

### Features

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



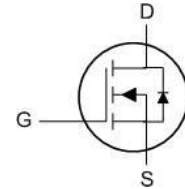
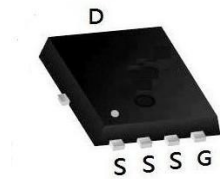
### Product Summary

BVDSS	RDSON	ID
60V	2.4mΩ	125A

### Applications

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

### PDFN5\*6 Pin Configuration



### Absolute Maximum Ratings:

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

### Thermal Characteristics:

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

**Electrical Characteristics** (Tc= 25°C unless otherwise specified):

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

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V V <sub>DS</sub> = 30V f = 1.0MHz	--	4610	6915	pF
C <sub>oss</sub>	Output Capacitance		--	2188	3282	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	66	132	
R <sub>g</sub>	Gate resistance		--	0.93	18.8	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t <sub>d(ON)</sub>	Turn-on Delay Time	I <sub>D</sub> =40A V <sub>DS</sub> = 30V V <sub>GS</sub> = 10V R <sub>G</sub> = 2.7Ω	--	14.13	--	ns
t <sub>r</sub>	Rise Time		--	63.73	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	46.8	--	
t <sub>f</sub>	Fall Time		--	105.07	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10V	--	74.37	111.56	nC
Q <sub>gs</sub>	Gate Source Charge	V <sub>DS</sub> = 30V	--	17.26	--	
Q <sub>gd</sub>	Gate Drain Charge	I <sub>D</sub> =40A	--	9.44	18.88	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I <sub>S</sub>	Diode Forward Current	T <sub>C</sub> =25 °C	--	--	125	A
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =40A, V <sub>GS</sub> =0V	--	0.83	1.2	V
t <sub>rr</sub>	Reverse Recovery time	I <sub>S</sub> =40A, dI/dt=300A/μs	--	52.78	105.56	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	56.31	112.62	nC

a<sup>1</sup>: Repetitive rating; pulse width limited by maximum junction temperature a<sup>2</sup>:  
 VDD=30V, L=0.3mH, Rg=25Ω, Starting T<sub>J</sub>=25 °C

