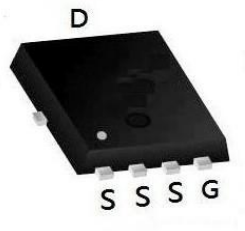
QN6102M6N

N-Ch 60V Fast Switching MOSFETs

Product Summary

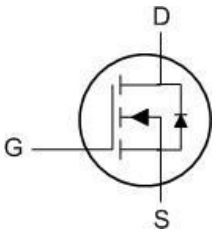
BVDSS	RDSON	ID
60V	2.4mΩ	125A



PDFN5060-8L

Features

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



Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		60	V
I_D	Continuous Drain Current	T_C = 25 °C	125	A
	Continuous Drain Current	T_C = 100 °C	101	A
I_{DM}[a1]	Pulsed Drain Current		641	A
E_{AS}[a2]	Single pulse avalanche energy		189	mJ
V_{GS}	Gate-to-Source Voltage		±20	V
P_D	Power Dissipation		113	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		150, –55 to 150	℃
T_L	Maximum Temperature for Soldering		260	℃

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.11	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	39.4	℃/W

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Electrical Characteristics (Tc= 25℃ unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	60	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} = 60V, V_{GS}= 0V	--	--	1	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D = 250μA	1.2	--	2.2	V
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V, I_D=20A	--	2.4	2.9	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 30V f = 1.0MHz	--	4610	6915	pF
C_{oss}	Output Capacitance		--	2188	3282	
C_{rss}	Reverse Transfer Capacitance		--	66	132	
R_g	Gate resistance		--	0.93	18.8	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =40A V_{DS} = 30V V_{GS} = 10V R_G = 2.7Ω	--	14.13	--	ns
tr	Rise Time		--	63.73	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	46.8	--	
t_f	Fall Time		--	105.07	--	
Q_g	Total Gate Charge	V_{GS} =10V V_{DS} = 30V I_D =40A	--	74.37	111.56	nC
Q_{gs}	Gate Source Charge		--	17.26	--	
Q_{gd}	Gate Drain Charge		--	9.44	18.88	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	T_C =25 °C	--	--	125	A
V_{SD}	Diode Forward Voltage	I_S=40A, V_{GS}=0V	--	0.83	1.2	V
t_{rr}	Reverse Recovery time	I_S=40A, dI/dt=300A/μs	--	52.78	105.56	ns
Q_{rr}	Reverse Recovery Charge		--	56.31	112.62	nC

[a1]: Repetitive rating; pulse width limited by maximum junction temperature [a2]: VDD=30V, L=0.3mH, Rg=25Ω, Starting TJ=25 °C

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TypicalTPerformanceTCharacteristics

