

Features

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

Bvdss

60V

Rdson

2.4mΩ

ID

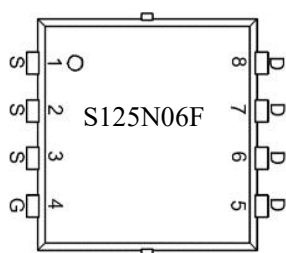
125A

Application

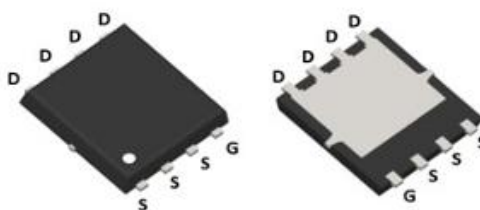
- DC-DC converter
- Power management functions
- Synchronous-rectification applications

RoHS

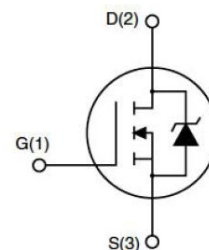
Package



Marking and pin assignment



PDFN5*6 top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
125N06F	S125N06F	PDFN5*6	5000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	60	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current (T _C = 25°C)	I _D	125	A
Continuous Drain Current (T _C = 100°C)	I _D	101	A
Pulsed Drain Current (1)	I _{DM}	641	A
Single Pulsed Avalanche Energy (2)	E _{AS}	189	mJ
Power Dissipation	P _d	113	W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55 ~ 150	°C
Maximum Temperature for Soldering	TL	260	°C



Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	--	1.11	$^{\circ}\text{C/W}$
Thermal Resistance,Junction-to-Ambient	$R_{\theta JA}$	--	39.4	$^{\circ}\text{C/W}$

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS125N06F	PDFN5*6	4	5,6,7,8	1,2,3	Tape Reel

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{DSS}	V _{GS} =0V I _D =250μA	60	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V,V _{GS} =0V	-	-	1	μA
Gate- Source Forward Leakage	I _{GSS} (F)	V _{GS} =+20V	-	-	100	nA
Gate- Source Reverse Leakage	I _{GSS} (R)	V _{GS} =-20V	-	-	-100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.2	-	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	2.4	2.9	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =30V,V _{GS} =0V, F=1.0MHz	-	4610	6915	pF
Output Capacitance	C _{oss}		-	2188	3282	pF
Reverse Transfer Capacitance	C _{rss}		-	66	132	pF
Gate resistance	R _g		-	0.93	18.8	Ω
Resistive Switching Characteristics						
Turn-on Delay Time	T _{d(on)}	V _{DS} =30V,I _D =40A V _{GS} =10V,R _{GEN} =2.7Ω	-	14.13	-	nS
Turn-on Rise Time	tr		-	63.73	-	nS
Turn-Off Delay Time	T _{d(off)}		-	46.8	-	nS
Turn-Off Fall Time	T _f		-	105.07	-	nS
Total Gate Charge	Q _g	V _{DS} =30V,I _D =40A, V _{GS} =10V	-	74.37	111.56	nC
Gate-Source Charge	Q _{gs}		-	17.26	-	nC
Gate-Drain Charge	Q _{gd}		-	9.44	18.88	nC
Source-Drain Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V,I _S =40A	-	0.83	1.2	V
Diode Forward Current	I _S	T _C = 25°C	-	-	125	A
Reverse Recovery Time	t _{rr}	I _s =40A	-	52.78	105.56	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 300A/μs	-	56.31	112.62	nC

Notes:

- 1.Repetitive rating; pulse width limited by maximum junction temperature
2. $V_{DD}=30\text{V}$, $L=0.3\text{mH}$, $R_g=25\Omega$, Starting $T_J=25^{\circ}\text{C}$



