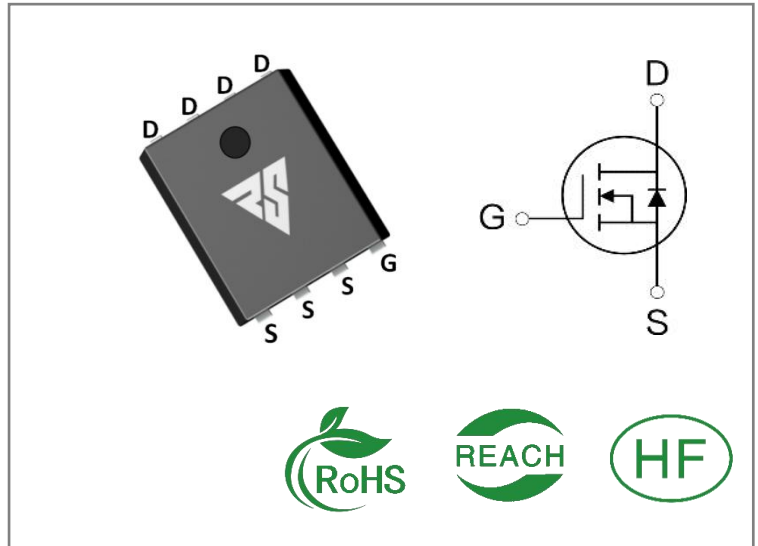


ID	R _{Ds(ON)} (Typ)	VDSS
120A	3mΩ	30V


Applications:

- Load Switch
- PWM Applications
- Power Managment

Features:

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

Ordering Information

Part Number	Package	Marking	Packing	Qty.
RS30N120G	DFN5*6	RS30N120G	Tape&reel	5000 PCS

Absolute Maximun Ratings Tc= 25°C unless otherwise specified

Symbol	Parameter	RS30N120G	Units
VDSS	Drain-to-Source Voltage	30	V
ID	Continuous Drain Current TC=25°C	120	A
ID	Continuous Drain Current TC=100°C	77.8	
IDM	Pulsed Drain Current (Note*1)	400	
PD	Power Dissipation	68	W
VGS	Gate- to- Source Voltage	±20	V
EAS	Single Pulse Avalanche Engergy L = 0.5mH, VDD = 15V, RG = 25 Ω,TC=25°C	350	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the“ Absolute Maximum Ratings” Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RS30N120G	Units	Test Conditions
R θ JC	Junction-to-Case	1.83	$^{\circ}\text{C} / \text{W}$	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 $^{\circ}\text{C}$
R θ JA	Junction-to-Ambient	50		1 cubic foot chamber, free air.

OFF Characteristics $T_J = 25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	30	--	--	V	$V_{GS}=0V, I_D=250\mu\text{A}$
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	$V_{DS}=30V, V_{GS}=0V$
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	$V_{GS}=20V, V_{DS}=0V$
	Gate- to- Source Reverse Leakage	--	--	-100		$V_{GS}=-20V, V_{DS}=0V$

ON Characteristics $T_J = 25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance(Note*2)	--	3	4	$\text{m}\Omega$	$V_{GS}=10V, I_D=30A$
		--	4	6	$\text{m}\Omega$	$V_{GS}=4.5V, I_D=20A$
VGS(TH)	Gate Threshold Voltage	1	--	2	V	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	11	--	nS	$V_{DS}=20V$ $I_D=20A$ $R_G=3\Omega$ $V_{GS}=10V$
trise	Rise Time	--	10	--		
td(OFF)	Turn- OFF Delay Time	--	35	--		
tfall	Fall Time	--	9	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	4000	--	pF	VGS=0V VDS=25V f=1MHz
Coss	Output Capacitance	--	450	--		
Crss	Reverse Transfer Capacitance	--	430	--		
Qg	Total Gate Charge	--	75	--	nC	VDS=15V ID=20A VGS=10V
Qgs	Gate- to- Source Charge	--	9	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	18	--		

