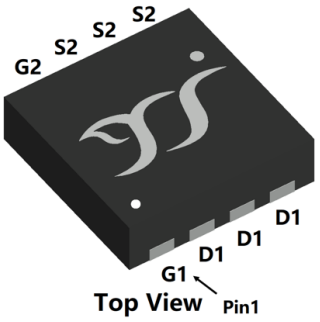
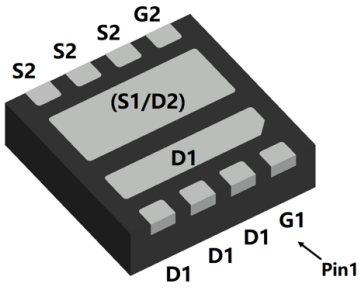
Dual N-Channel Enhancement Mode Field Effect Transistor

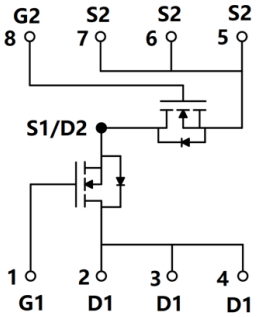


Top View



Bottom View

DFN3030-8L



Product Summary

NMOS(Die1)

- V_{DS} 30V
- I_D 33A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜9.5mΩ
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜19mΩ
- 100% EAS Tested

NMOS(Die2)

- V_{DS} 30V
- I_D 34A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜9.5mΩ
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜18mΩ
- 100% EAS Tested
- ESD Level(HBM) H1B

General Description

- Dual Asymmetric N-Channel
- High Current Capability
- Low Gate Charge
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC/DC Converters in Computing, Servers
- Isolated DC/DC Converters in Telecom and Industrial

■ Limiting Values

Parameter	Conditions		Symbol	NMOS(Die1)		NMOS(Die2)		Unit
				Min	Max	Min	Max	
Drain-source Voltage			V_{DS}	-	30	-	30	V
Gate-source Voltage			V_{GS}	-20	20	-20	20	
Continuous Drain Current (Note 1,2)	Steady-State	T_A=25℃,V_{GS}=10V	I_D	-	10	-	10.4	A
		T_A=100℃,V_{GS}=10V		-	6.3	-	6.6	
Continuous Drain Current (Note 1,3)	Steady-State	T_C=25℃,V_{GS}=10V, Chip limitation		-	33	-	34	
		T_C=100℃,V_{GS}=10V		-	20.8	-	21.5	
Pulsed Drain Current	T_C=25℃,t_p≤10μs		I_{DM}	-	132	-	136	
Maximum Body-Diode Continuous Current	T_C=25℃		I_S	-	14	-	15	
Avalanche Energy (non-repetitive)	T_J=25℃,V_G=10V,R_G=25Ω,L=0.5mH, I_{AS}=13A		EAS	-	42.2	-	42.2	mJ
Total Power Dissipation (Note 1,2)	Steady-State	T_A=25℃	P_D	-	1.54	-	1.71	W
		T_A=100℃		-	0.61	-	0.68	
Total Power Dissipation (Note 1,3)	Steady-State	T_C=25℃		-	17.1	-	18.3	
		T_C=100℃		-	6.8	-	7.3	
Junction and Storage Temperature Range			T_J ,T_{STG}	-55	150	-55	150	℃

■Thermal resistance

Parameter		Symbol	NMOS(Die1)		NMOS(Die2)		Units
			Typ	Max	Typ	Max	
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	81	-	73	℃/W
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	7.3	-	6.8	

■ NMOS(Die1) Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA,Tj=25℃	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V,Tj=25℃	-	-	1	μA
		V_{DS}=30V,V_{GS}=0V,Tj=125℃	-	-	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V,Tj=25℃	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA,Tj=25℃	1.1	1.5	2.2	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=20A,Tj=25℃	-	7.2	9.5	mΩ
		V_{GS}=4.5V,I_D=10A,Tj=25℃	-	13	19	mΩ
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V,Tj=25℃	-	0.88	1.2	V
Gate Resistance	R_G	f=1MHz,Tj=25℃	-	2.5	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V,f=1MHz,Tj=25℃	-	907	-	pF
Output Capacitance	C_{oss}		-	134	-	
Reverse Transfer Capacitance	C_{rss}		-	109	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=15V,I_D=20A,Tj=25℃	-	17.4	-	nC
Gate-Source Charge	Q_{gs}		-	3.4	-	
Gate-Drain Charge	Q_{gd}		-	4	-	
Reverse Recovery Charge	Q_{rr}	I_F=20A,di/dt=100A/μs,V_{GS}=0V,V_R=15V, Tj=25℃	-	6	-	nC
Reverse Recovery Time	t_{rr}		-	13.4	-	ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DS}=15V,I_D=20A,R_{GEN}=3Ω, Tj=25℃	-	7.5	-	ns
Turn-on Rise Time	t_r		-	4	-	
Turn-off Delay Time	$t_{D(off)}$		-	20	-	
Turn-off Fall Time	t_f		-	5.4	-	

■ NMOS(Die2) Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA,Tj=25℃	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V,Tj=25℃	-	-	1	μA
		V_{DS}=30V,V_{GS}=0V,Tj=125℃	-	-	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V,Tj=25℃	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA,Tj=25℃	1.1	1.5	2.2	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=20A,Tj=25℃	-	6.5	9.5	mΩ
		V_{GS}=4.5V,I_D=10A,Tj=25℃	-	12	18	mΩ
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V,Tj=25℃	-	0.87	1.2	V
Gate Resistance	R_G	f=1MHz,Tj=25℃	-	2.5	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V,f=1MHz,Tj=25℃	-	907	-	pF
Output Capacitance	C_{oss}		-	134	-	
Reverse Transfer Capacitance	C_{rss}		-	109	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=15V,I_D=20A,Tj=25℃	-	17.4	-	nC
Gate-Source Charge	Q_{gs}		-	3.4	-	
Gate-Drain Charge	Q_{gd}		-	4	-	
Reverse Recovery Charge	Q_{rr}	I_F=20A,di/dt=100A/μs,V_{GS}=0V,V_R=15V, Tj=25℃	-	6	-	nC
Reverse Recovery Time	t_{rr}		-	13.4	-	ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DS}=15V,I_D=20A,R_{GEN}=3Ω, Tj=25℃	-	7.5	-	ns
Turn-on Rise Time	t_r		-	4	-	
Turn-off Delay Time	$t_{D(off)}$		-	20	-	
Turn-off Fall Time	t_f		-	5.4	-	

Note：

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in^2 pad of 2oz. Copper, in the still air environment with T_A=25℃.The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).