Typical Performance Characteristics

Fig 1: Output Characteristics

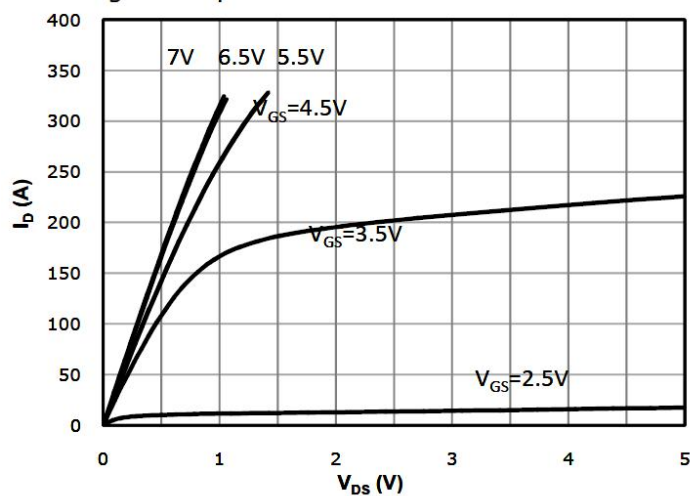


Fig 2: Transfer Characteristics

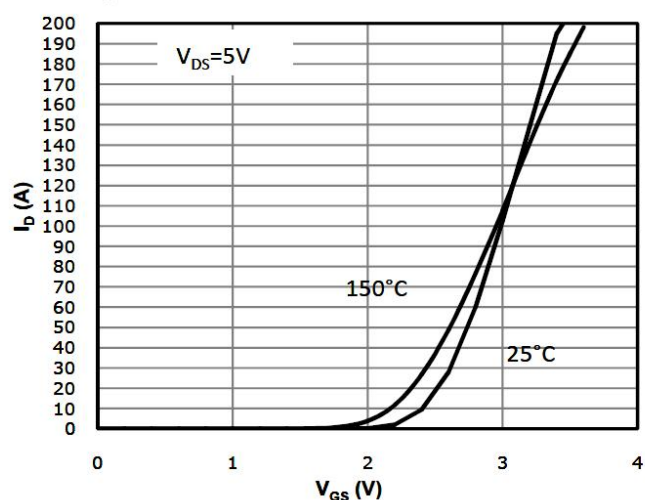
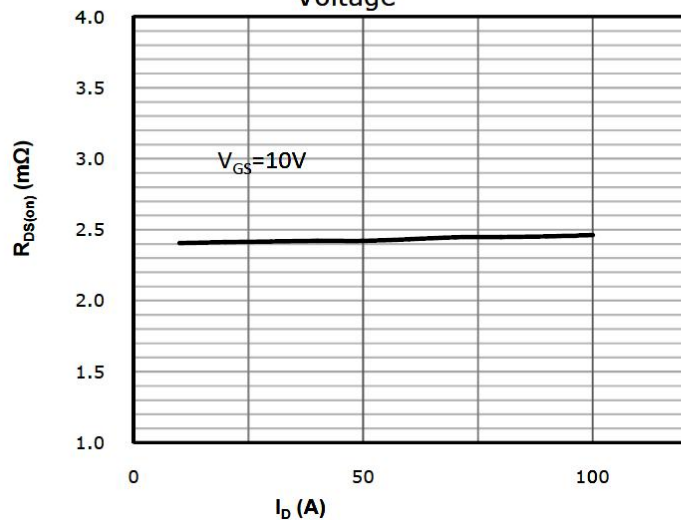
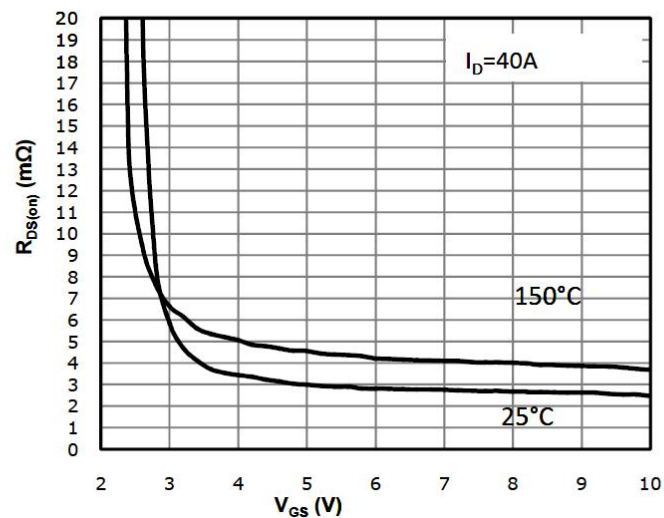
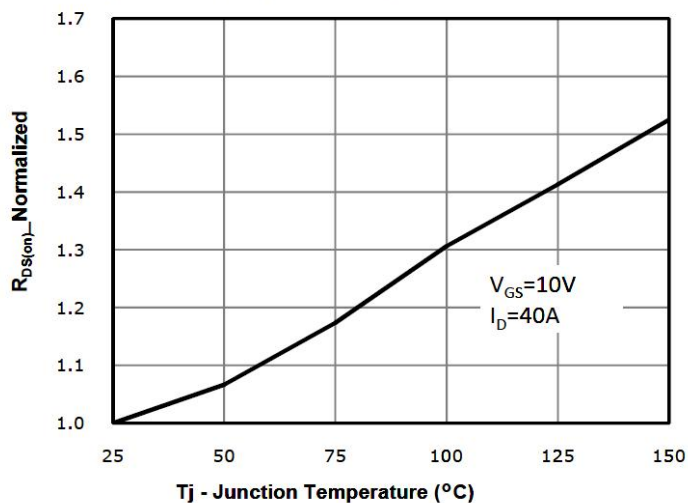
Fig 3: $R_{DS(on)}$ vs Drain Current and Gate VoltageFig 4: $R_{DS(on)}$ vs Gate VoltageFig 5: $R_{DS(on)}$ vs. Temperature

