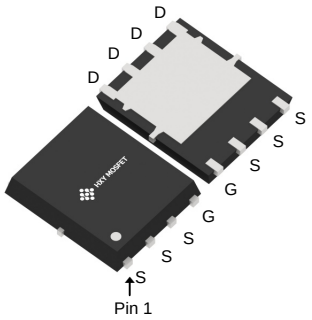
General Description

The BSC039N06NS use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable.

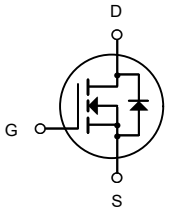


DFN5X6-8L
(DFN-8(5.1x5.9))

General Features

V_{DS} =60V I_D =125A

$R_{DS(ON)}$ < 2.9mΩ@ V_{GS}=10V



N-Channel MOSFET

Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
BSC039N06NS	DFN5X6-8L(DFN-8(5.1x5.9))	039N06NS XXXX	5000

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	125	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	101	A
I_{DM}	Pulsed Drain Current[2]	641	A
EAS	Single Pulse Avalanche Energy[3]	189	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	113	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JC}$	Thermal Resistance from Junction-to-Ambient[3]	1.11	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	39.4	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.2	1.6	2.2	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=20A	-	2.4	2.9	mΩ
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1.0MHz	-	4610	6915	pF
C_{oss}	Output Capacitance		-	2188	3282	pF
C_{rss}	Reverse Transfer Capacitance		-	66	132	pF
Q_g	Total Gate Charge	V_{DS}=30V, I_D=40A, V_{GS}=10V	-	74.37	111.56	nC
Q_{gs}	Gate-Source Charge		-	17.26	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	9.44	18.88	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, I_D=40A, R_G=2.7Ω,V_{GS}=10V	-	14.13	-	ns
t_r	Turn-on Rise Time		-	63.73	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	46.8	-	ns
t_f	Turn-off Fall Time		-	105.07	-	ns
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	125	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	641	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=40A	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	T_J=25℃, I_F=40A,dI/dt=100A/μs	-	52.78	105.56	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	56.31	112.62	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25℃, V_{DD}=30V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=12A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Characteristics