■ NMOS(Die1) Typical Electrical and Thermal Characteristics Diagrams

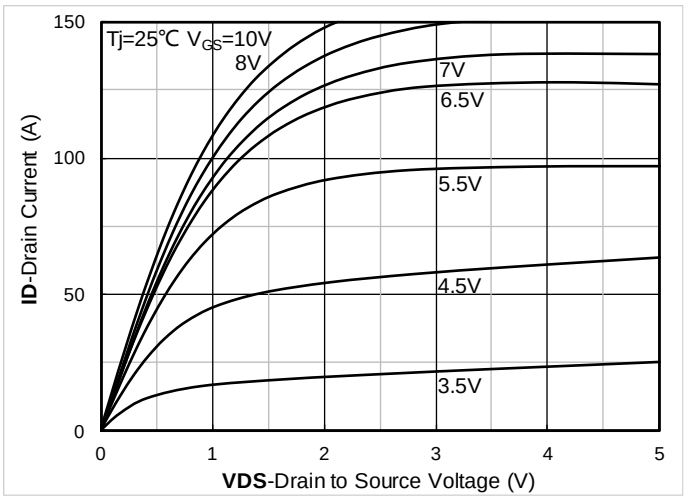


Figure 1. Output Characteristics; typical values

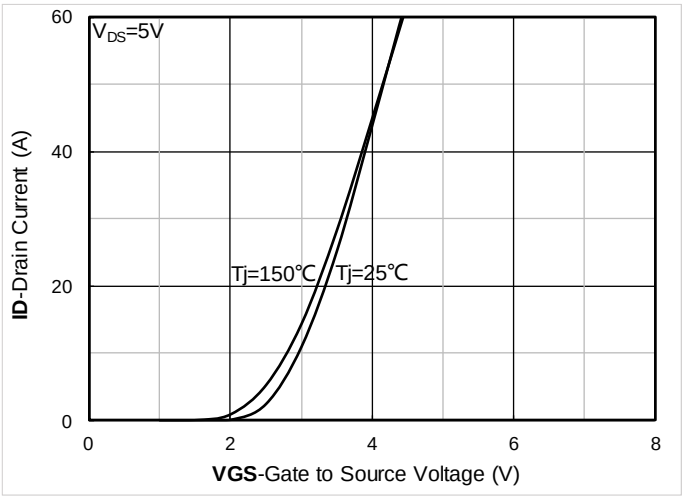


Figure 2. Transfer Characteristics; typical values

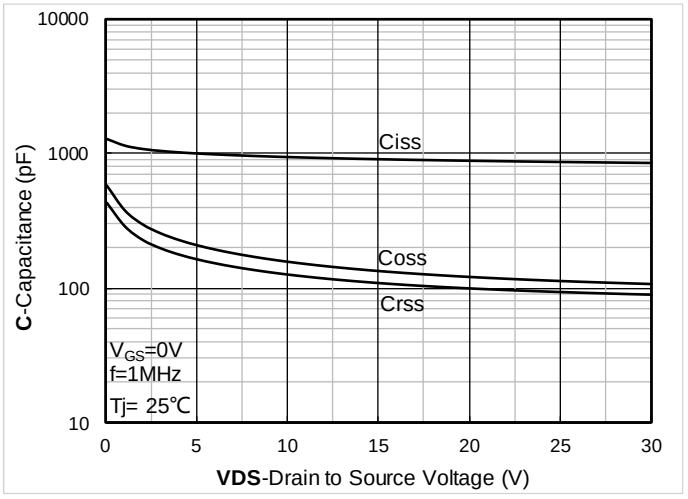


Figure 3. Capacitance Characteristics; typical values

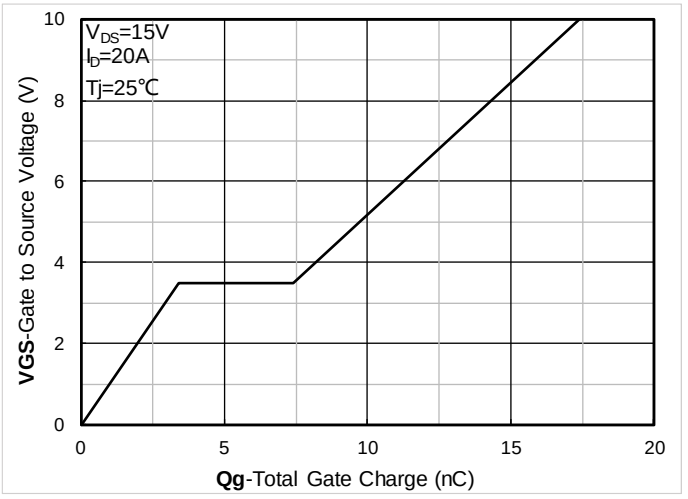


Figure 4. Gate Charge; typical values

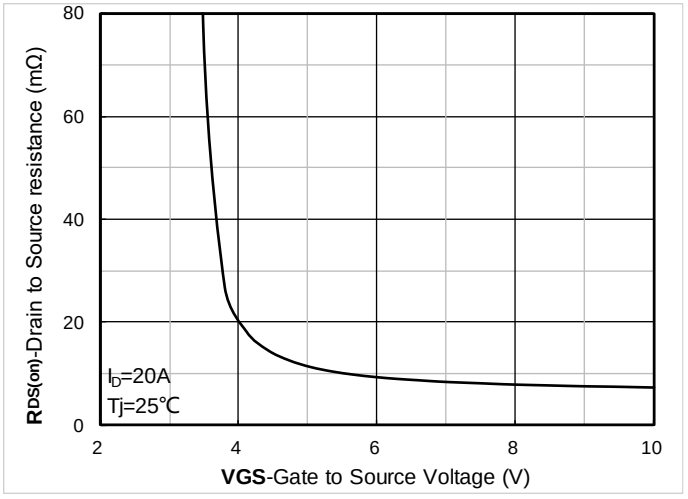


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

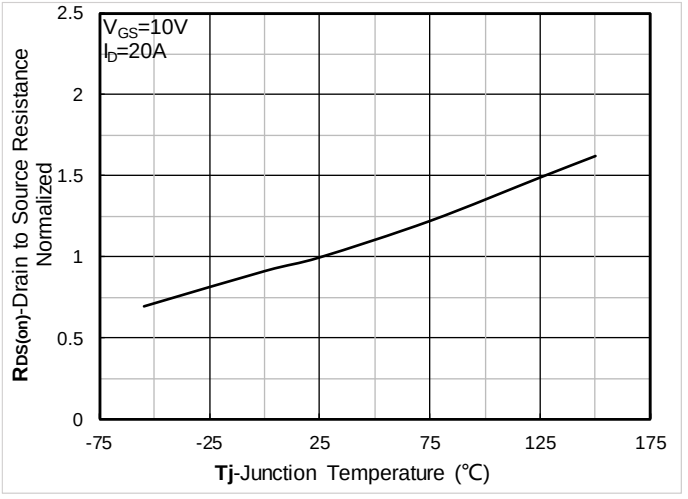