Fig 6: Capacitance Characteristics

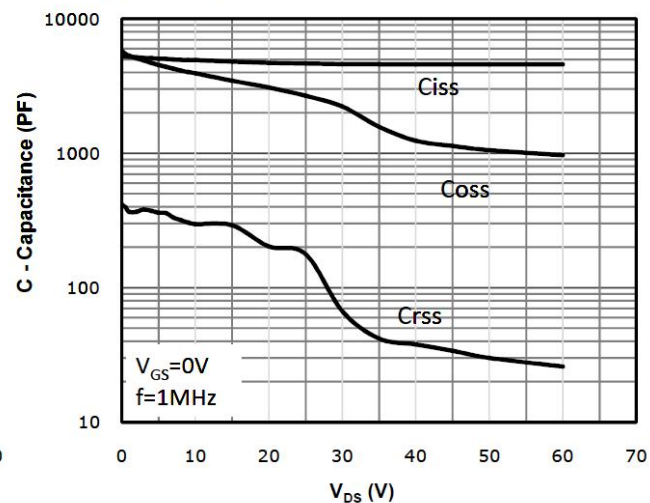


Fig 7: Gate Charge Characteristics

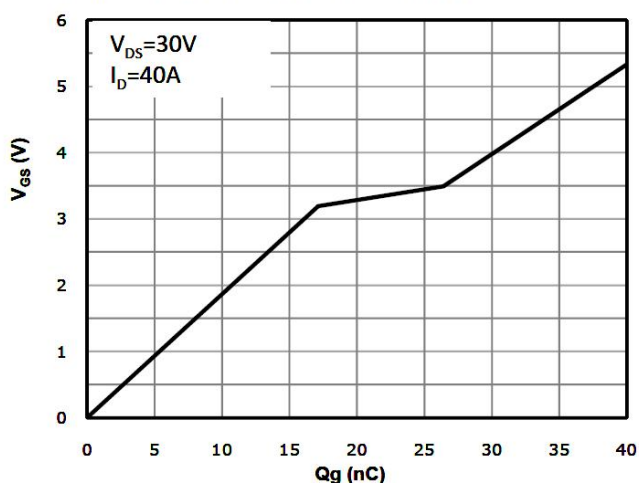


Fig 8: Body-diode Forward Characteristics