Source- Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	120	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	400	A	
VSD	Diode Forward Voltage	--	--	1.2	V	IS=20A, VGS=0V
trr	Reverse Recovery Time	--	26	--	nS	IS=20A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	34	--	nC	

Notes:

- * 1. Repetitive rating, pulse width limited by maximum junction temperature.
- * 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Feature Curve

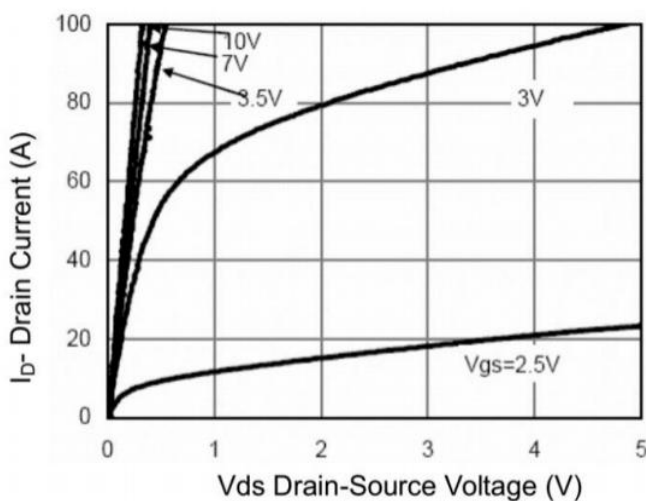


Figure 1 Output Characteristics

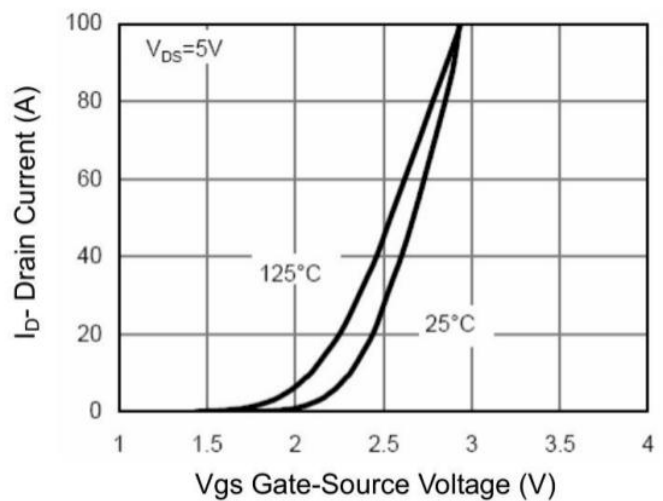


Figure 2 Transfer Characteristics

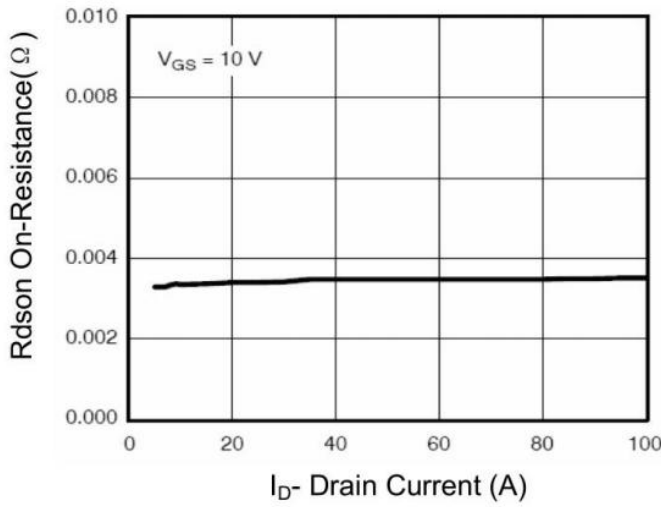


Figure 3 Rdson- Drain Current

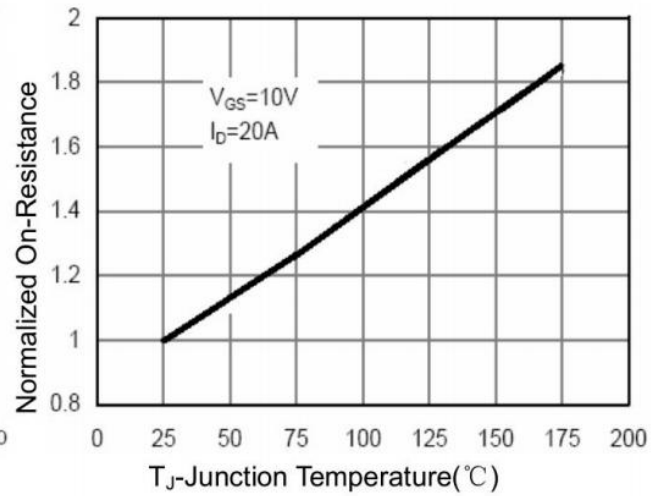


Figure 4 Rdson-Junction Temperature

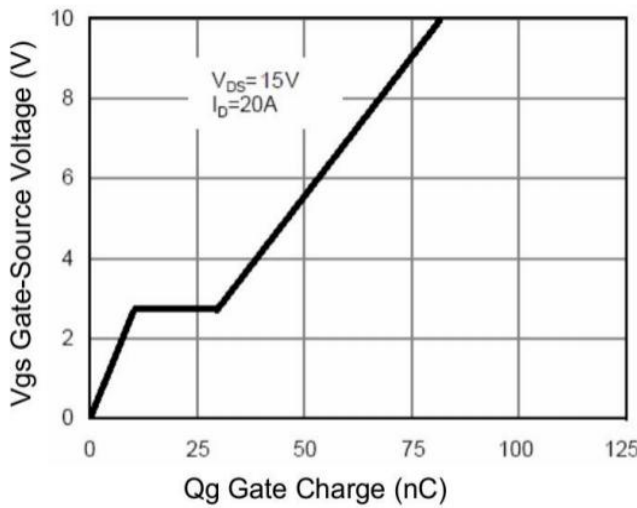


Figure 5 Gate Charge

