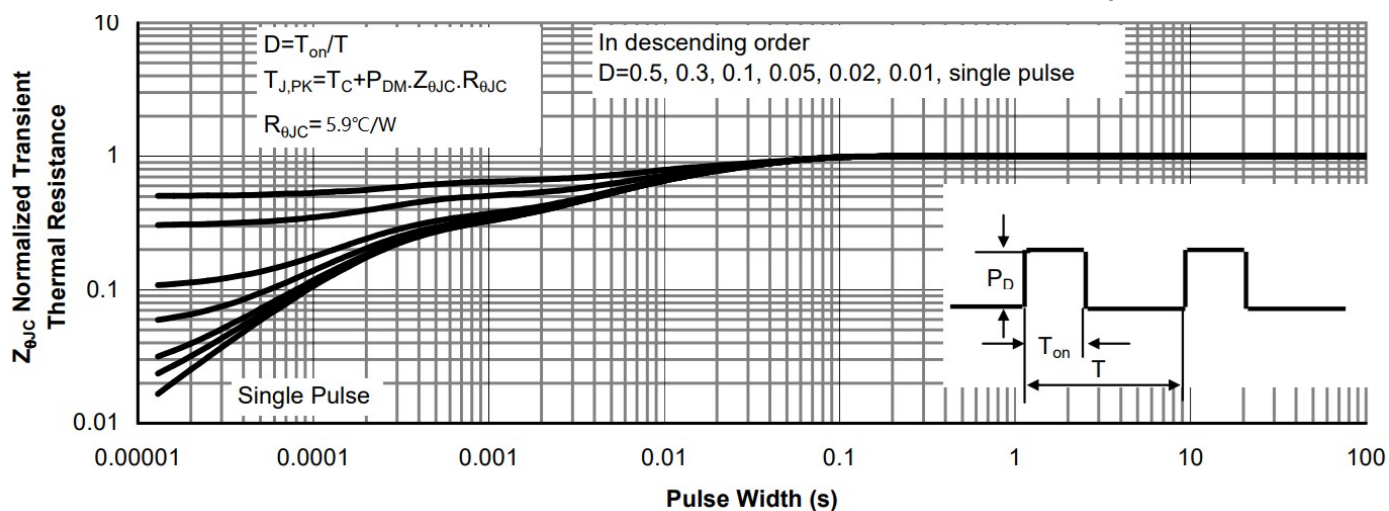
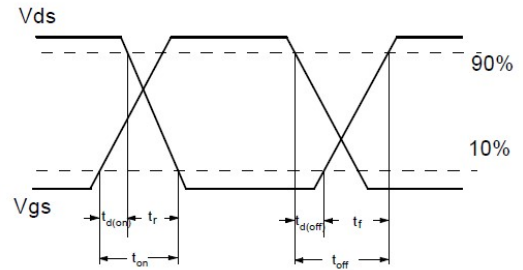
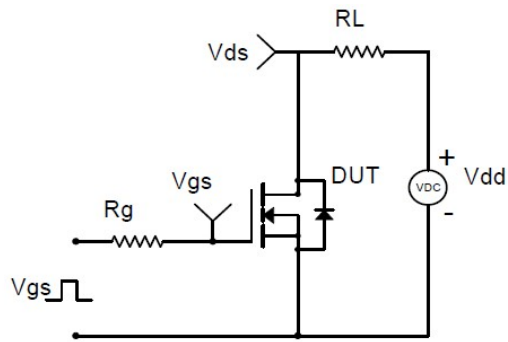
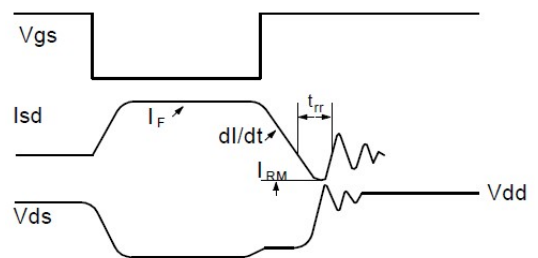
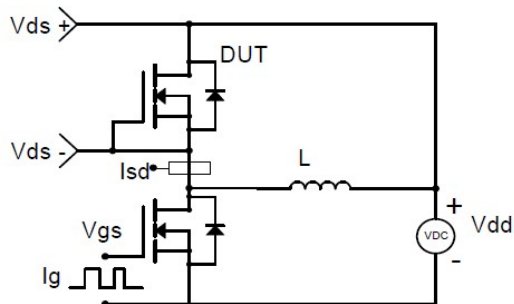


