

PDFN5060 Plastic-Encapsulate MOSFETS

Features

- $V_{DS}=40V$
- $I_D=50A$
- $R_{DS(on)}@V_{GS}=10V < 12m\Omega$
- $R_{DS(on)}@V_{GS}=4.5V < 18m\Omega$
- High density cell design for ultra low Rdson
- Fast Switching Speedze

Drain-source Voltage
40 V

Drain Current
50 Ampere

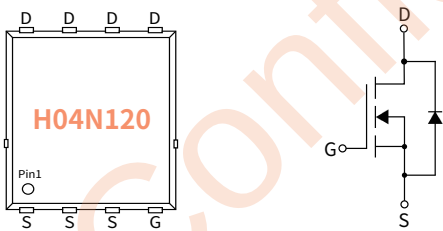
Applications

- DC-DC Converters
- Motor Control

Mechanical Data

- Case: PDFN5060
Molding compound meets UL 94V-0 flammability rating, RoHS-compliant,halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750,Method 2026

Function Diagram



Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
PDFN5060	R3	0.09	5000	10000	80000	13"

Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	V_{DS}	V	40
Gate-source Voltage	V_{GS}	V	± 20
Drain Current	I_D	A	50
Pulsed Drain Current ⁽¹⁾	I_{DM}	A	200
Total Power Dissipation	P_D	W	35
Single pulse avalanche energy ⁽²⁾	EAS	mJ	24
Junction temperature	T_J	°C	-55 ~+150
Storage temperature	T_{stg}	°C	-55 ~+150
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	°C / W	3.6

HD504N120S

N-CHANNEL MOSFET

● Static Parameter Characteristics (Tj=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	V	40	—	—
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	μA	—	—	1.0
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	nA	—	—	± 100
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	V	1.0	1.5	2.5
Static Drain-Source On-Resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS}=10V, I_D=12A$	m Ω	—	8	12
		$V_{GS}=4.5V, I_D=6A$		—	11	18

● Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, f=1MHz$	pF	—	2050	—
Output Capacitance	C_{oss}			—	210	—
Reverse Transfer Capacitance	C_{rss}			—	158	—