### Typical Performance Characteristics

Fig 1: Output Characteristics

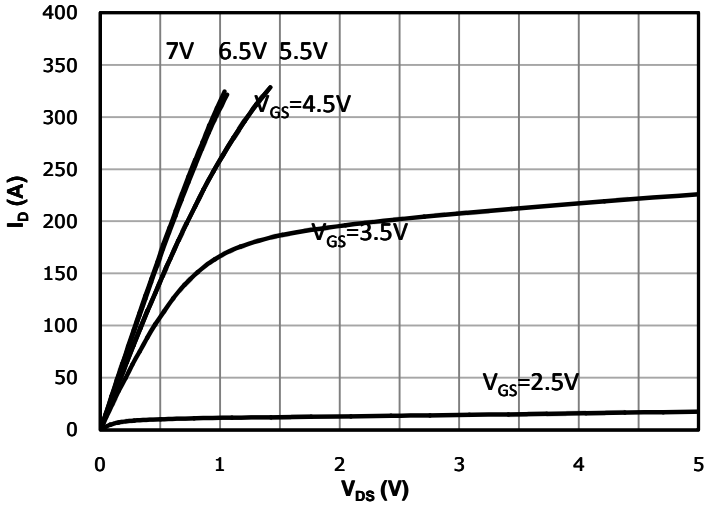


Fig 2: Transfer Characteristics

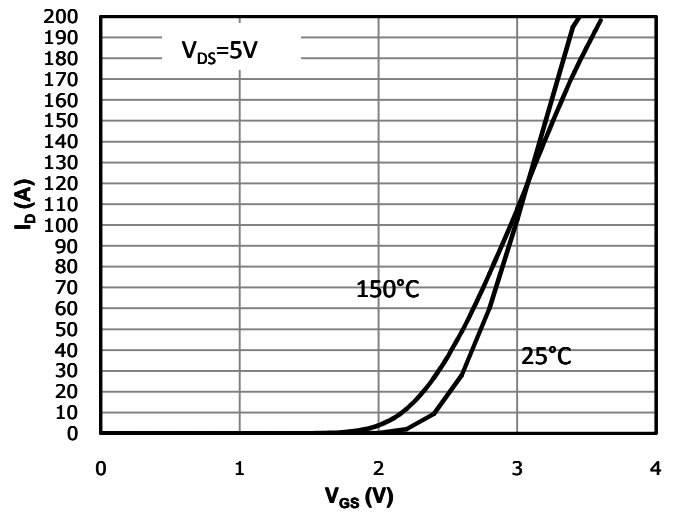


Fig 3:  $R_{DS(on)}$  vs Drain Current and Gate Voltage

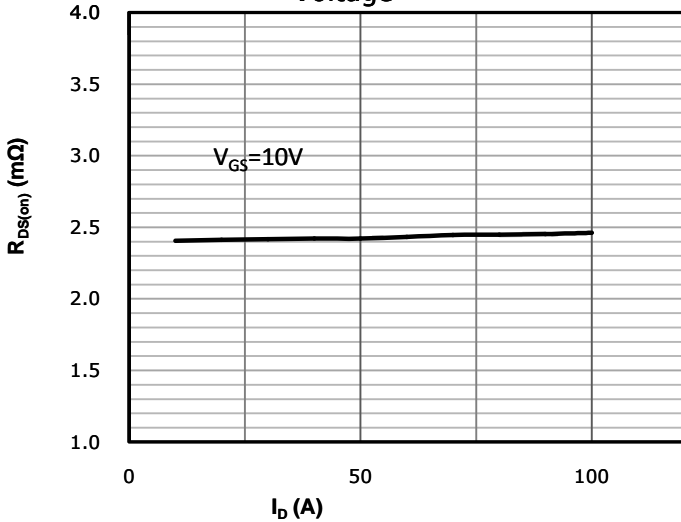


Fig 4:  $R_{DS(on)}$  vs Gate Voltage