Figure 6. Normalized On-Resistance

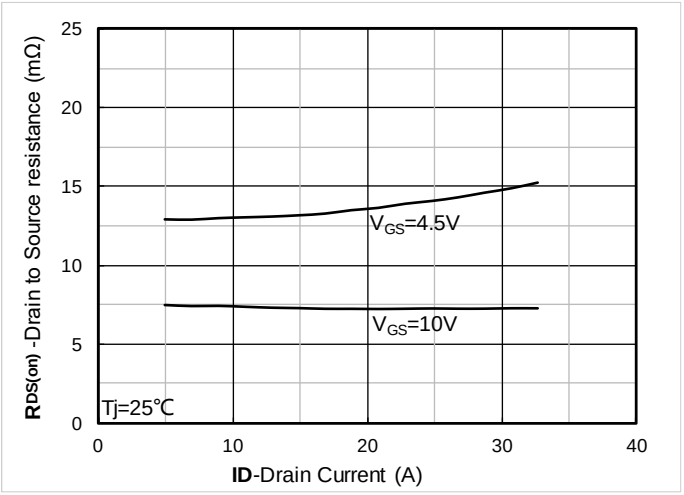


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

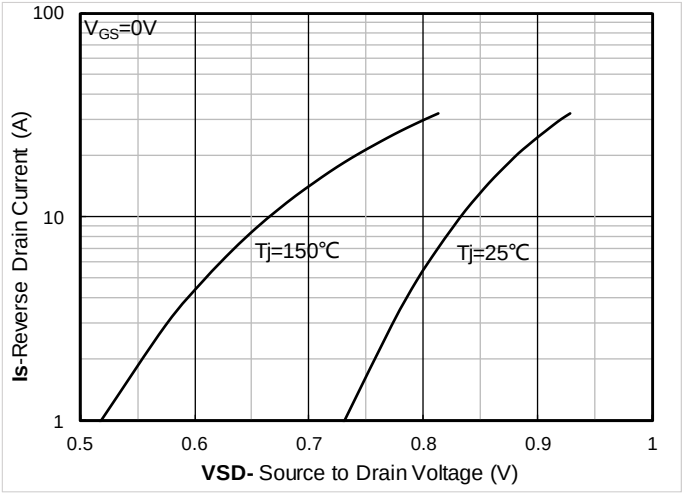


Figure 8. Forward characteristics of reverse diode; typical values

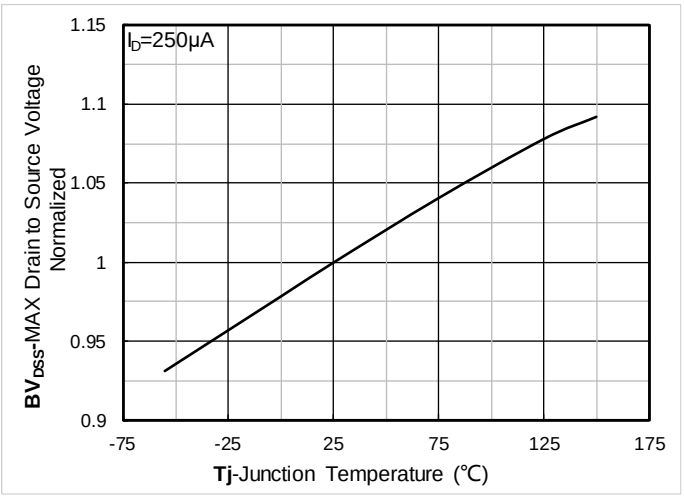


Figure 9. Normalized breakdown voltage

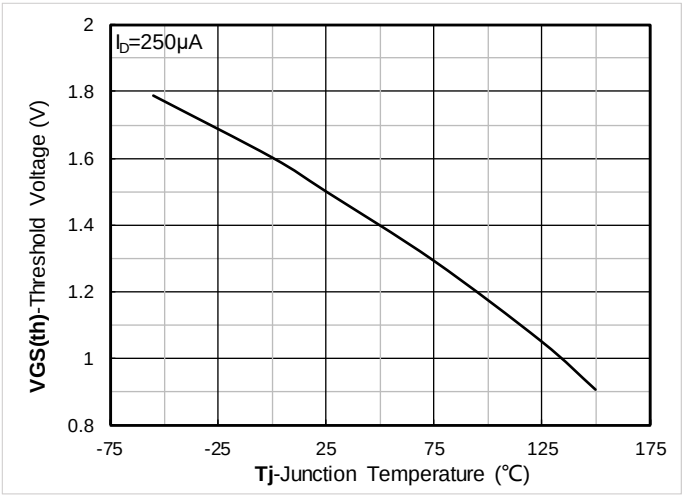


Figure 10. Gate Threshold voltage; typical values

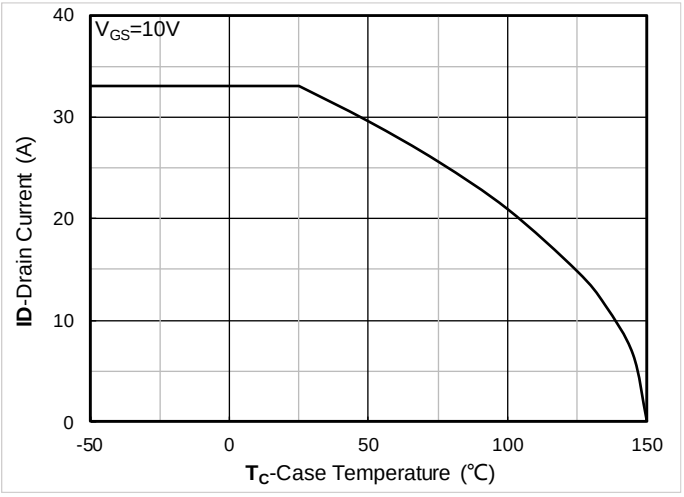


Figure 11. Current dissipation

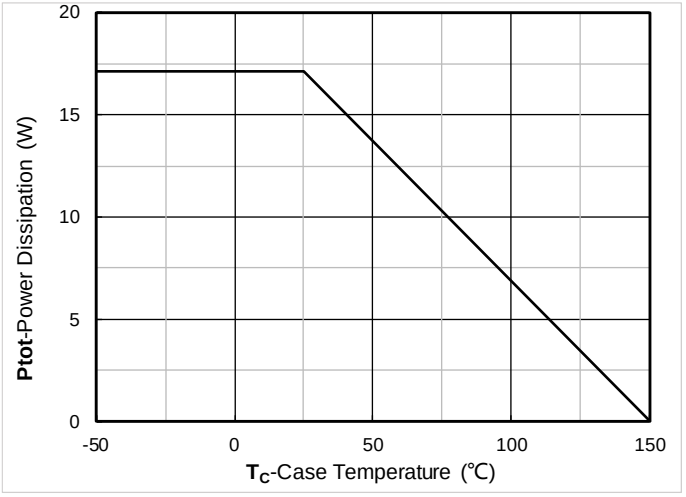


Figure 12. Power dissipation