Fig 1: Output Characteristics

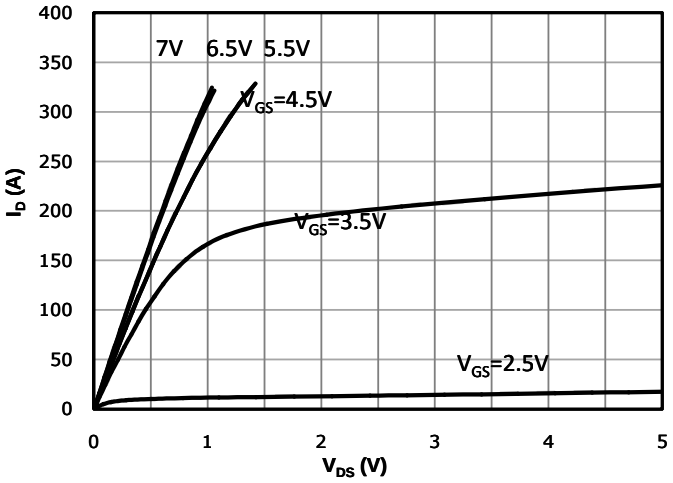


Fig 2: Transfer Characteristics

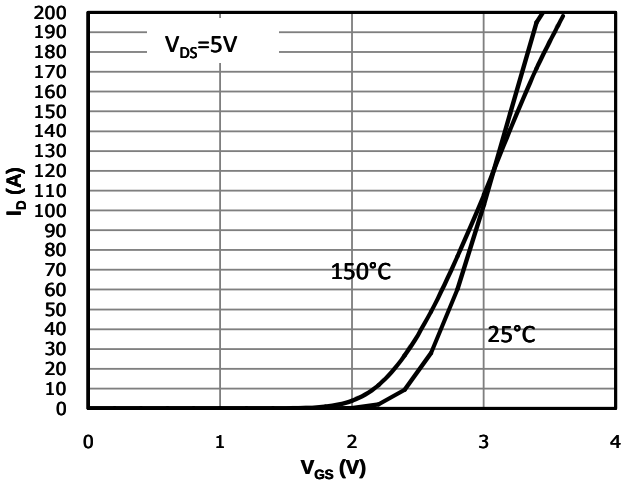


Fig 3: Rds(on) vs Drain Current and Gate Voltage

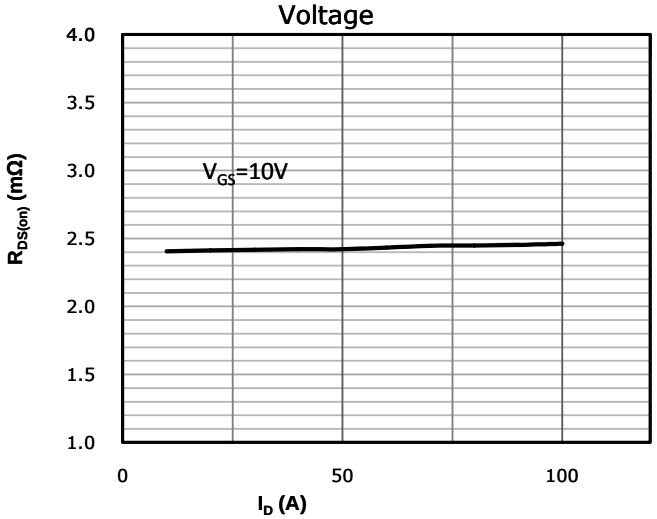


Fig 4: Rds(on) vs Gate Voltage

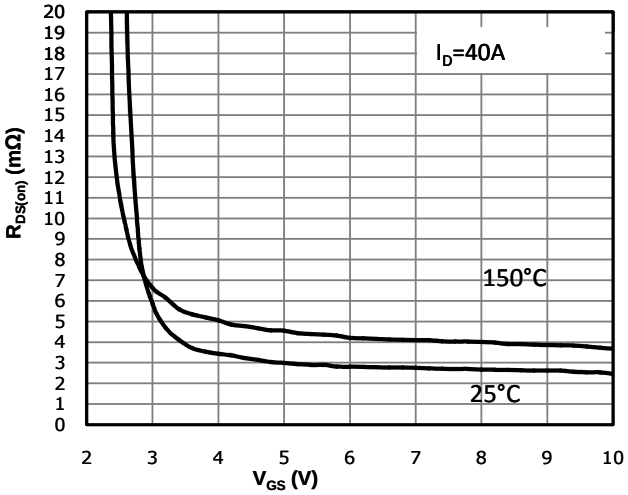