● Switching Parameters

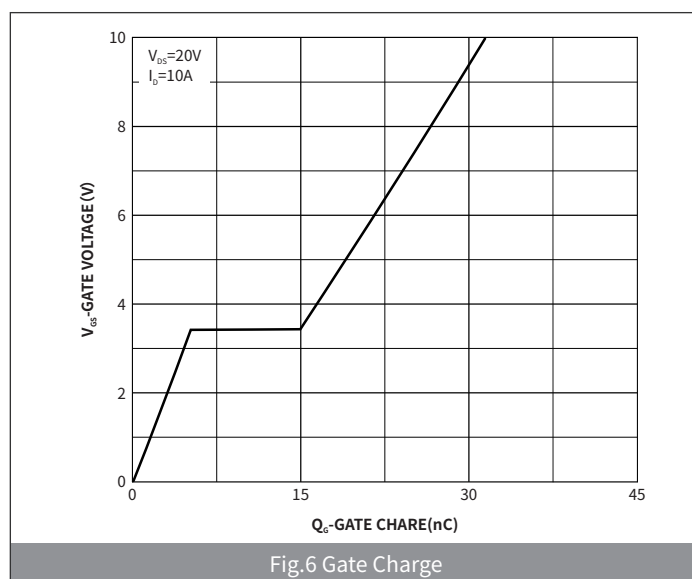
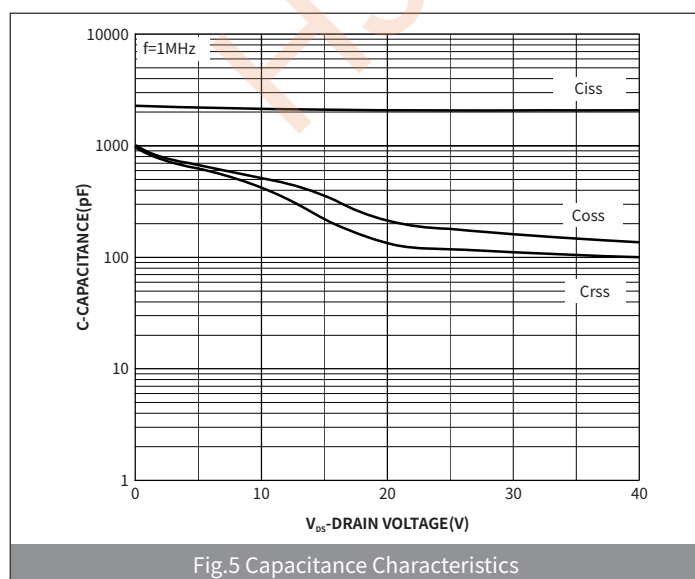
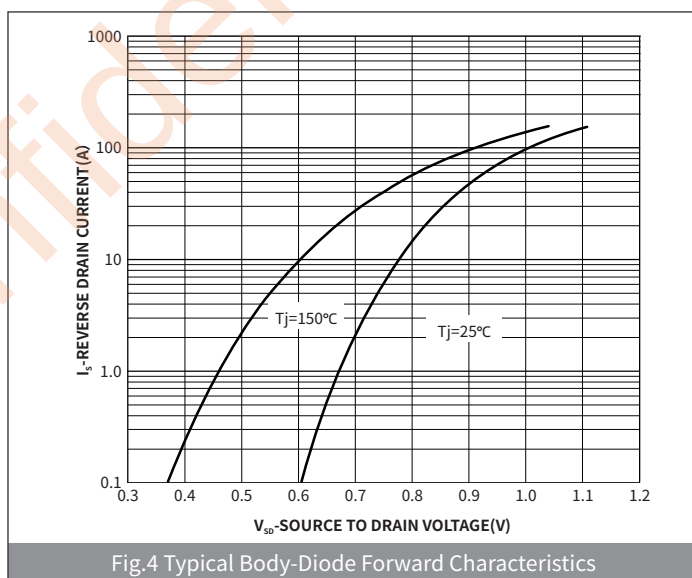
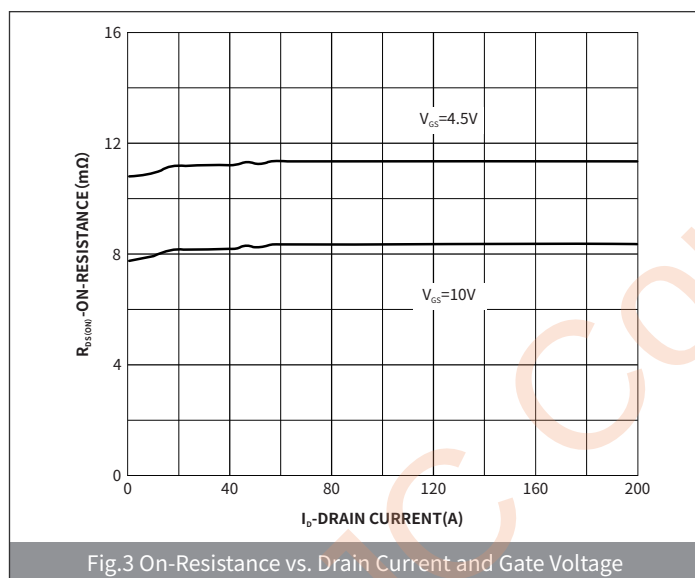
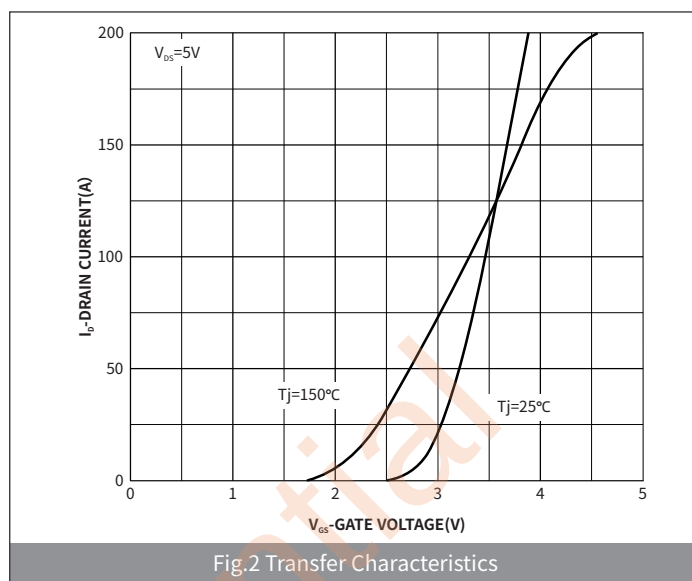
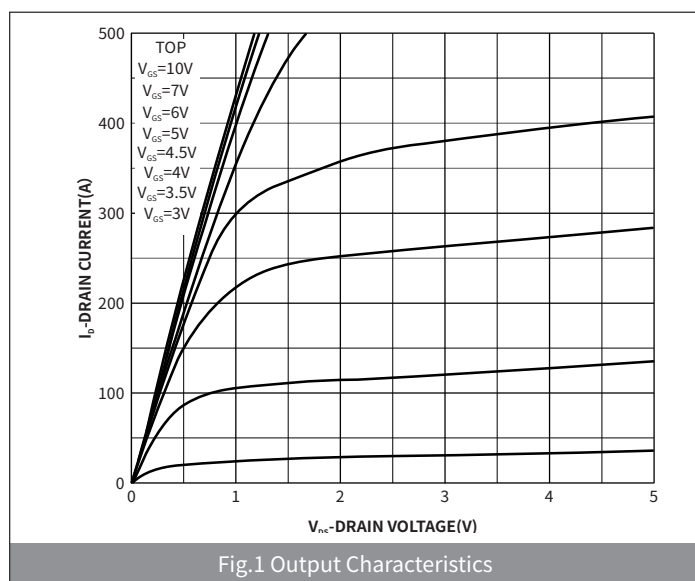
PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=20V, I_D=10A, R_{GEN}=3\Omega$	nS	—	6	—
Turn-on Rise Time	t_r		nS	—	16	—
Turn-off Delay Time	$t_{D(off)}$		nS	—	31	—
Turn-off fall Time	t_f		nS	—	15	—
Total Gate Charge	Q_g	$V_{DS}=20V, I_D=10A, V_{GS}=10V$	nC	—	31	—
Gate-Source Charge	Q_{gs}		nC	—	4	—
Gate-Drain Charge	Q_{gd}		nC	—	9	—