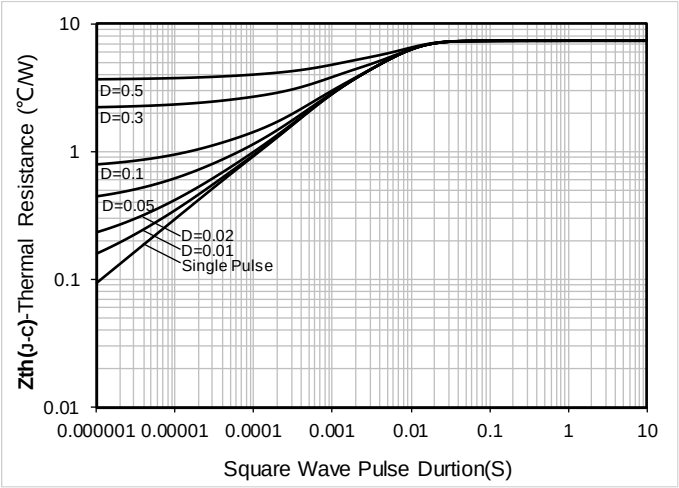


Figure 13. Maximum Transient Thermal Impedance

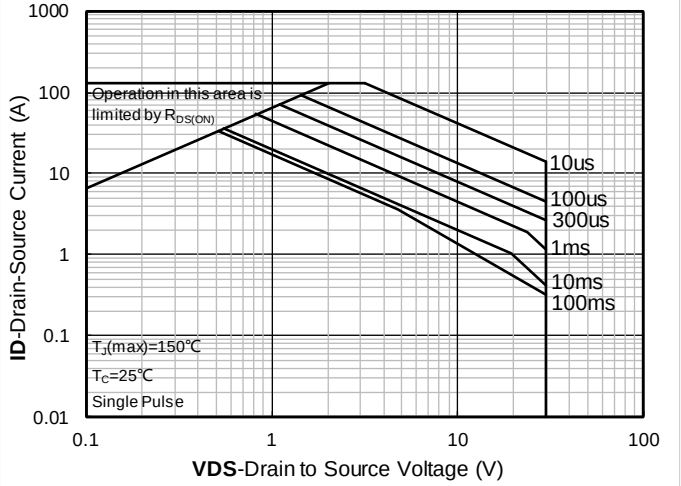


Figure 14. Safe Operation Area

■ NMOS(Die2) Typical Electrical and Thermal Characteristics Diagrams

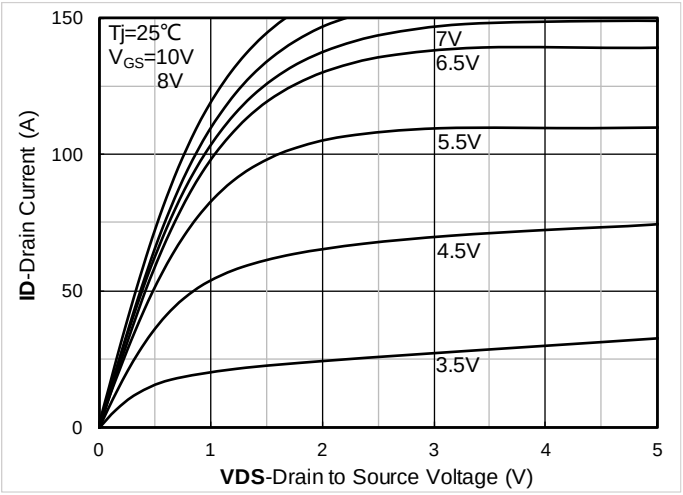


Figure 1. Output Characteristics; typical values

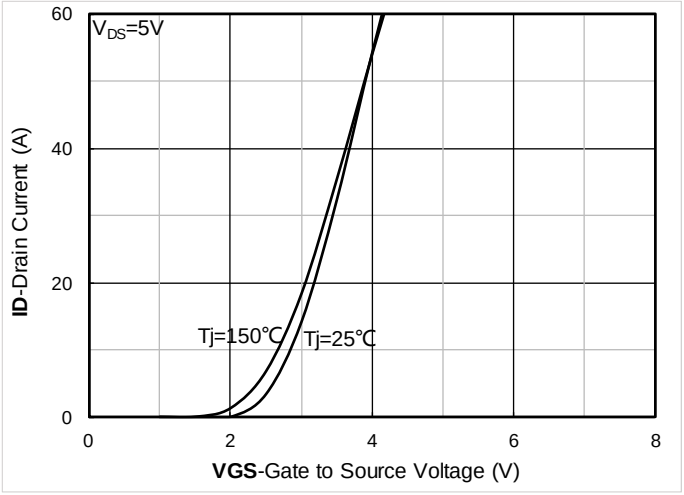


Figure 2. Transfer Characteristics; typical values

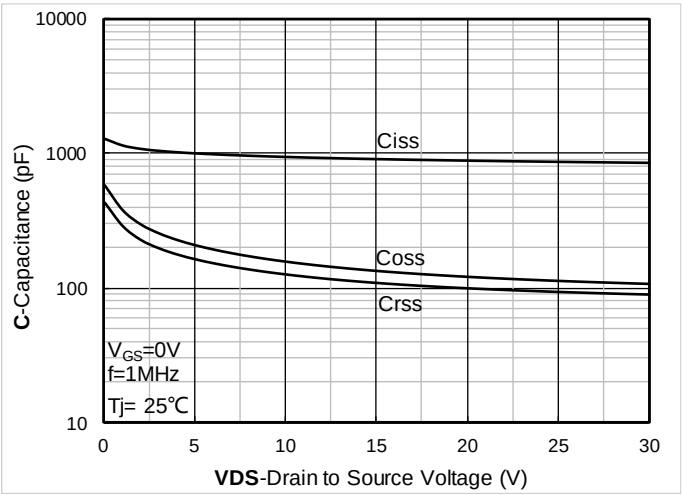


Figure 3. Capacitance Characteristics; typical values

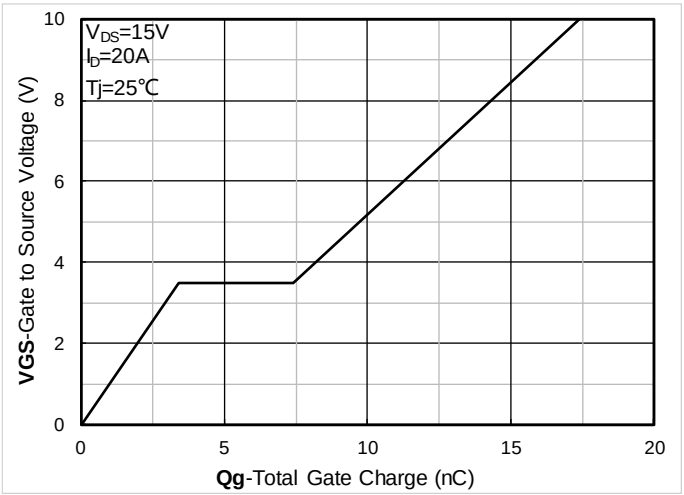


Figure 4. Gate Charge; typical values