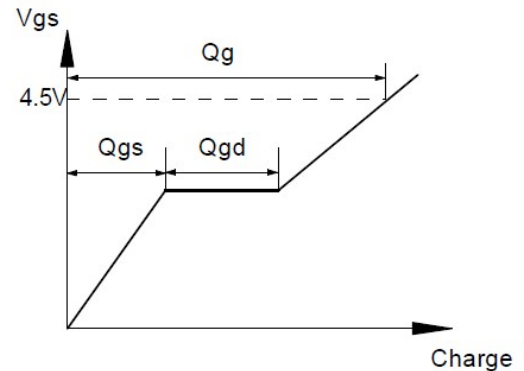
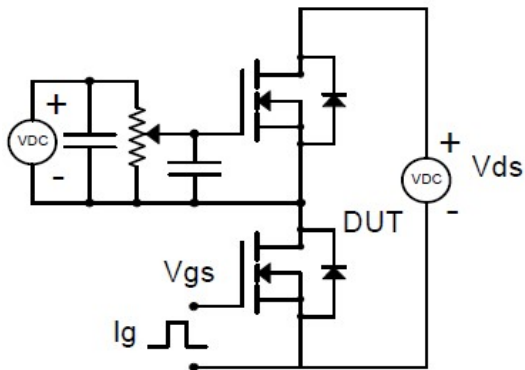
Figure9.Normalized Maximum Transient Thermal Impedance



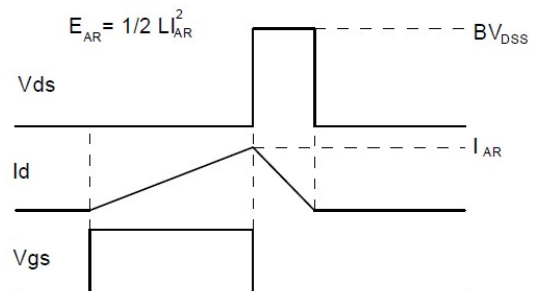
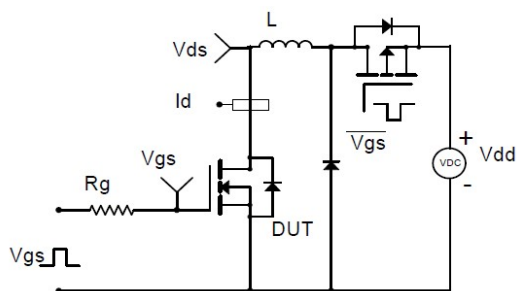
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

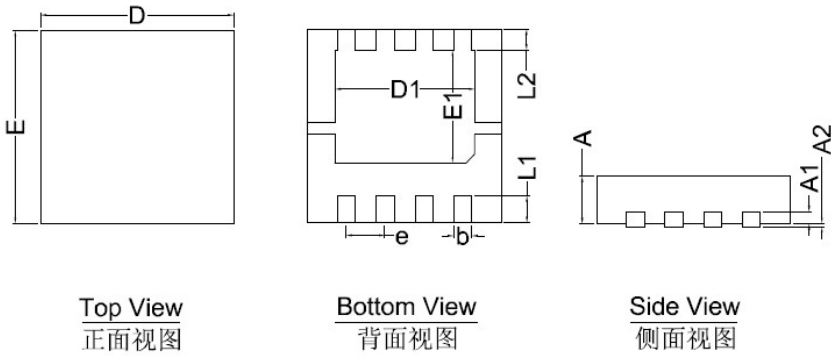


Gate Charge Test Circuit & Waveform

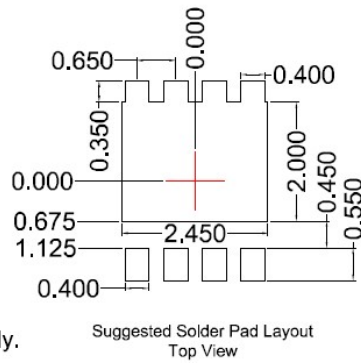


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

■ DFN3.3x3.3 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	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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