● Drian-Source Diode Characteristics

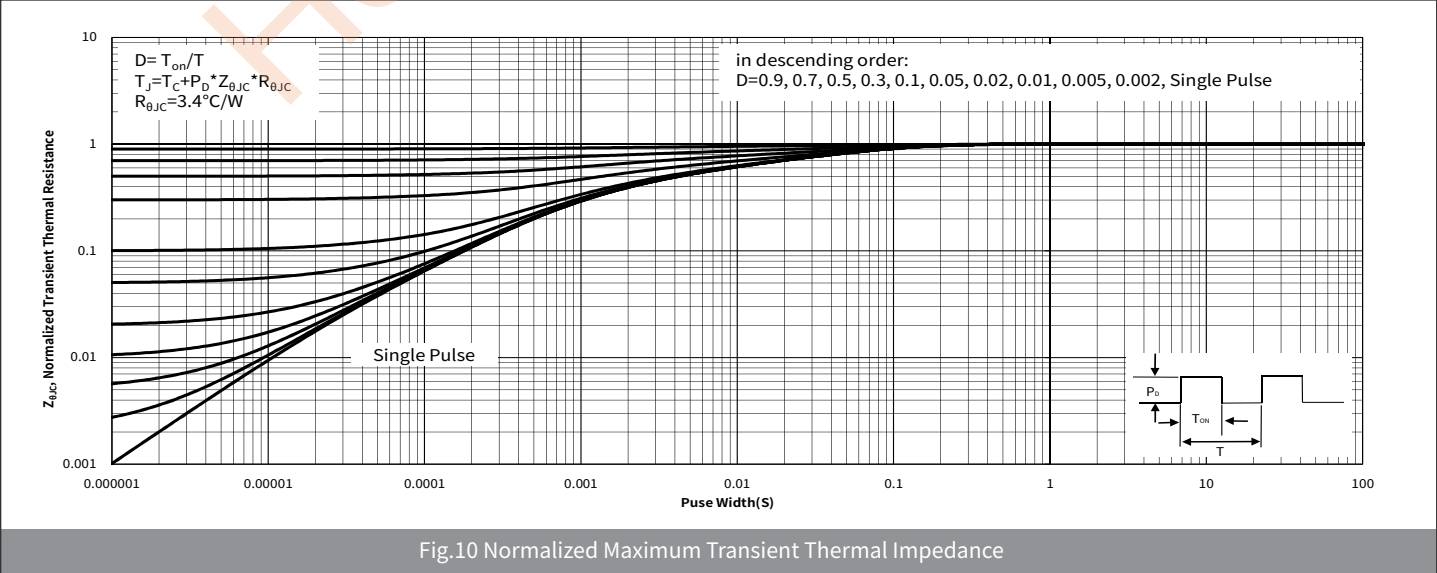
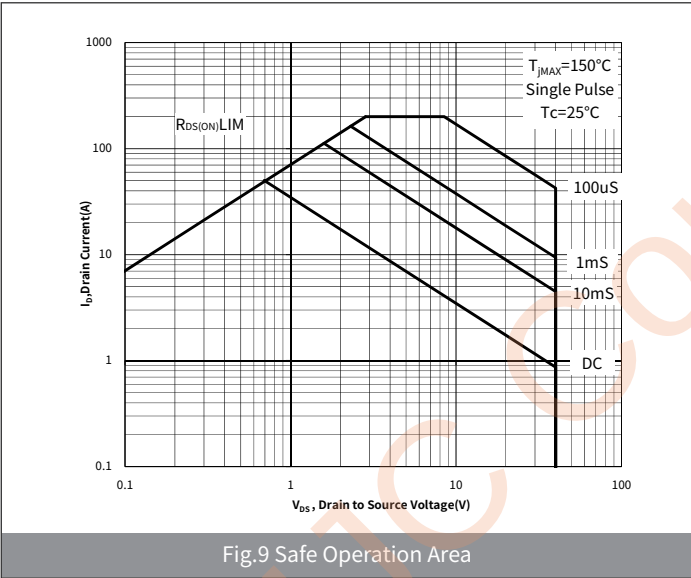
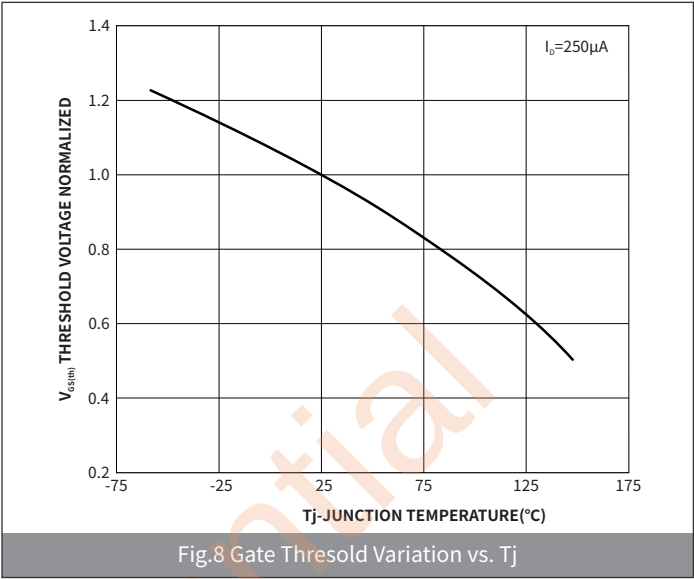
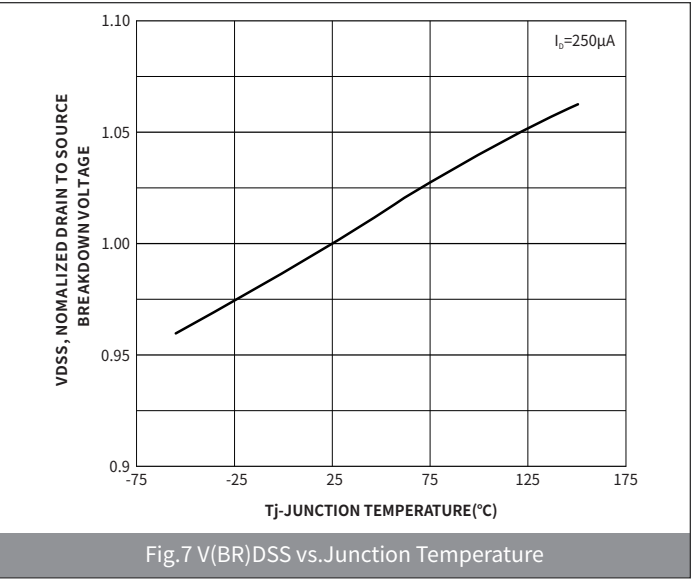
PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	V	—	—	1.2
Maximum Body-Diode Continuous Current	I_S	—	A	—	—	50
Reverse Recovery time	t_{rr}	$I_{SD}=50A, di/dt=100A/us$	nS	—	31	—
Reverse Recovery Charge	Q_{rr}		nC	—	23	—