Fig 1: Output Characteristics

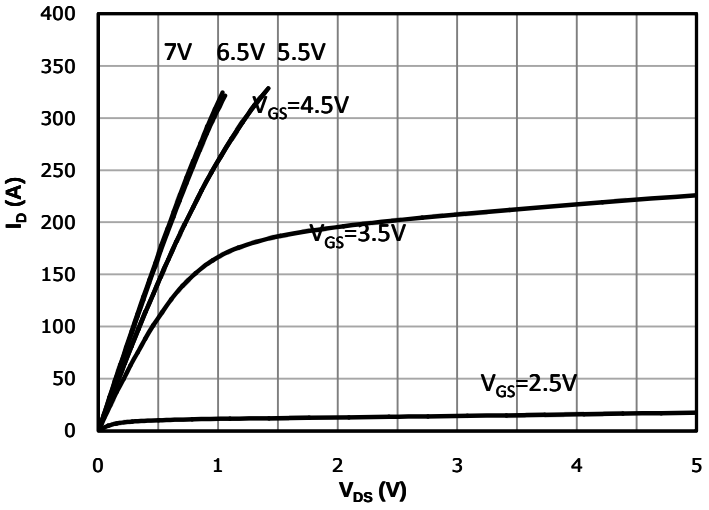

Fig 2: Transfer Characteristics

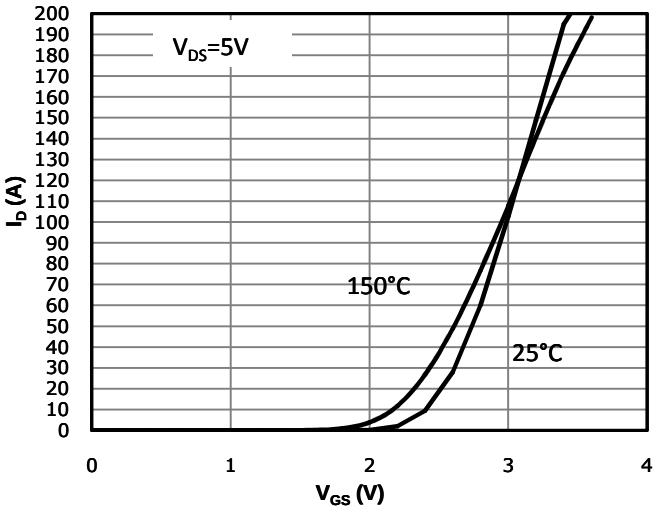

Fig 3: Rds(on) vs Drain Current and Gate Voltage

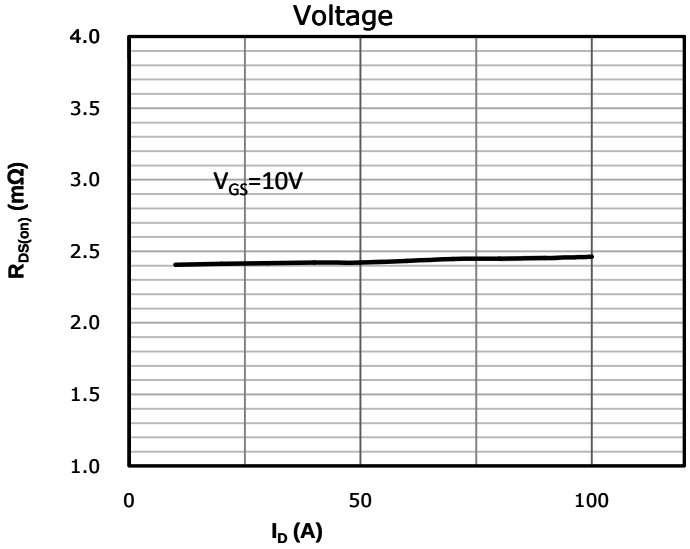

Fig 4: Rds(on) vs Gate Voltage

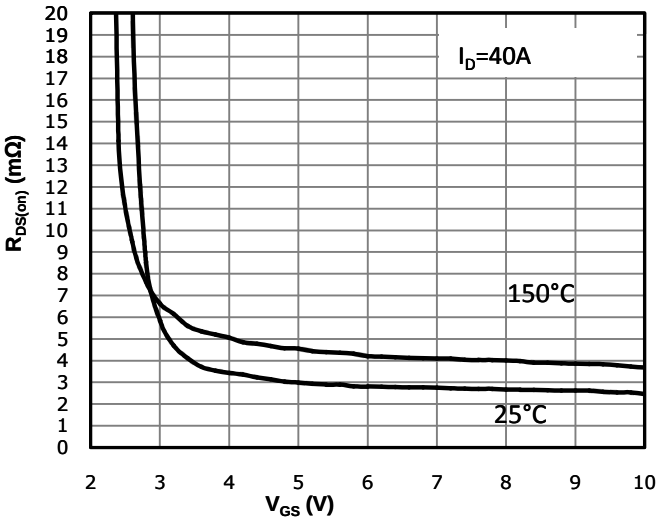

Fig 5: Rds(on) vs. Temperature

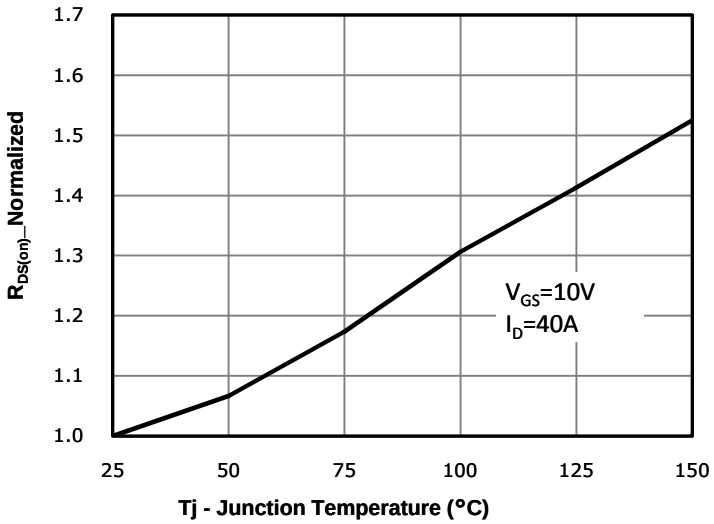

Fig 6: Capacitance Characteristics

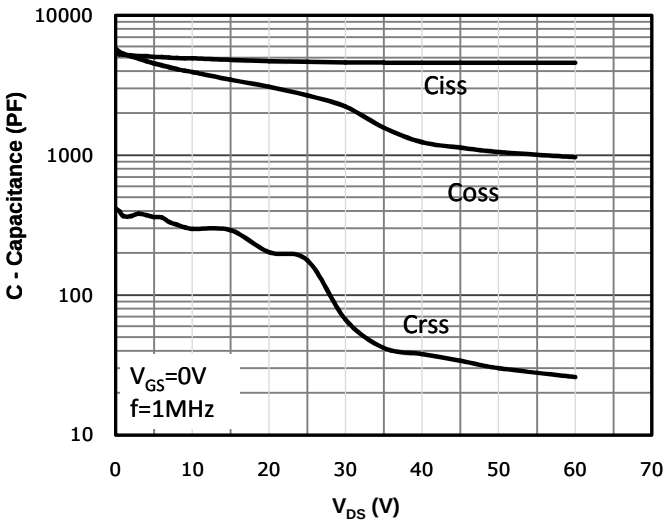

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Fig 7: Gate ChargeCharacteristics