Fig 5: Rds(on) vs. Temperature

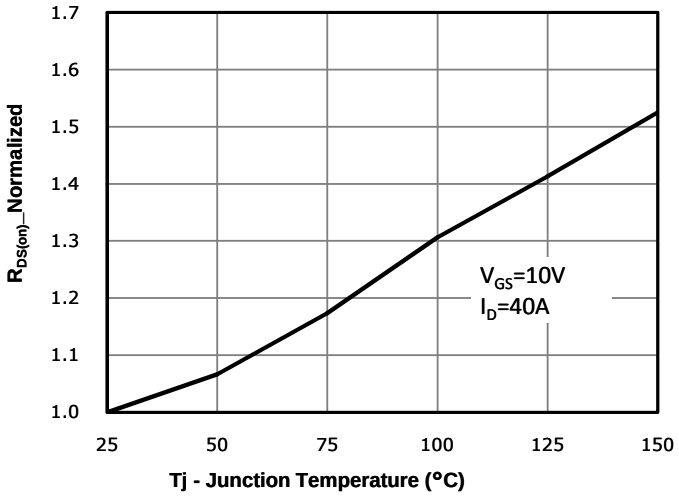


Fig 6: Capacitance Characteristics

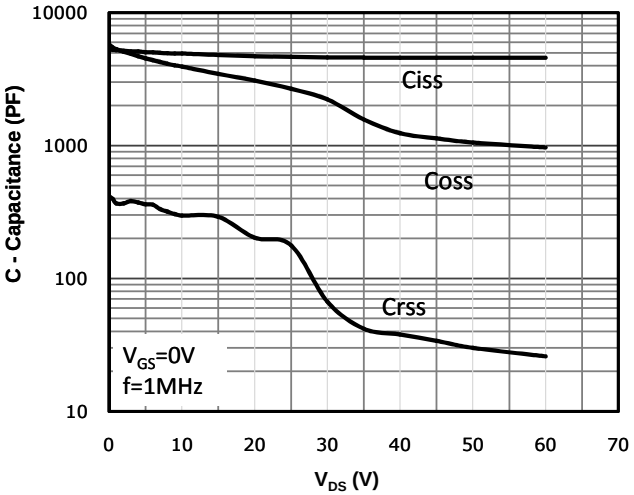


Fig 7: Gate ChargeCharacteristics

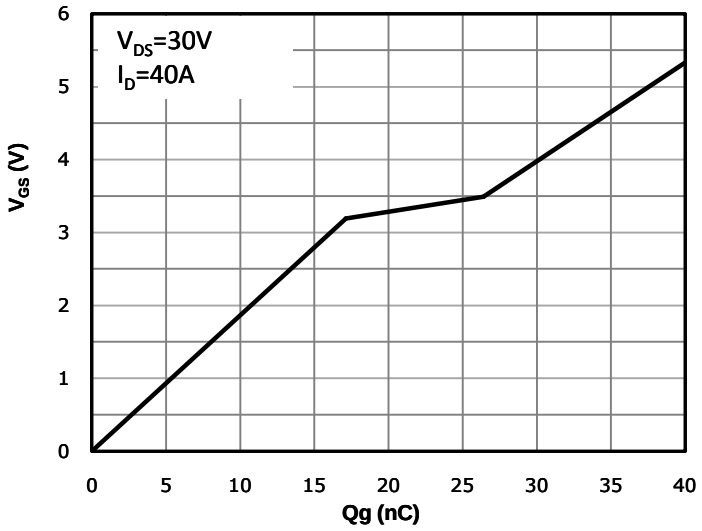


Fig 8: Body-diode Forward Characteristics

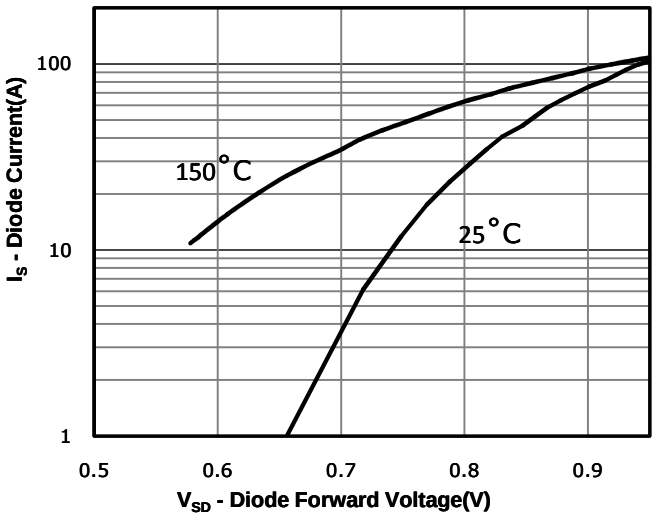