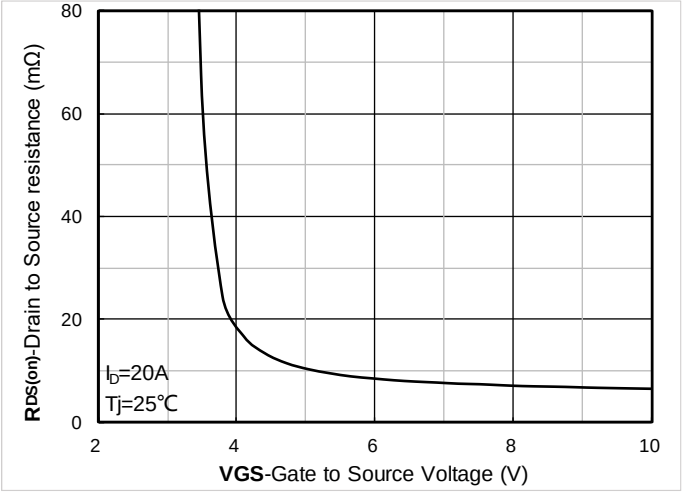


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

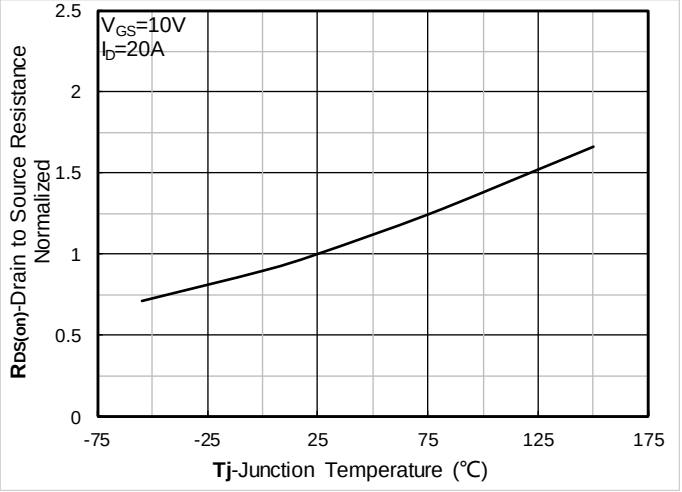


Figure 6. Normalized On-Resistance

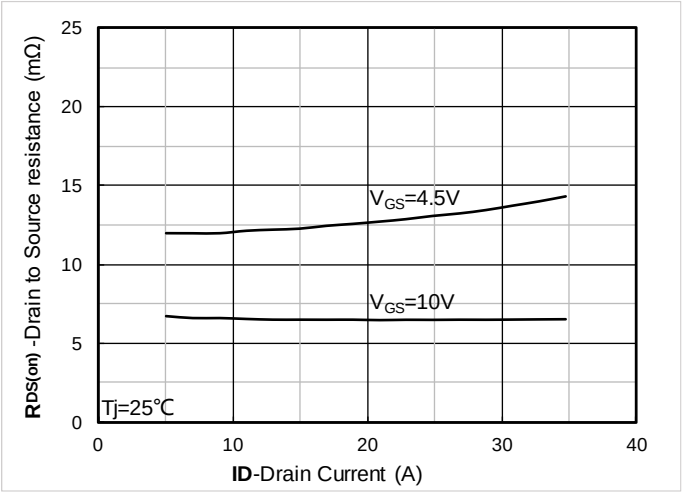


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

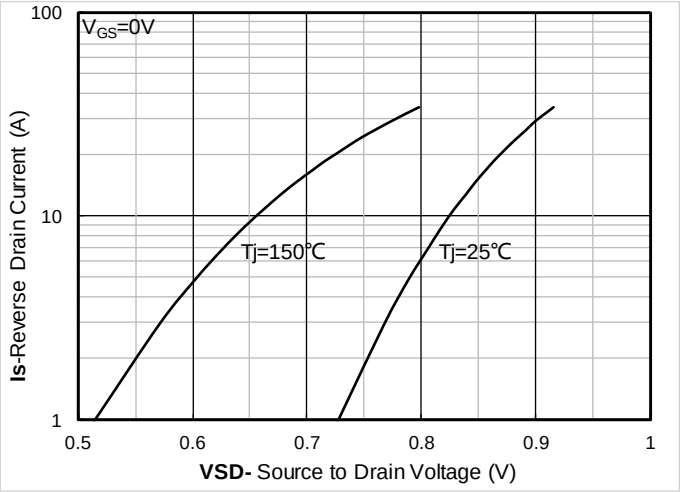


Figure 8. Forward characteristics of reverse diode; typical values

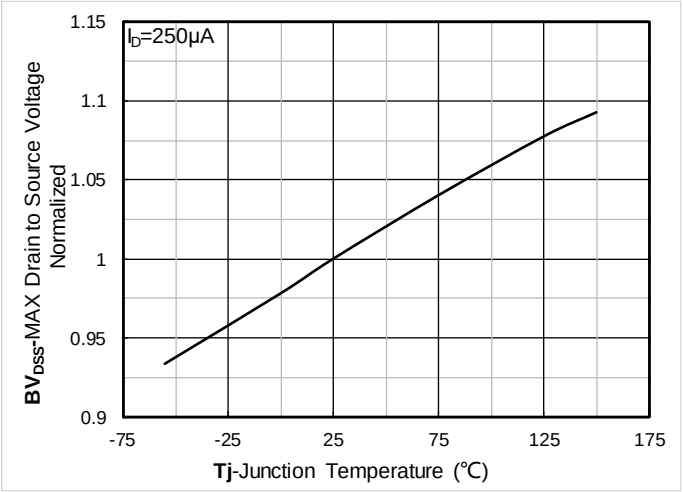


Figure 9. Normalized breakdown voltage

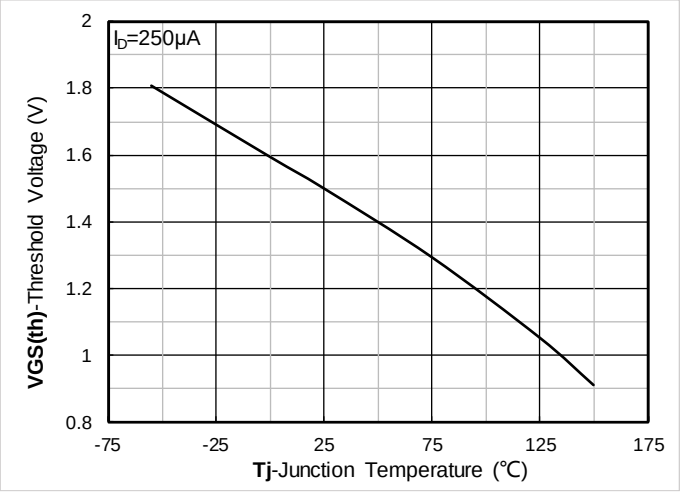


Figure 10. Gate Threshold voltage; typical values