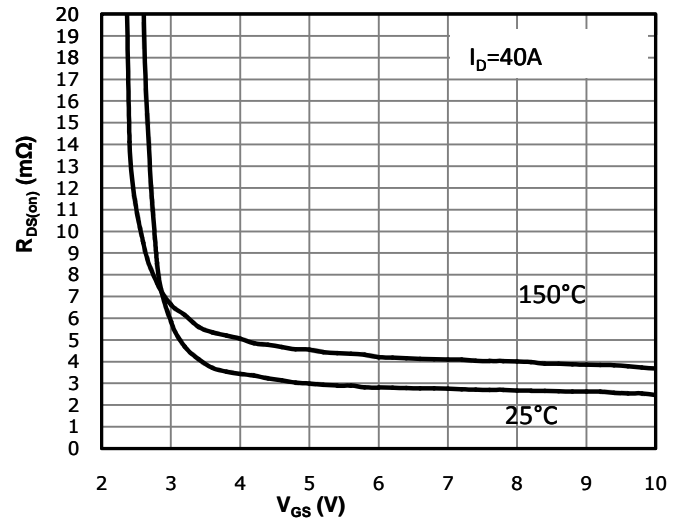


Fig 5:  $R_{DS(on)}$  vs. Temperature

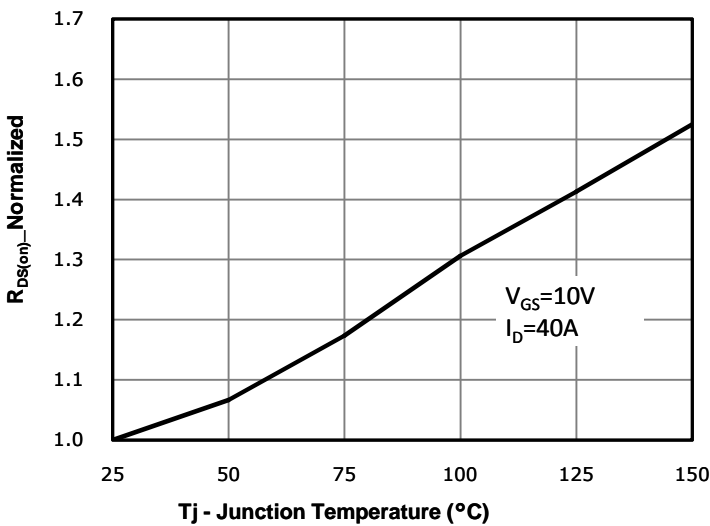


Fig 6: Capacitance Characteristics

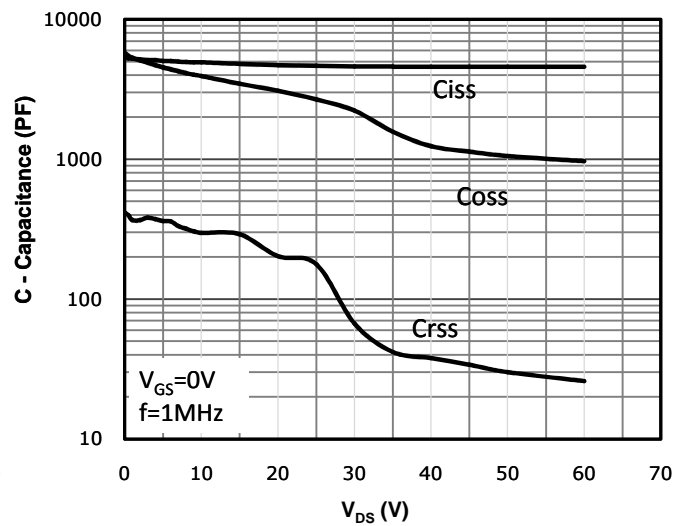


Fig 7: Gate Charge Characteristics

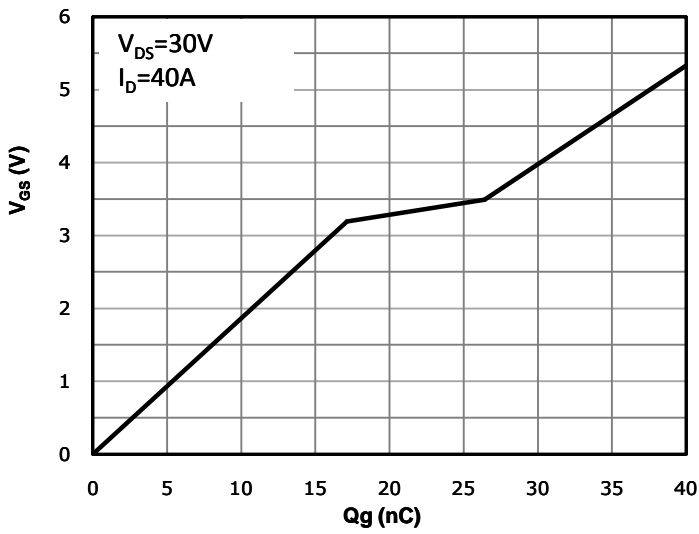


Fig 8: Body-diode Forward Characteristics