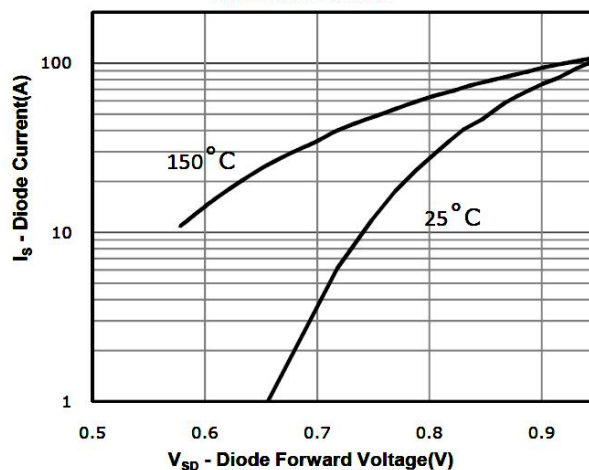


Fig 9: Power Dissipation

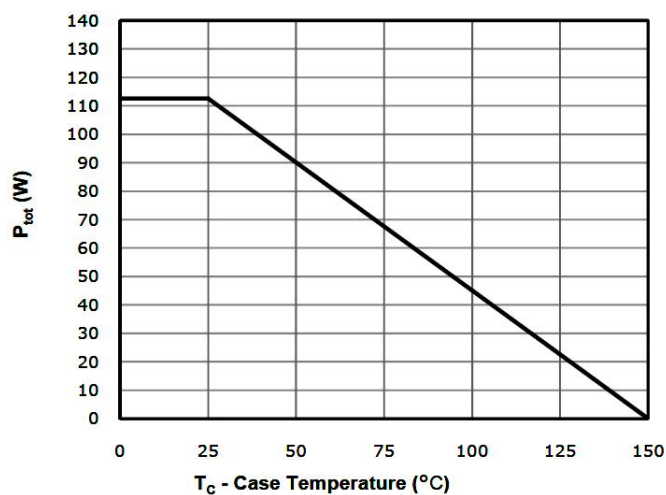


Fig 10: Drain Current Derating