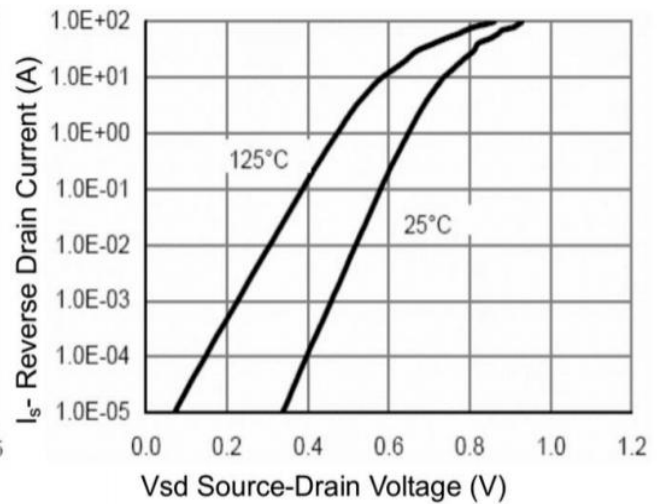


Figure 6 Source- Drain Diode Forward

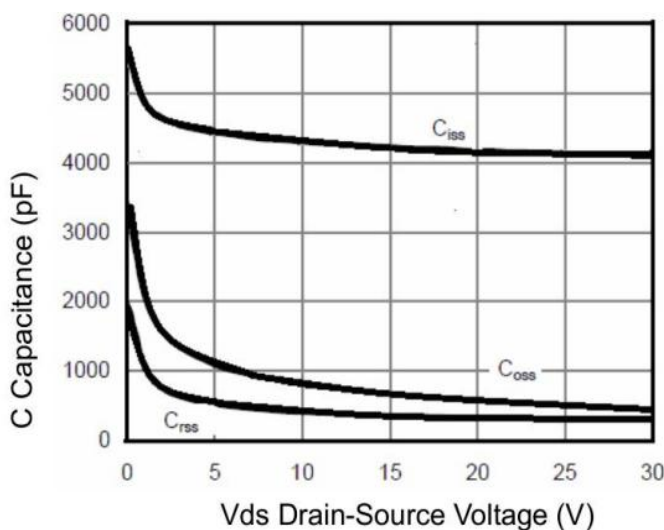


Figure 7 Capacitance vs Vds

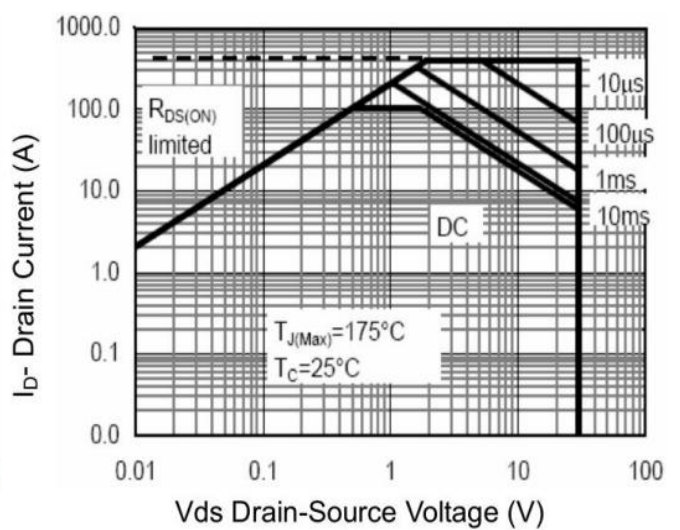


Figure 8 Safe Operation Area

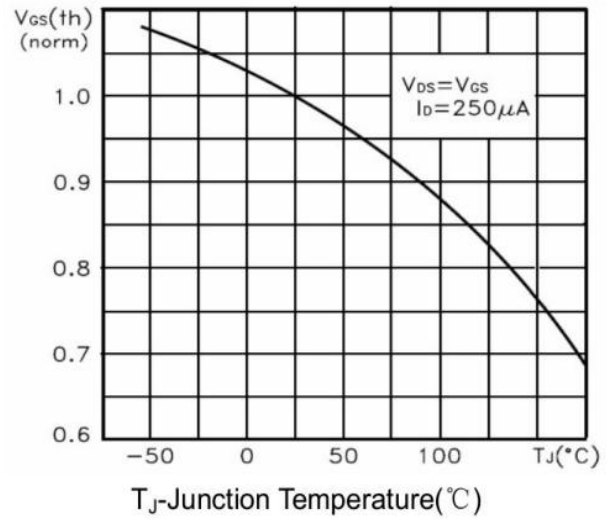
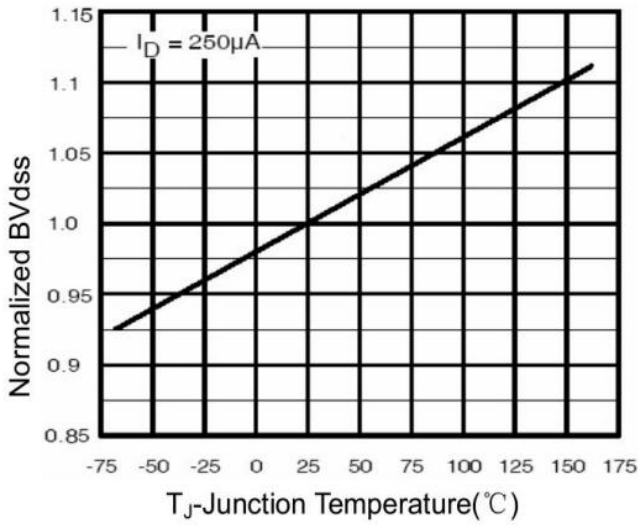


Figure 9 BV_{DSS} vs Junction Temperature Figure 10 $V_{GS(th)}$ vs Junction Temperature