Note :
(1)Repetitive Rating: Pulse width limited by maximum junction temperature.
(2)EAS condition : Tj=25°C ,VDD=20V,VG=10V,L=0.1mH,IAS=22A,Rg=25Ω.
(3)Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

● **Ratings And Characteristics Curves** ($T_a=25^\circ\text{C}$ Unless otherwise specified)



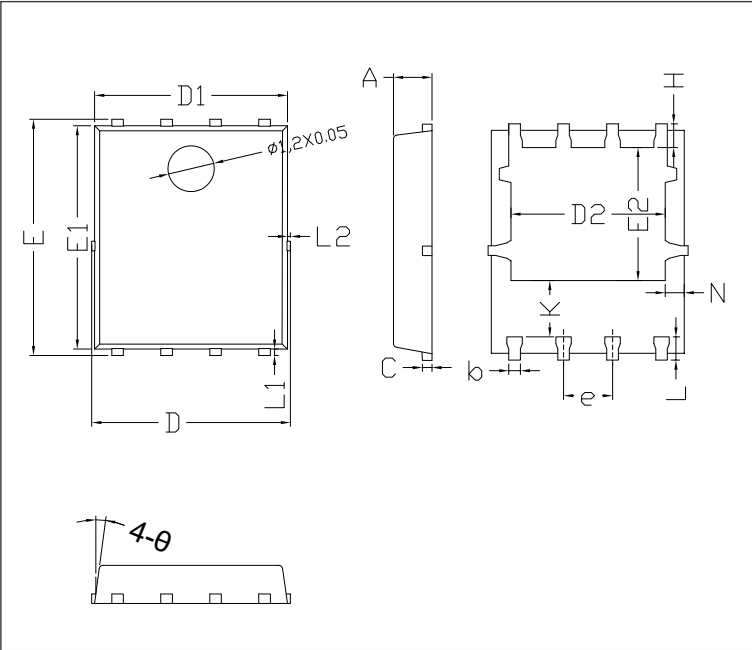
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



HD504N120S

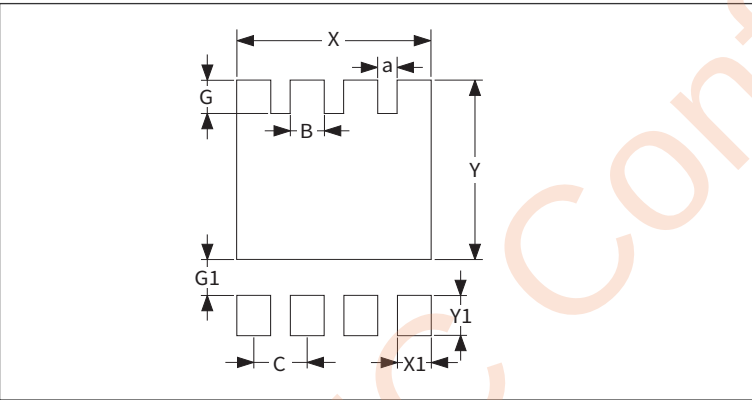
N-CHANNEL MOSFET

Package Outline Dimensions (PDFN5060)