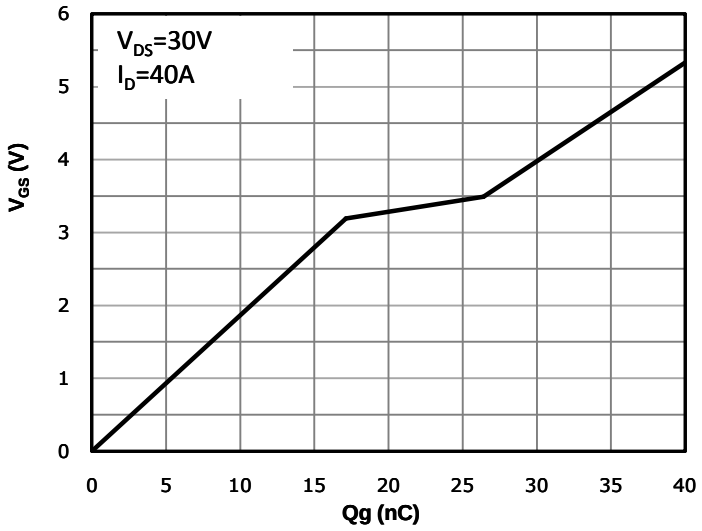

Fig 8: Body-diode Forward Characteristics

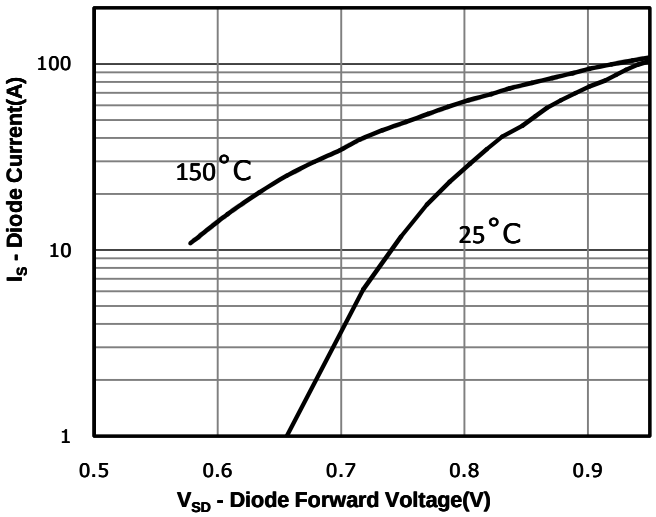

Fig 9: Power Dissipation

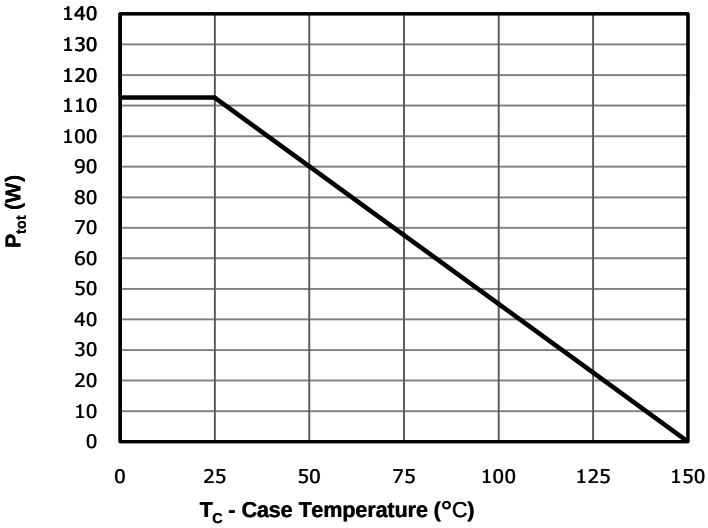

Fig 10: Drain Current Derating