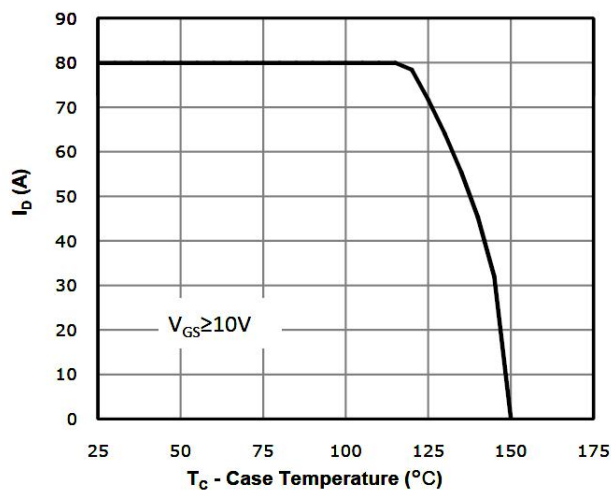


Fig 11: Safe Operating Area

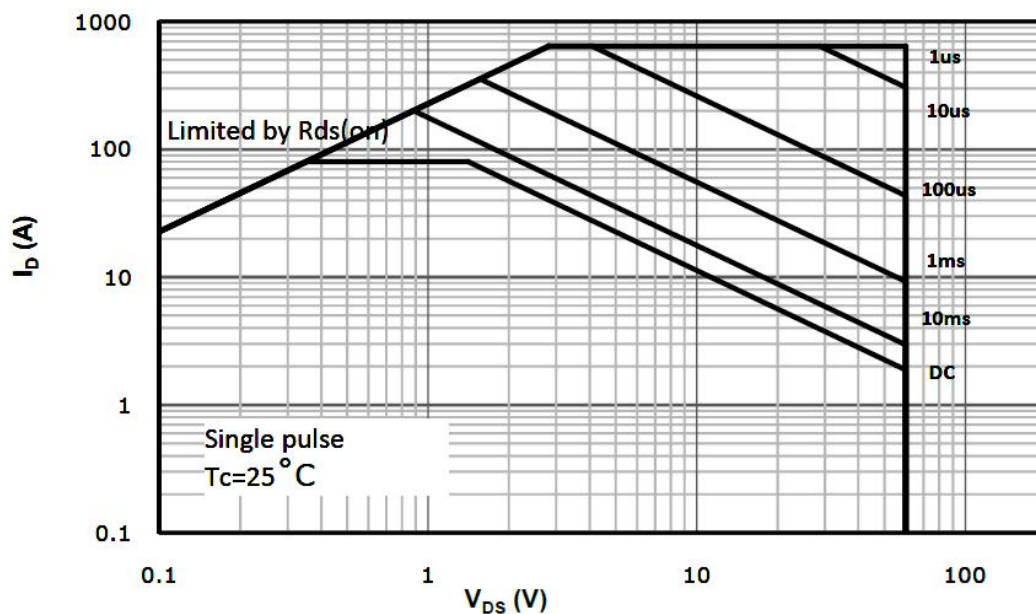
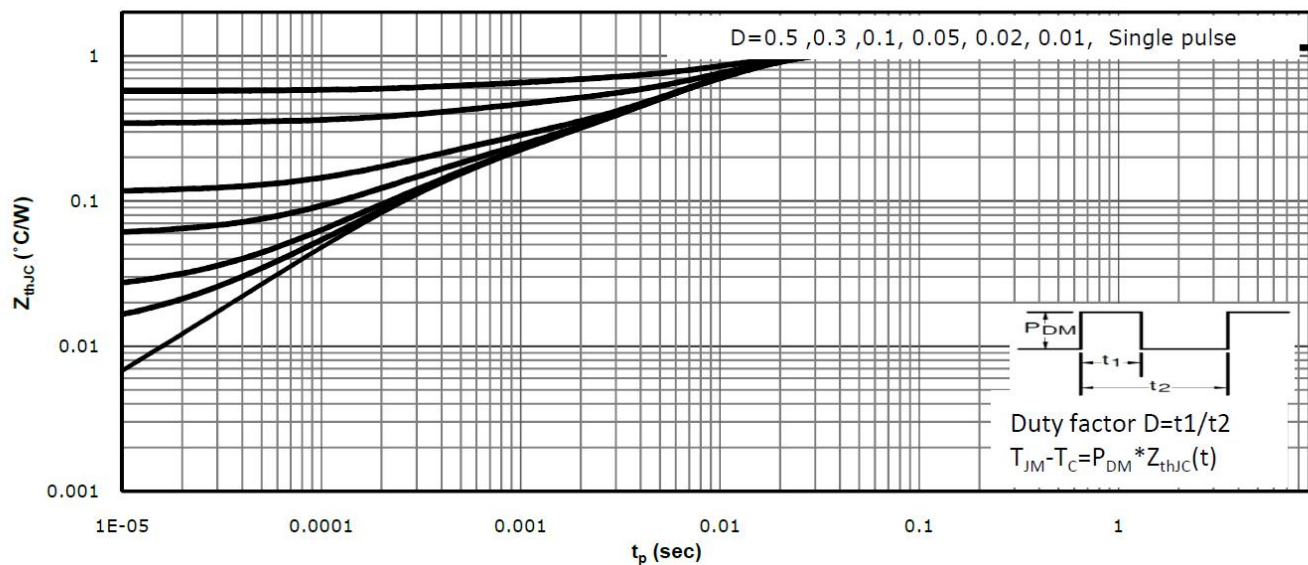
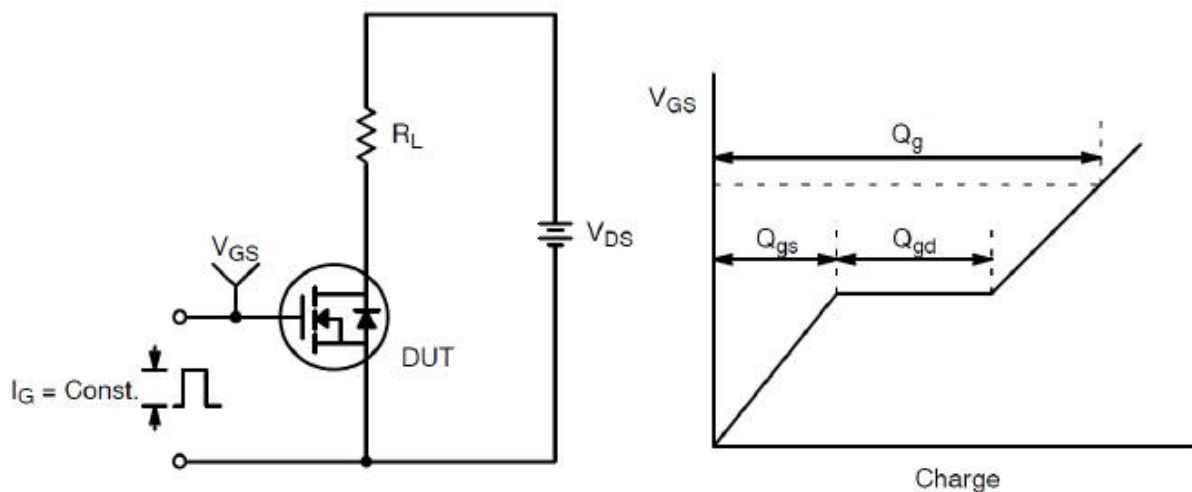