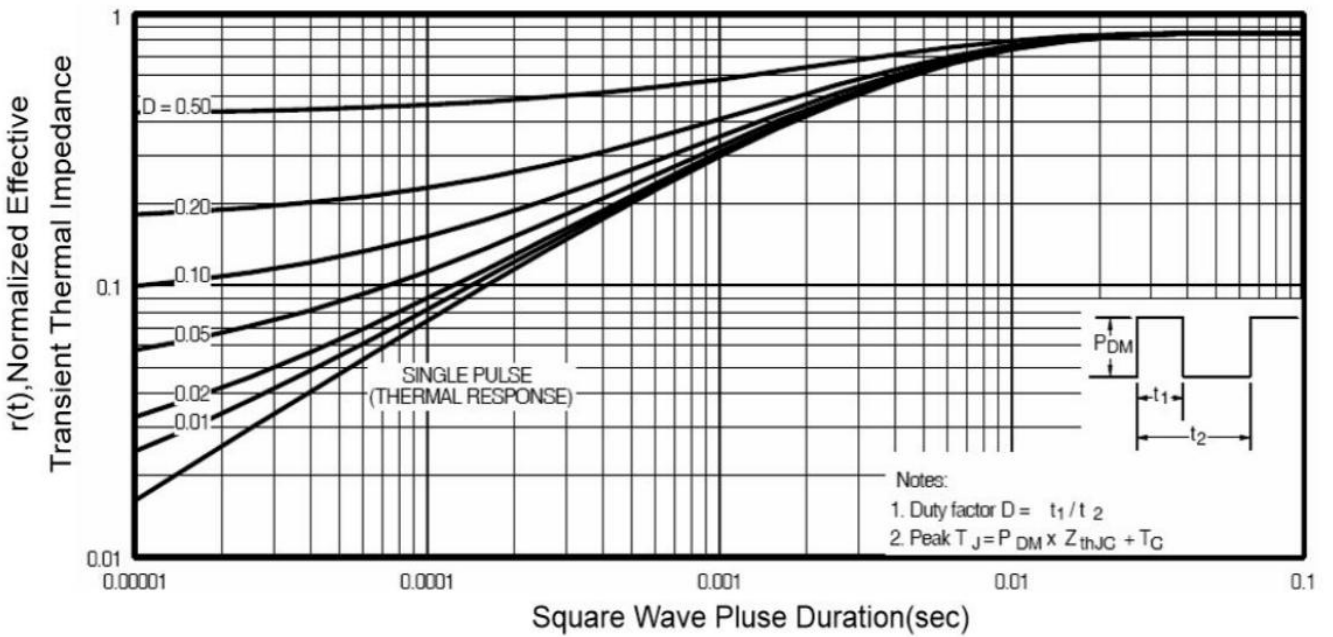


Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuits and Waveforms

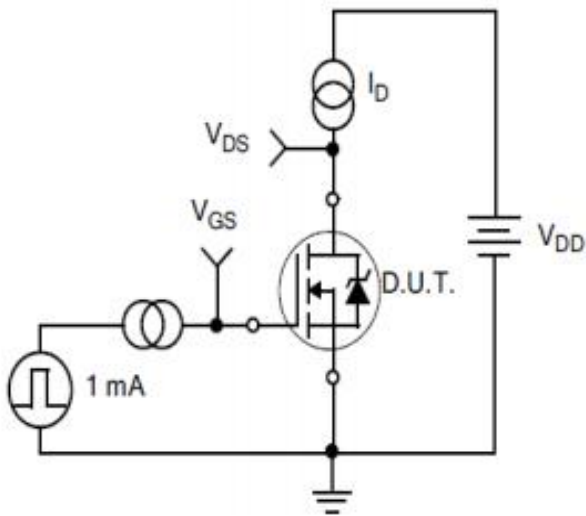


Figure A.
Gate Charge Test Circuit

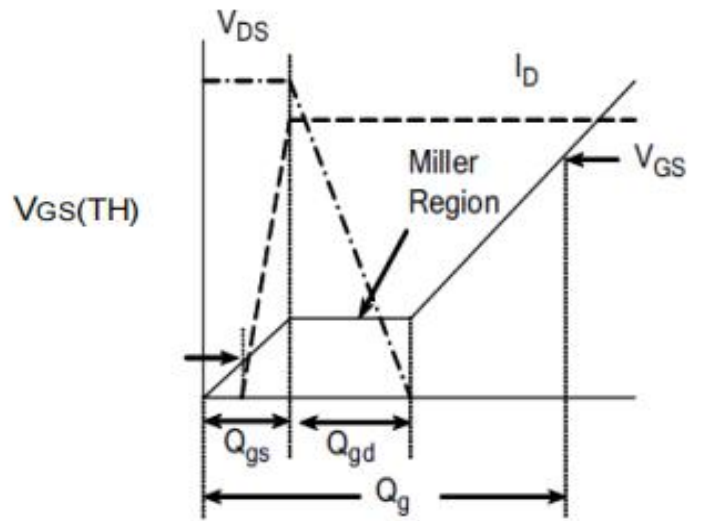


Figure B.