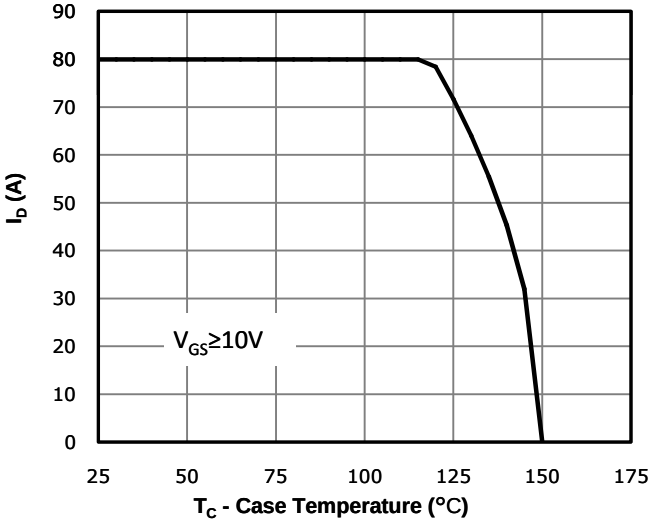

Fig 11: Safe Operating Area

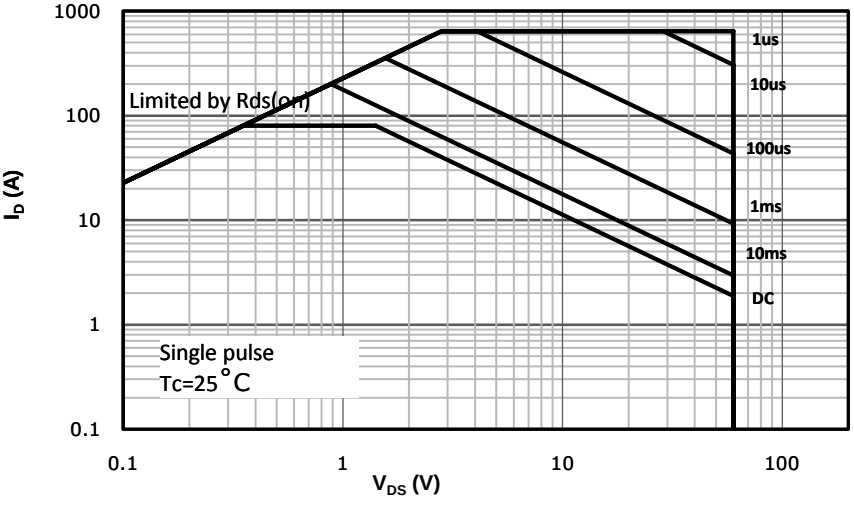

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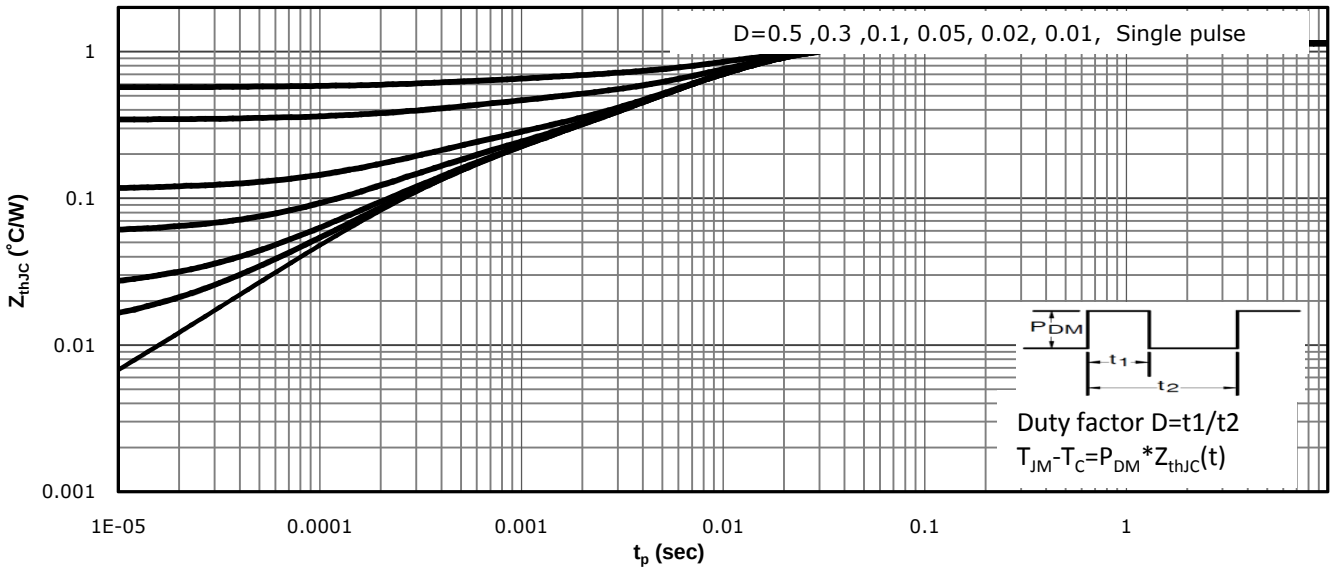
Fig 12: Max. Transient Thermal Impedance