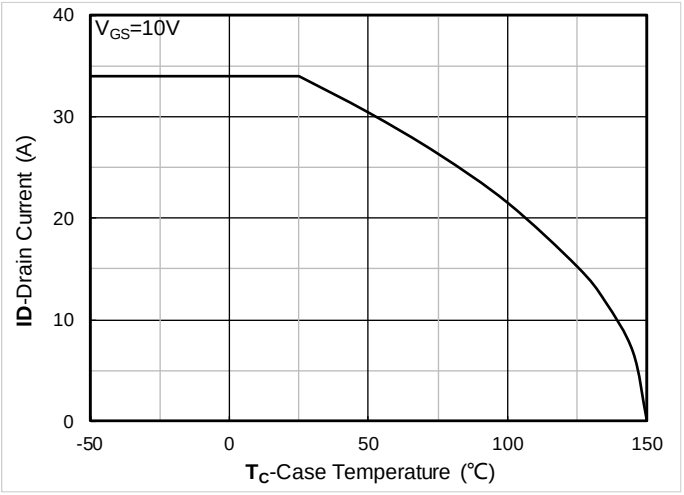


Figure 11. Current dissipation

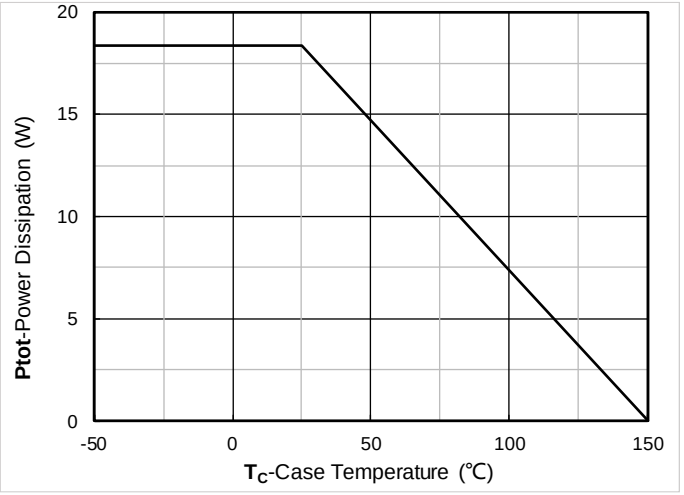


Figure 12. Power dissipation

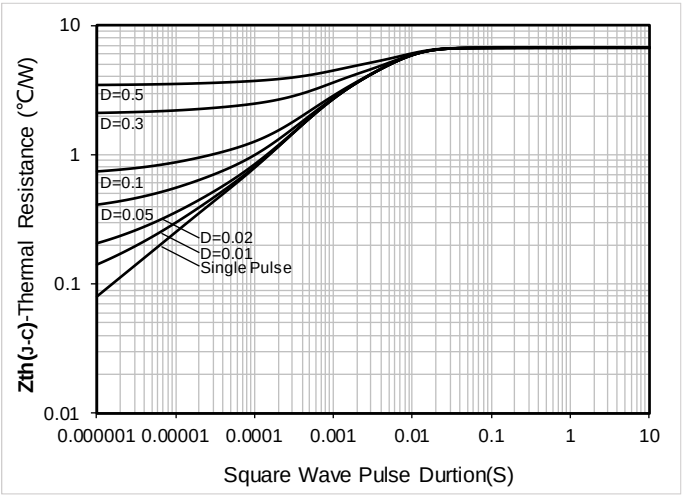


Figure 13. Maximum Transient Thermal Impedance

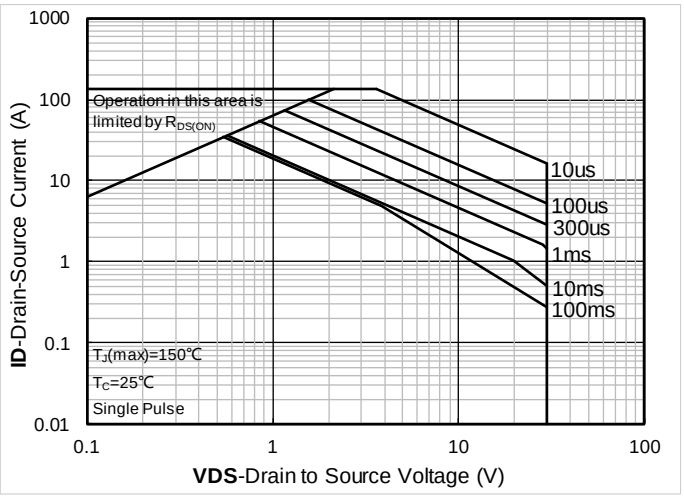


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

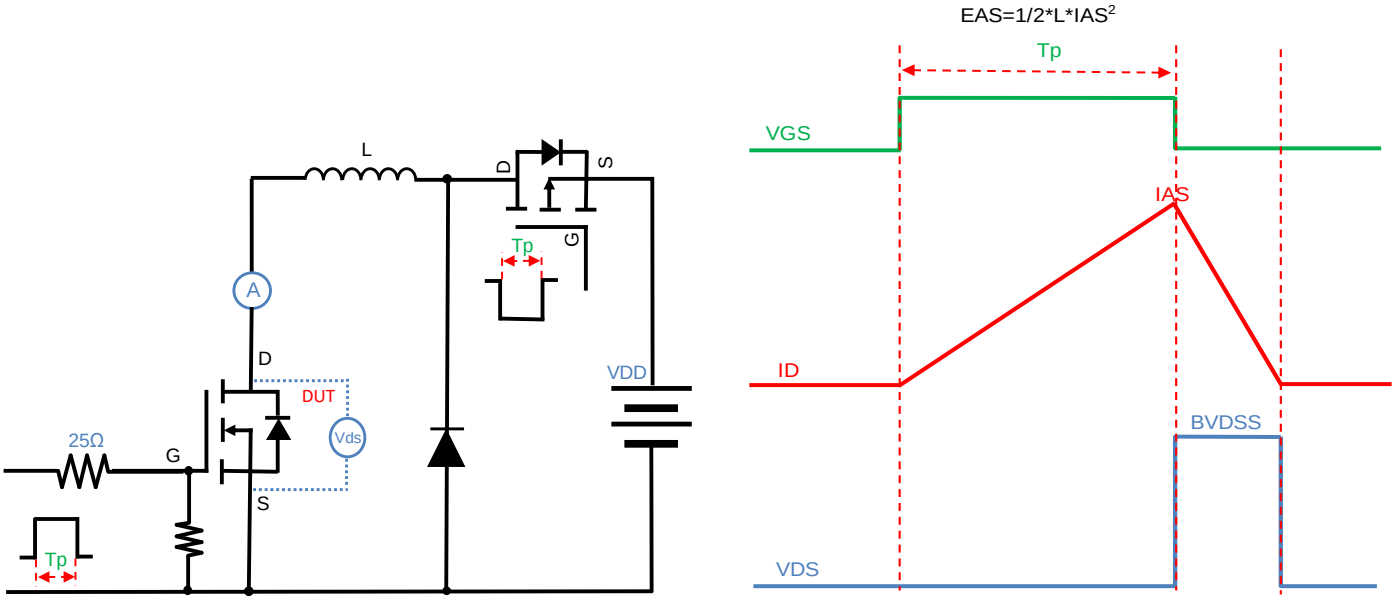


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

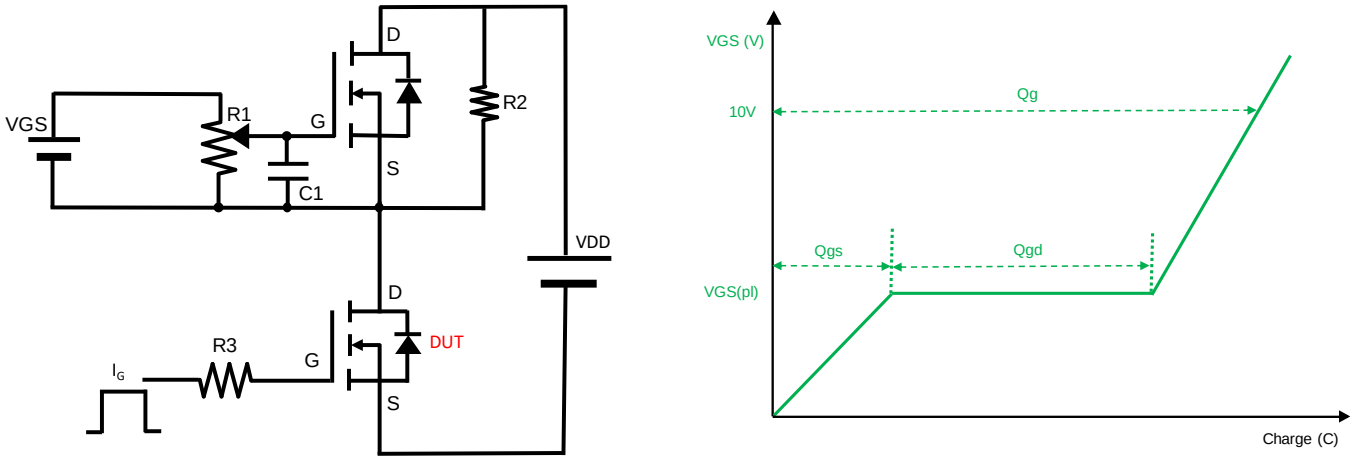


Figure B. Gate Charge Test Circuit & Waveform

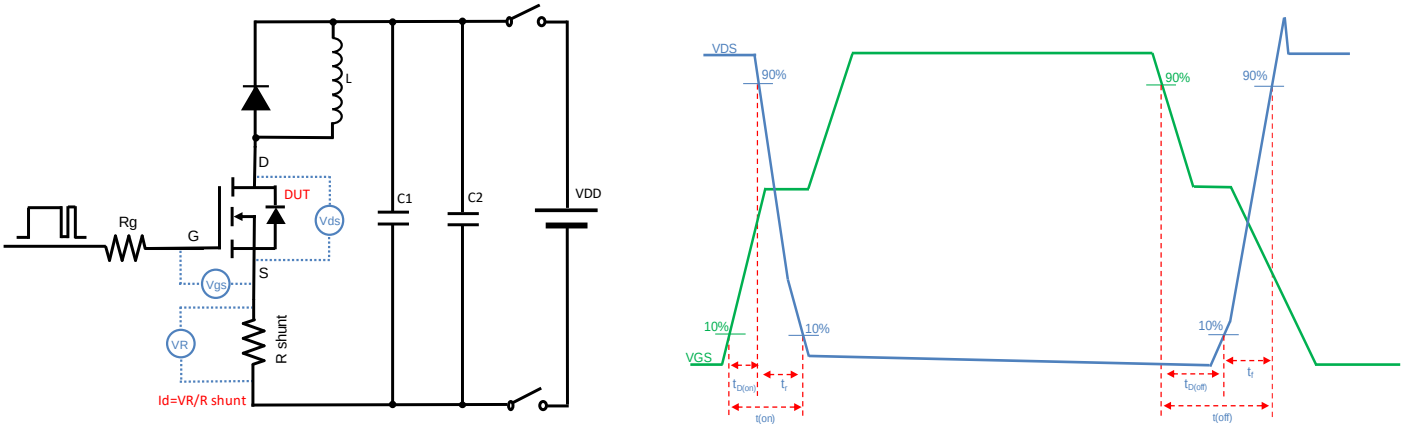


Figure C. Resistive Switching Test Circuit & Waveform