Gate Charge Waveform

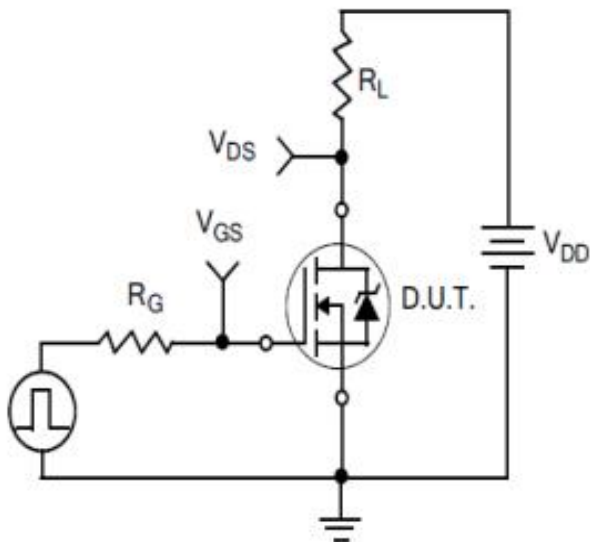


Figure C.
Resistive Switching Test Circuit

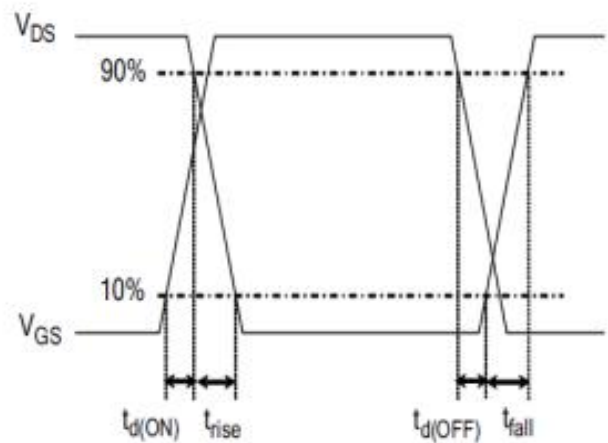


Figure D.
Resistive Switching Waveforms

Test Circuits and Waveforms