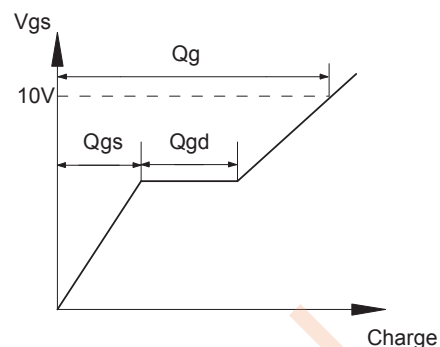
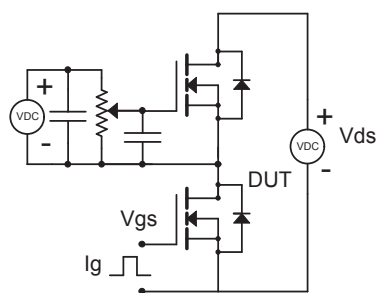
Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.05	0.035	0.041
b	0.35	0.45	0.014	0.018
C	0.20	0.30	0.008	0.012
D	4.944	5.09	0.195	0.201
D1	4.82	4.97	0.190	0.196
D2	3.90	4.20	0.154	0.165
e	1.17	1.37	0.046	0.054
E	5.97	6.13	0.236	0.241
E1	5.67	5.82	0.223	0.229
E2	3.35	3.65	0.132	0.144
H	0.57	0.72	0.023	0.029
K	1.19	1.39	0.047	0.056
L	0.56	0.71	0.022	0.028
L1	0.06	0.20	0.002	0.008
L2	-	0.12	-	0.005
N	0.40	0.60	0.016	0.024
θ	9°	13°	9°	13°

Suggested Pad Layout

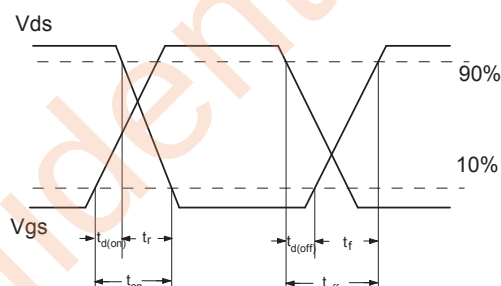
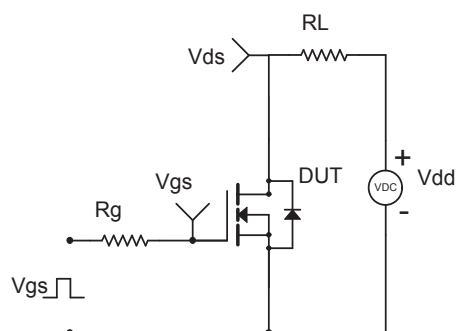


Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
a	0.46	0.48	0.0184	0.0192
B	0.70	0.90	0.028	0.036
C	1.17	1.37	0.0468	0.0548
G	0.75	0.95	0.03	0.038
G1	0.80	1.00	0.032	0.04
X	4.50	4.70	0.180	0.188
X1	0.70	0.90	0.028	0.036
Y	4.40	4.60	0.176	0.184
Y1	0.90	1.10	0.036	0.044

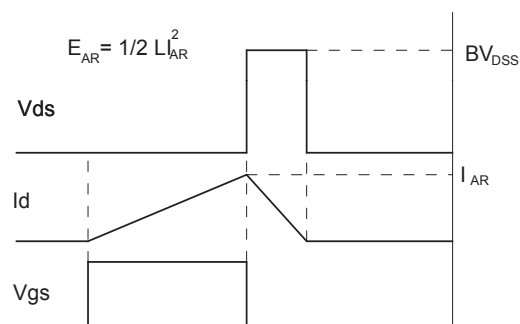
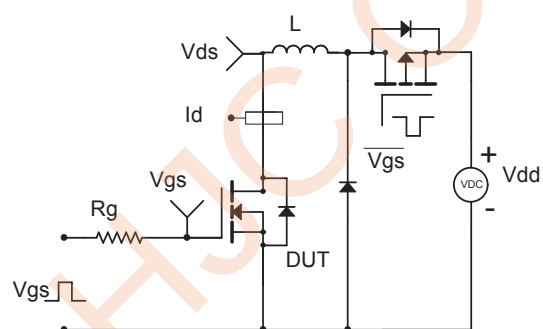
1. Gate Charge Test Circuit & Waveforms



2. Resistive Switching Test Circuit & Waveforms



3. Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



4. Diode Recovery Test Circuit & Waveforms