Fig 9: Power Dissipation

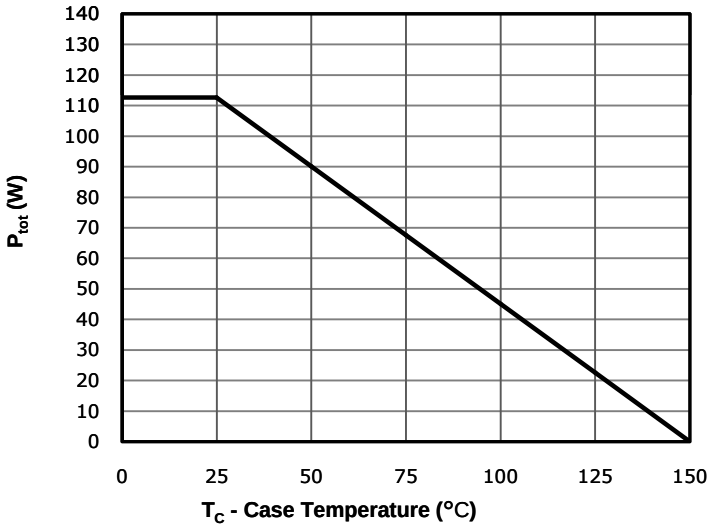


Fig 10: Drain Current Derating

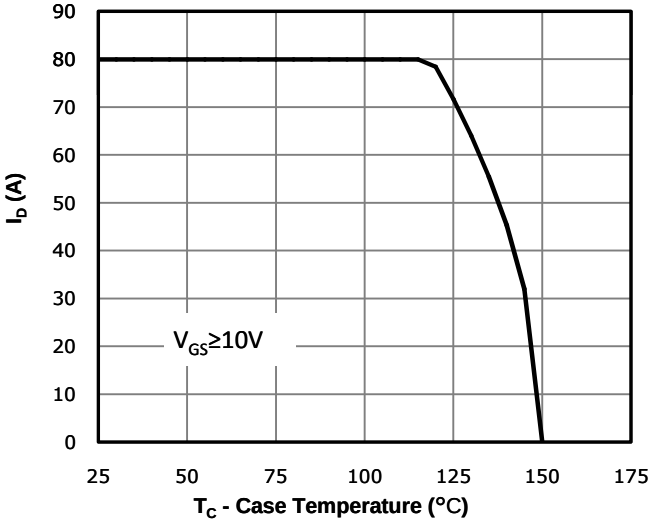


Fig 11: Safe Operating Area

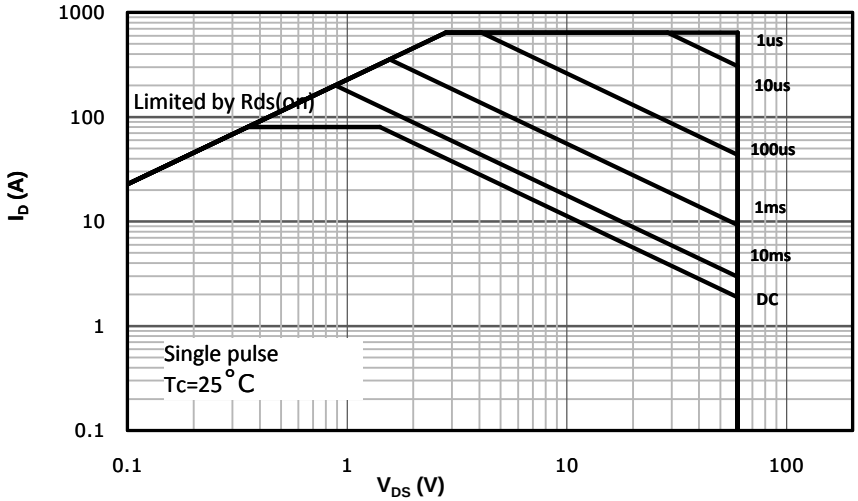
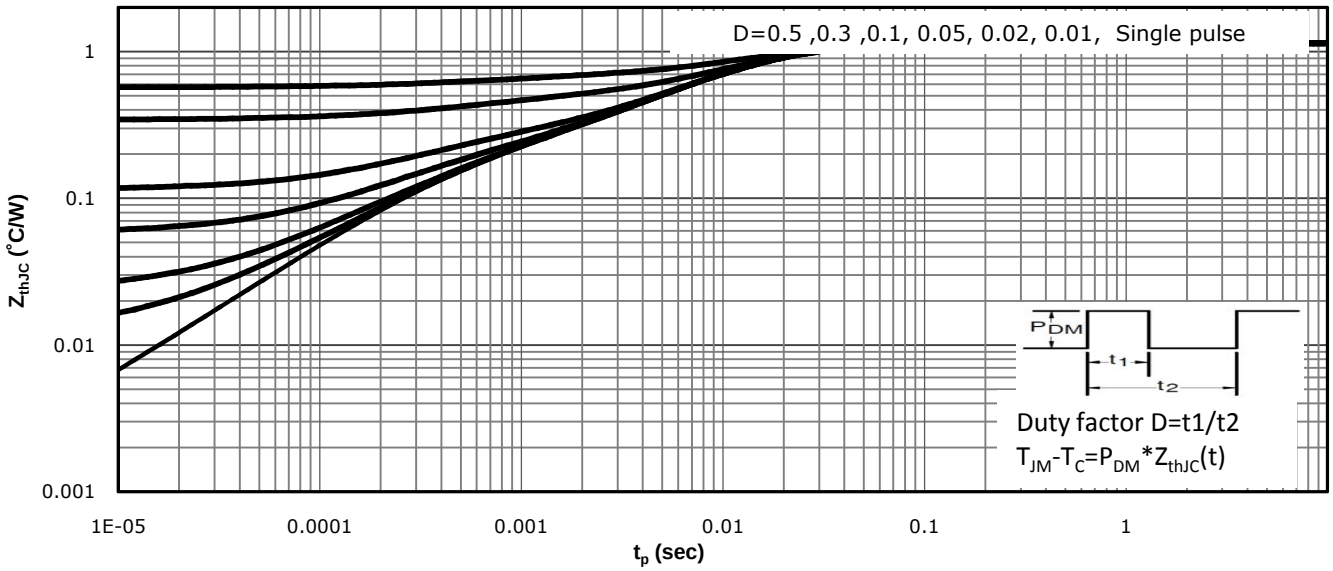
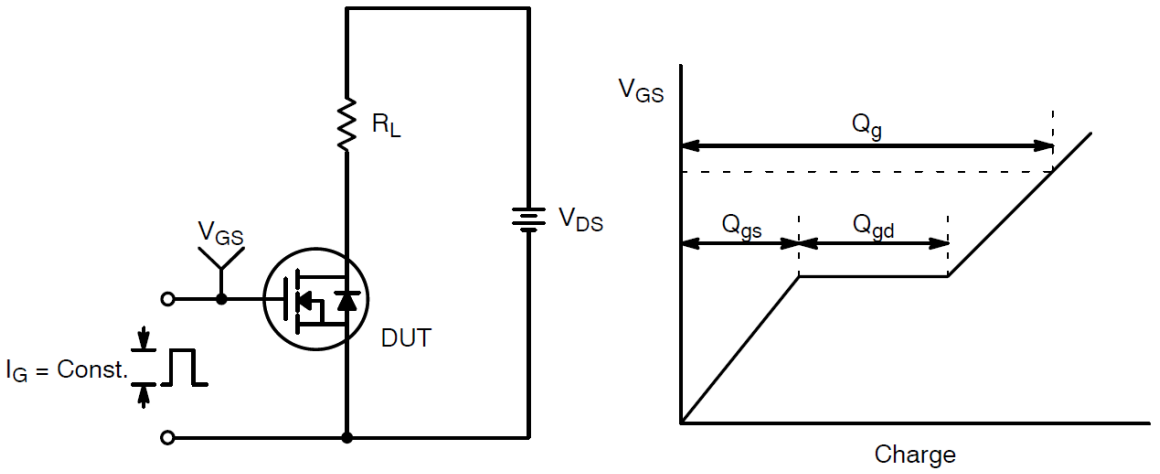