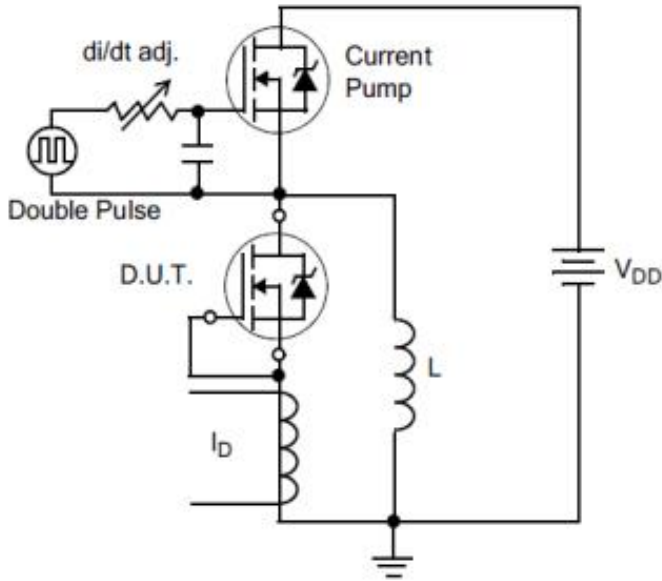


Figure E. Diode Reverse Recovery Test Circuit

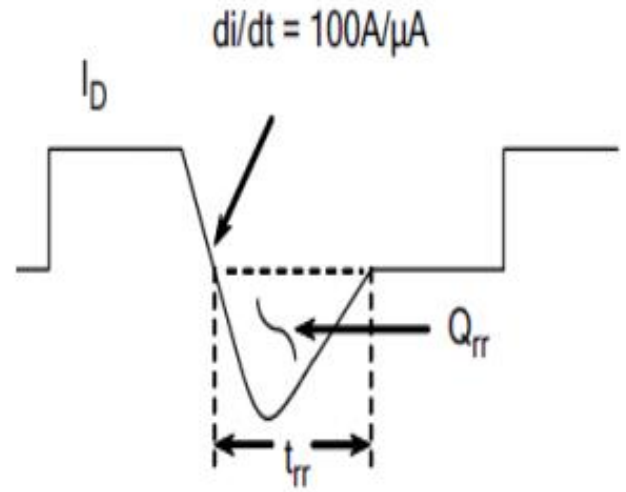


Figure F. Diode Reverse Recovery Waveform

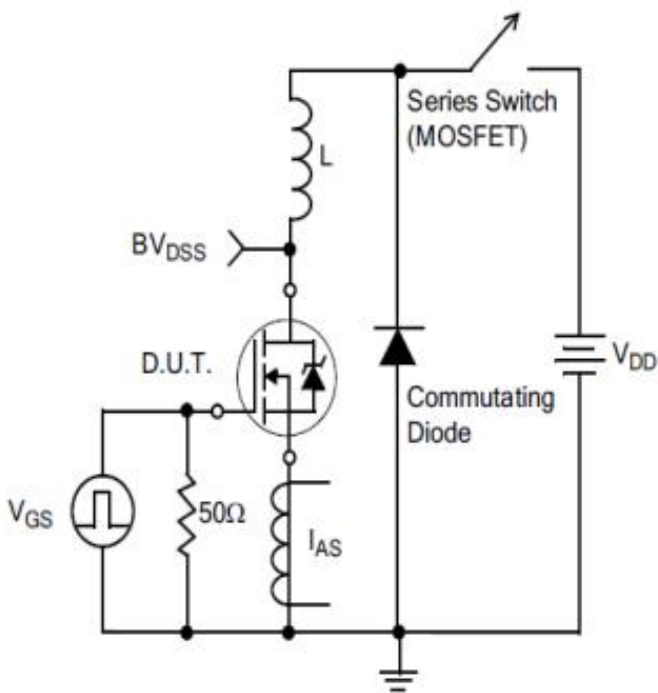
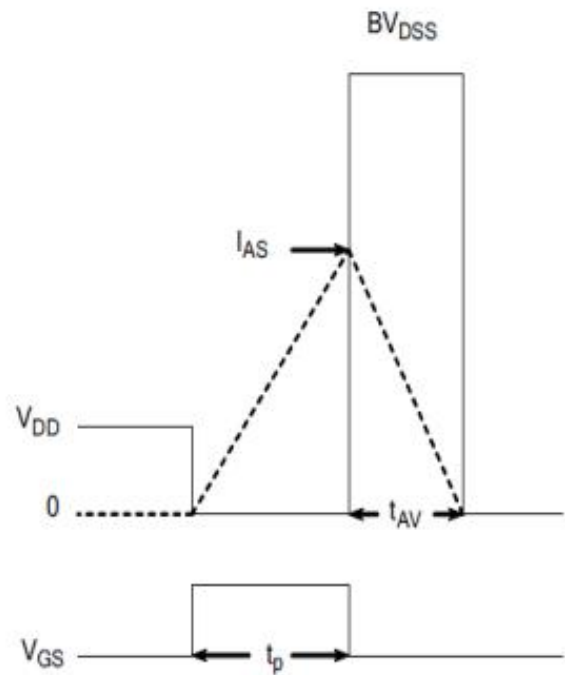