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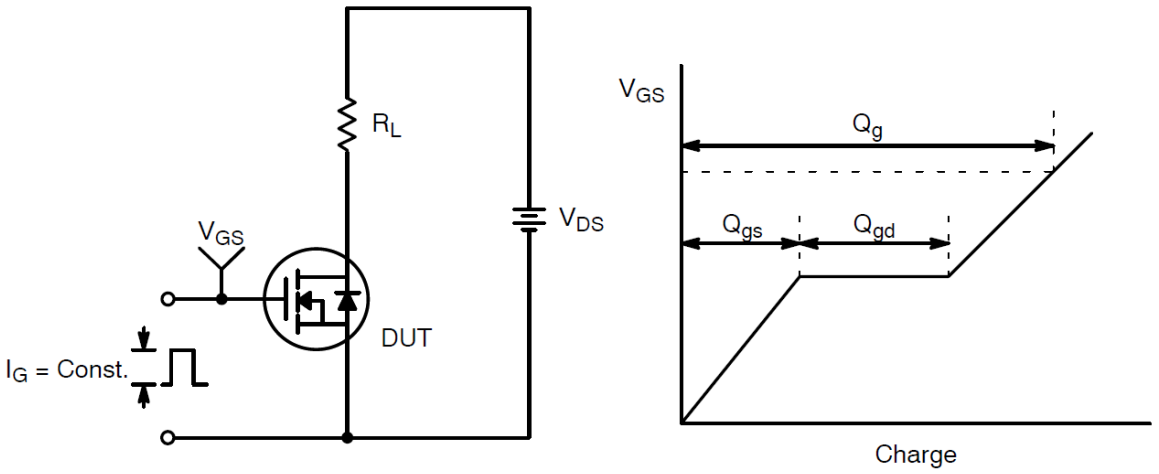
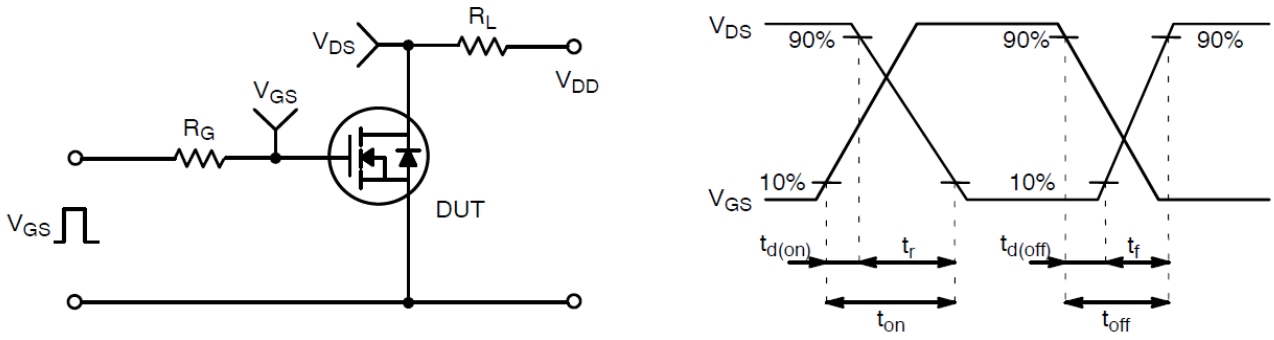
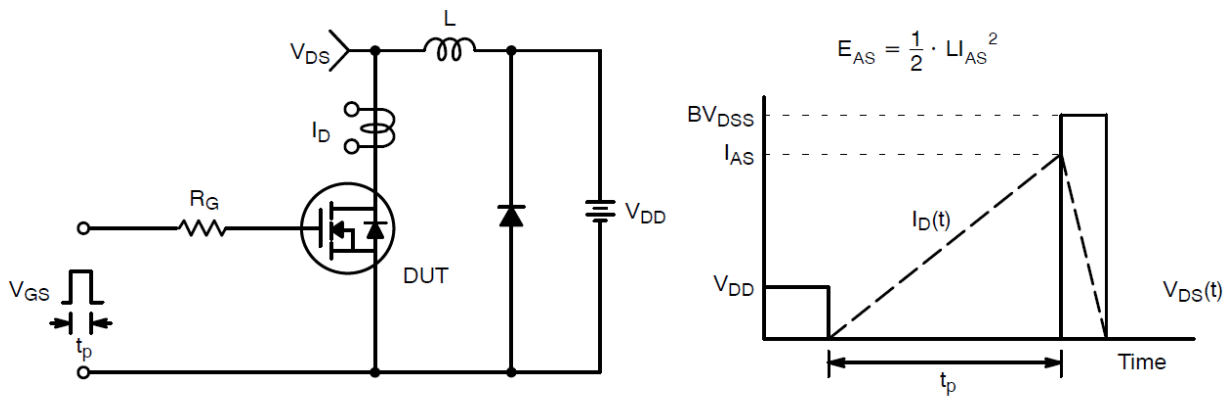
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