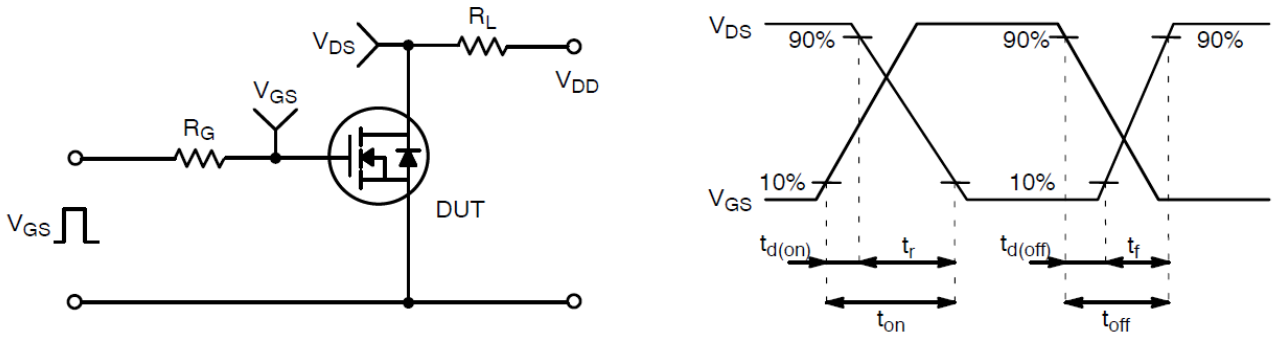
Fig 12: Max. Transient Thermal Impedance