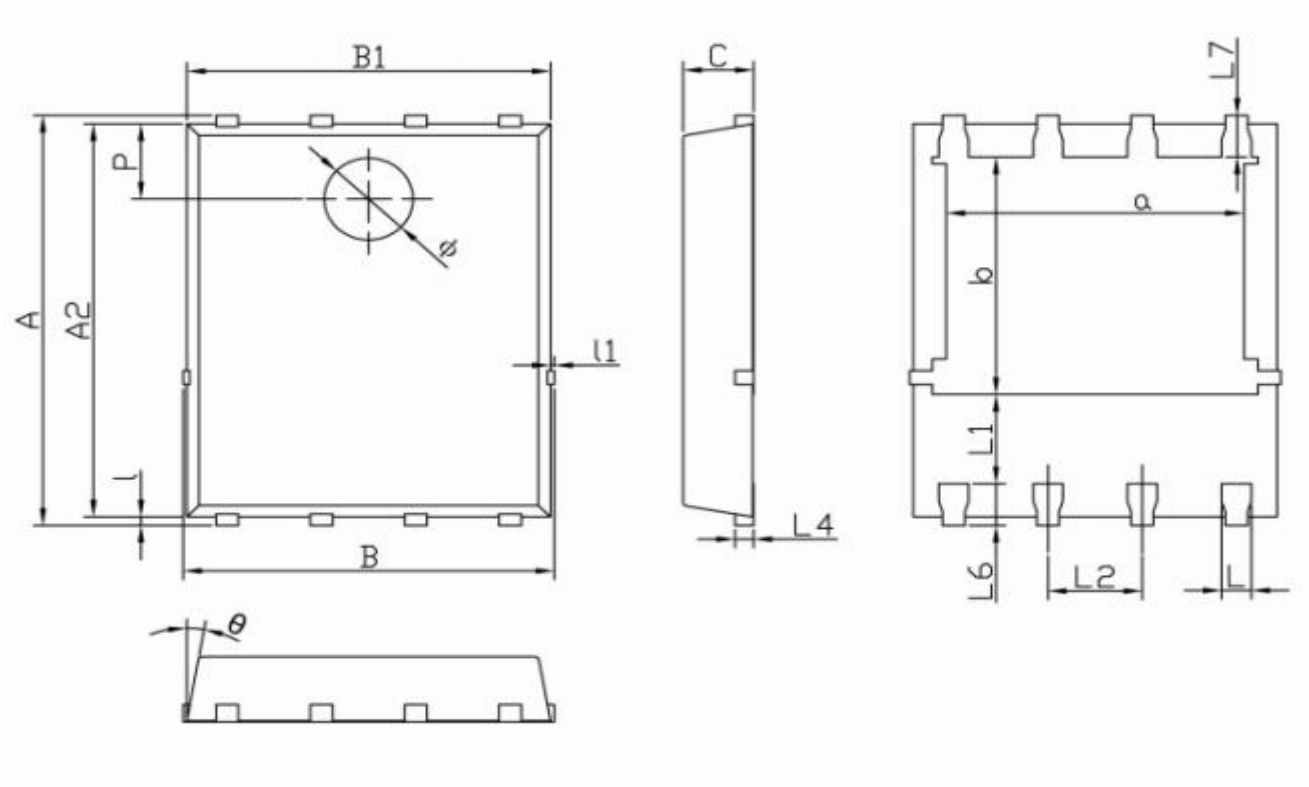
Figure G. Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Figure H. Unclamped Inductive Switching Waveforms

Package outline drawing(DFN5*6 Unit: mm)



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	5.90	6.00	6.10
a	3.91	4.01	4.11
A2	5.70	5.75	5.80
B	4.90	5.00	5.10
b	3.37	3.47	3.57
B1	4.80	4.90	5.00
C	0.90	0.95	1.00
L	0.35	0.40	0.45
l	0.06	0.13	0.20
L1	1.10	-	-
l1	-	-	0.10
L2	1.17	1.27	1.37
L4	0.21	0.26	0.34
L6	0.51	0.61	0.71
L7	0.51	0.61	0.71
P	1.00	1.10	1.20
θ	8°	10°	12°
ϕ	1.10	1.20	1.30

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