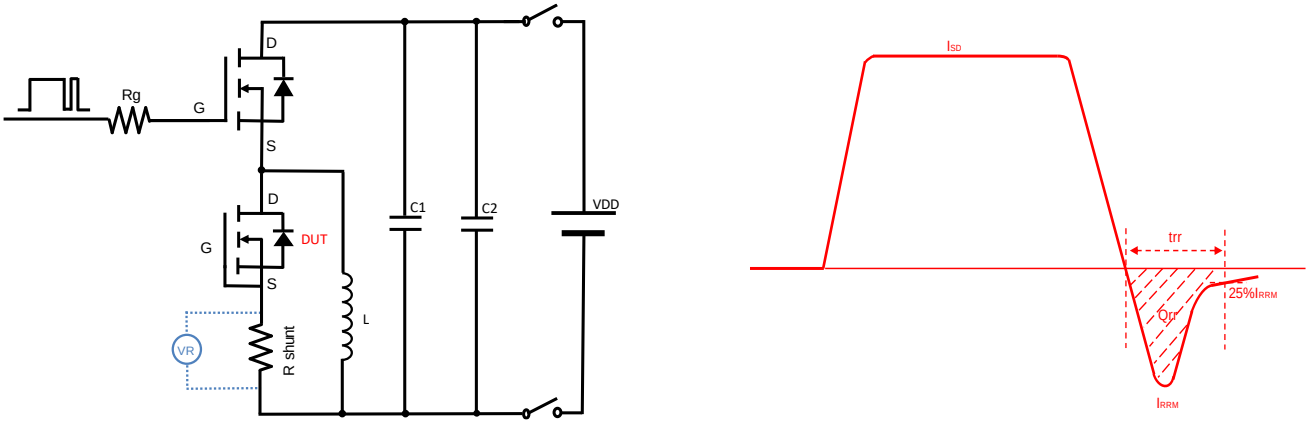
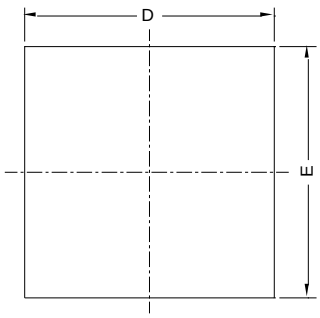
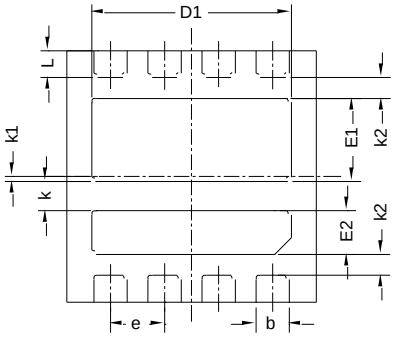


Figure D. Diode Recovery Test Circuit & Waveform

■ DFN3030-8L Package information

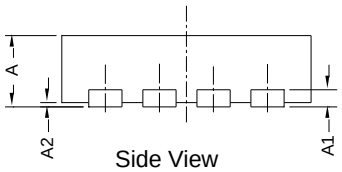


Top View
正面视图

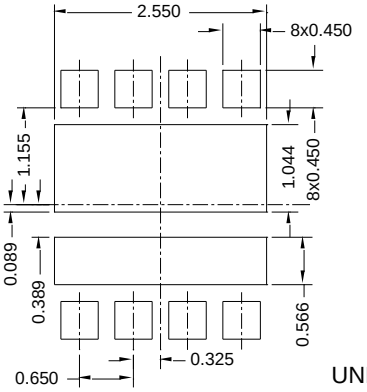


Bottom View
背面视图

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	2.90	3.00	3.10
E	2.90	3.00	3.10
A	0.70	0.80	0.90
A1		0.20 BSC	
A2			0.10
D1	2.30	2.40	2.50
E1	0.89	0.99	1.09
E2	0.42	0.52	0.62
L	0.22	0.32	0.42
k		0.35 BSC	
k1		0.06 BSC	
k2		0.25 BSC	