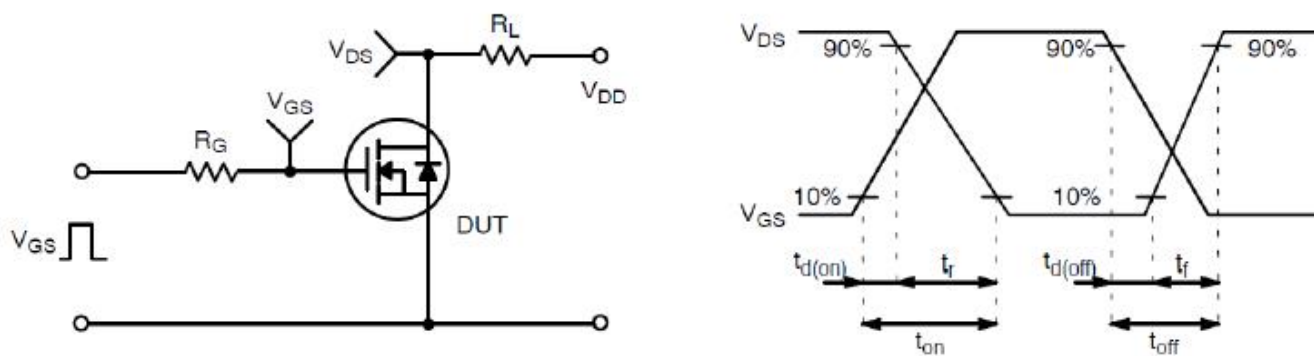
Fig 12: Max. Transient Thermal Impedance