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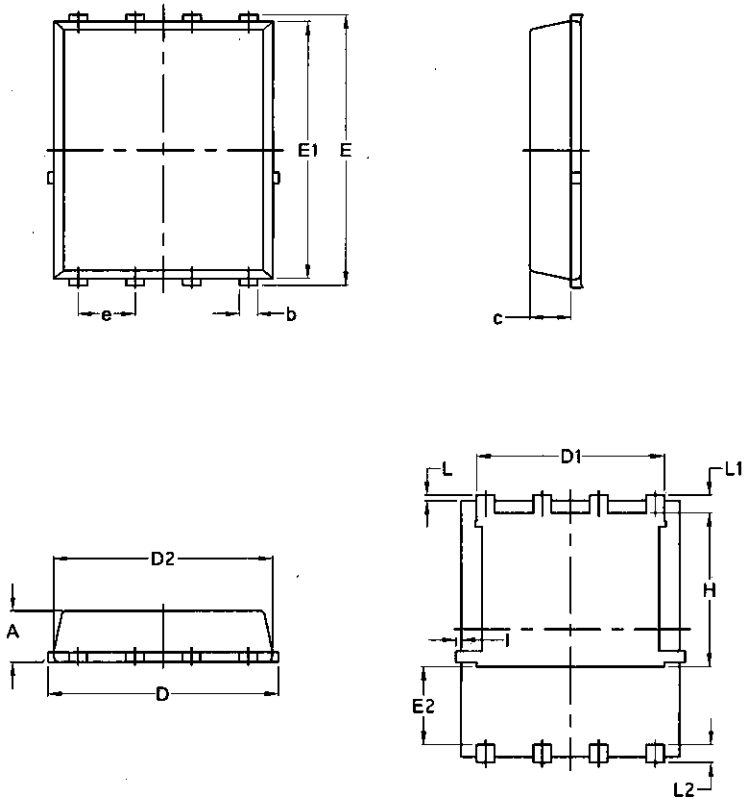
Package Mechanical Data-PDFN5060-8L-Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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