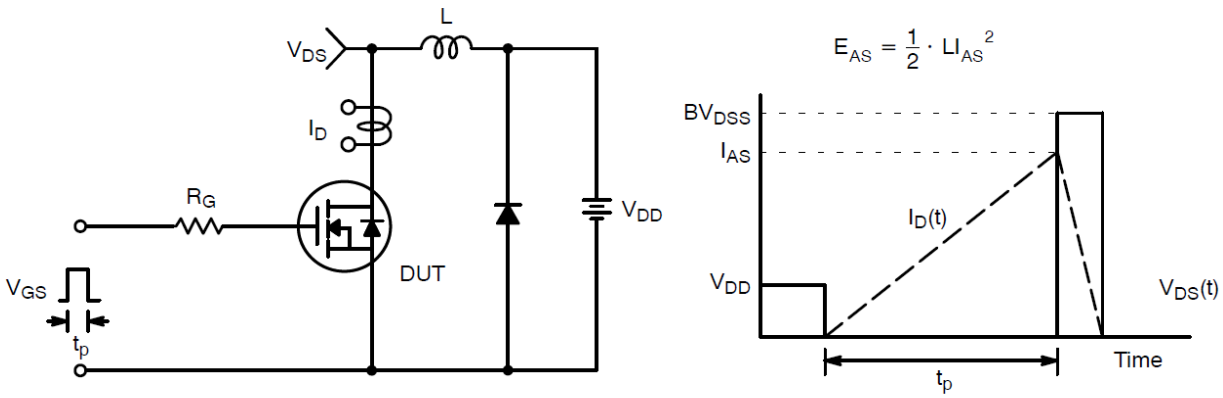
Test Circuit and Waveform



Gate Charge Test Circuit & Waveform

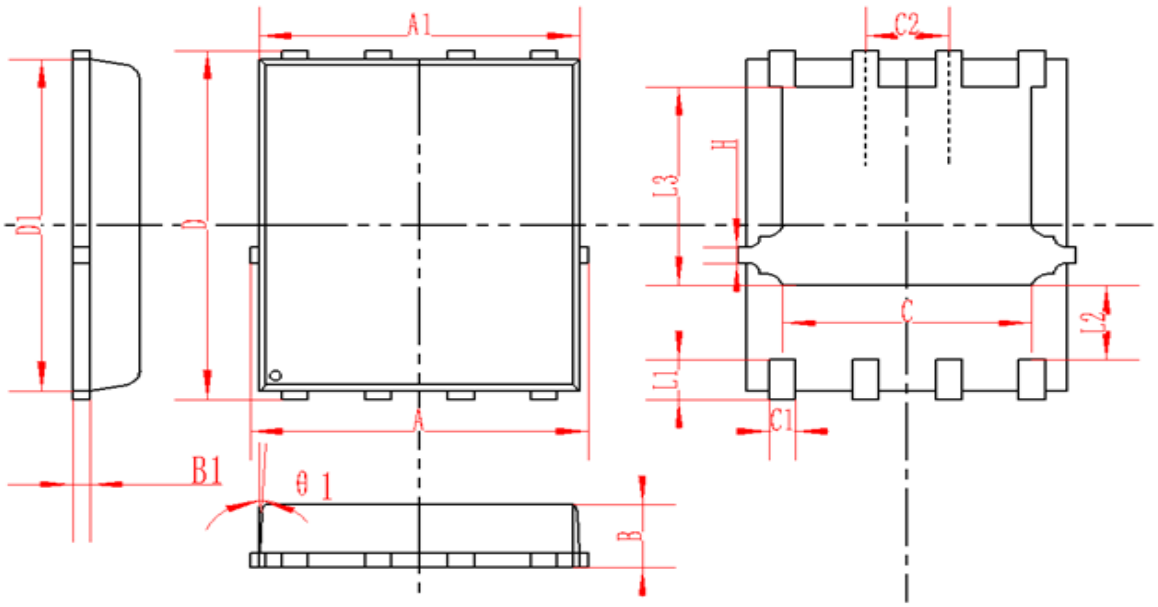


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

DFN5X6-8L(DFN-8(5.1x5.9)) Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010

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