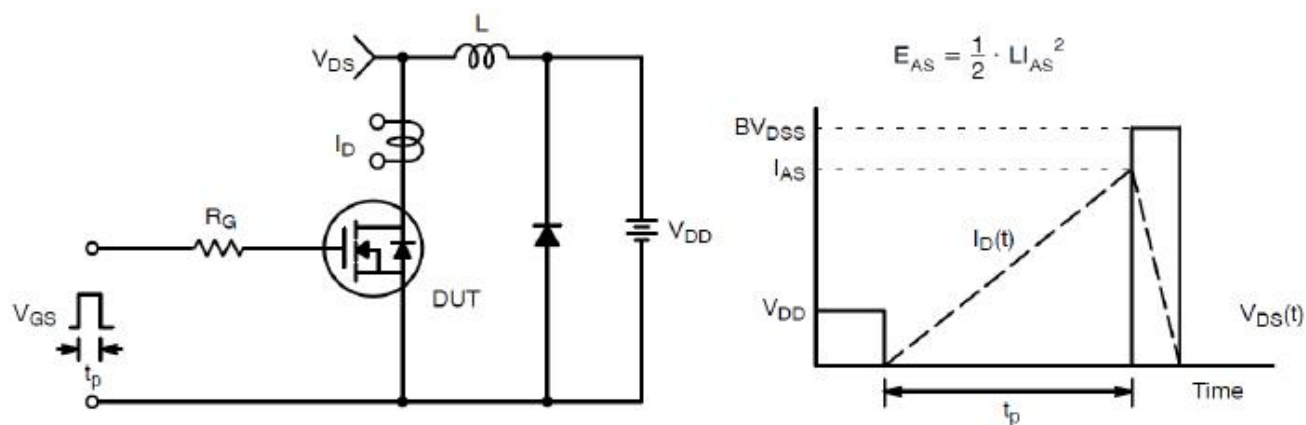
Test Circuit and Waveform



Gate Charge Test Circuit & Waveform

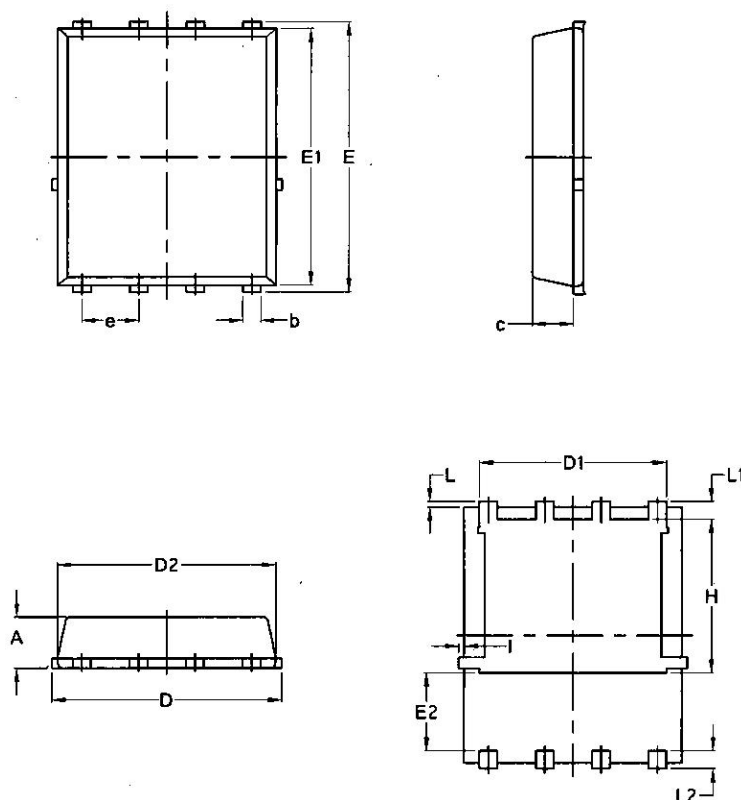


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Package Dimensions PDFN5x6-8L



Symbol	Common			
	mm		Inch	
	Min	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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