b	0.30	0.40	0.50
e		0.65 BSC	



Side View
侧面视图

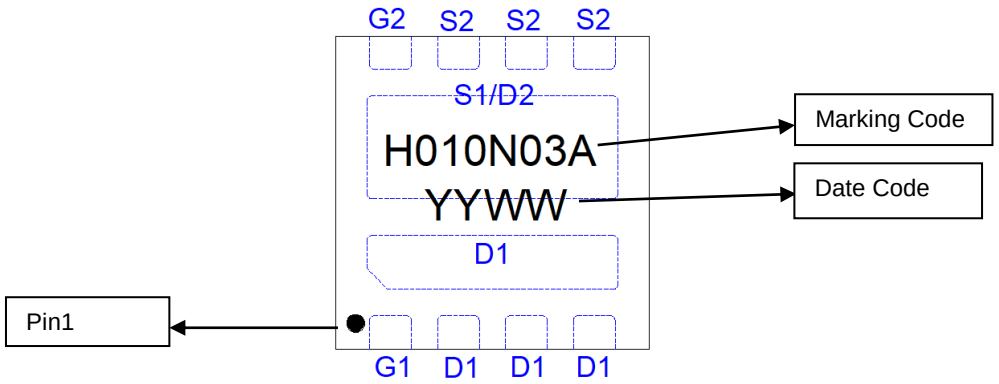


UNIT:mm

Suggested Solder Pad Layout
Top View

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

■ Marking Information



Note：
1. All marking is at middle of the product body
2. All marking is in laser printing
3. H010N03A is marking code, YYWW is date code, “YY” is year, “WW” is week
4. Body color: Black

Disclaimer

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The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

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