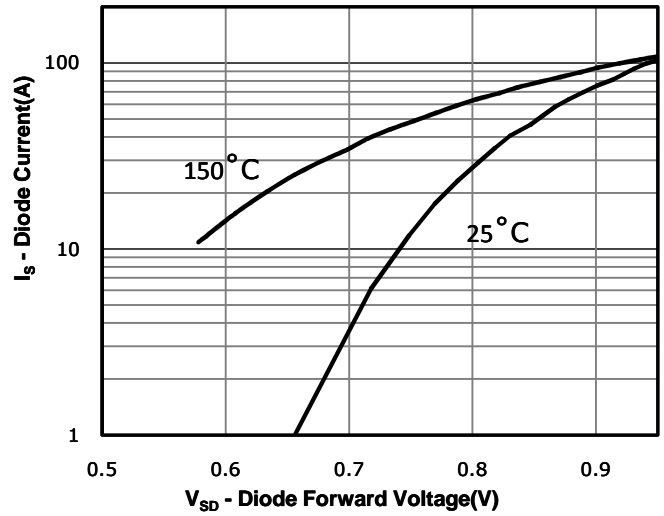


Fig 9: Power Dissipation

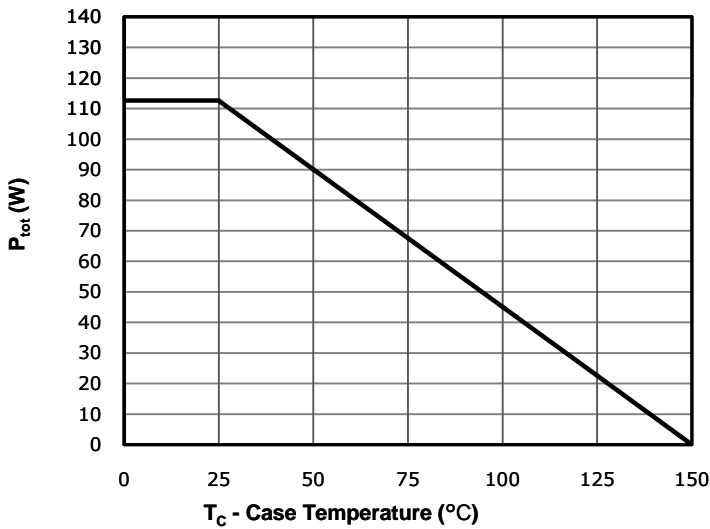


Fig 10: Drain Current Derating

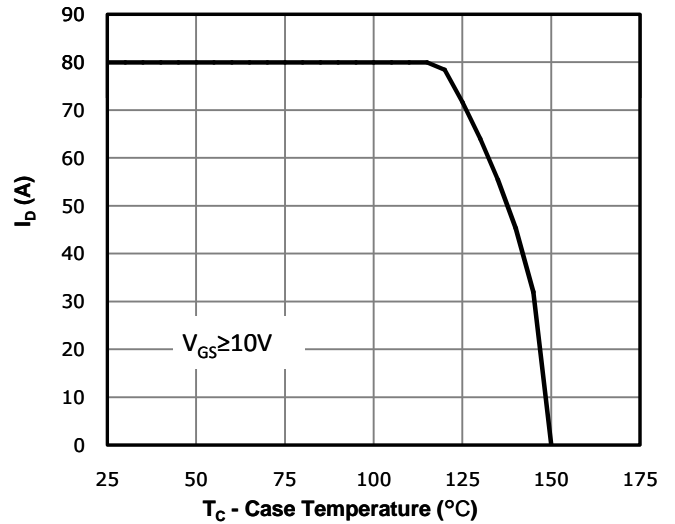


Fig 11: Safe Operating Area

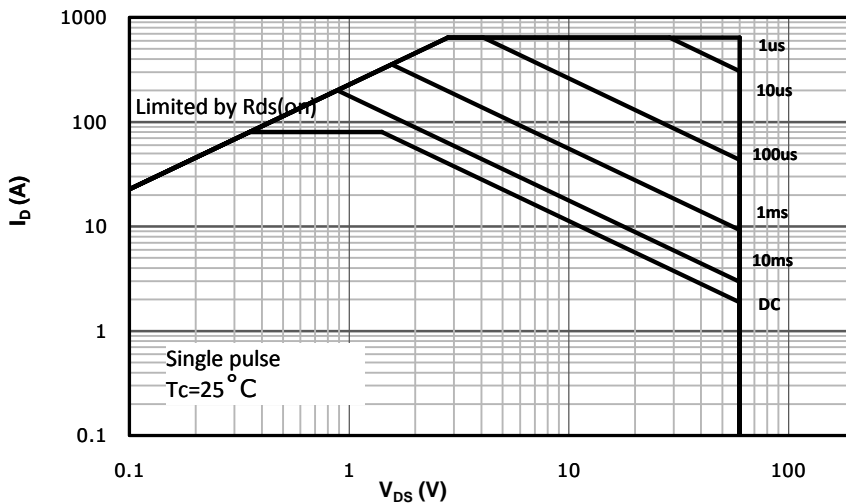
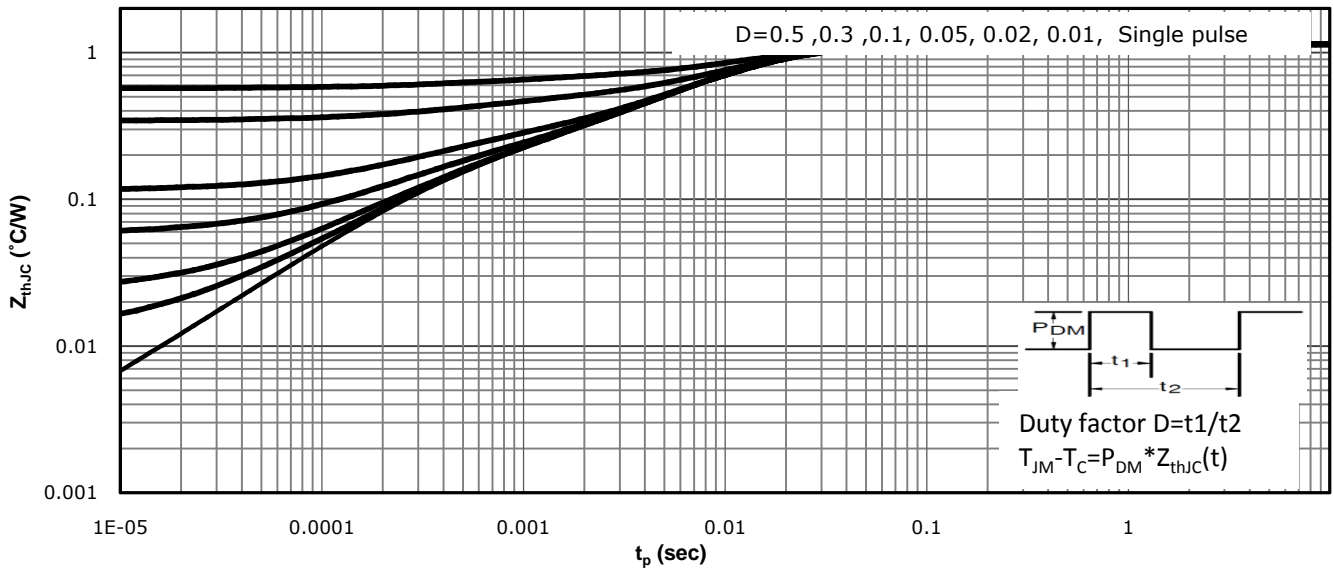
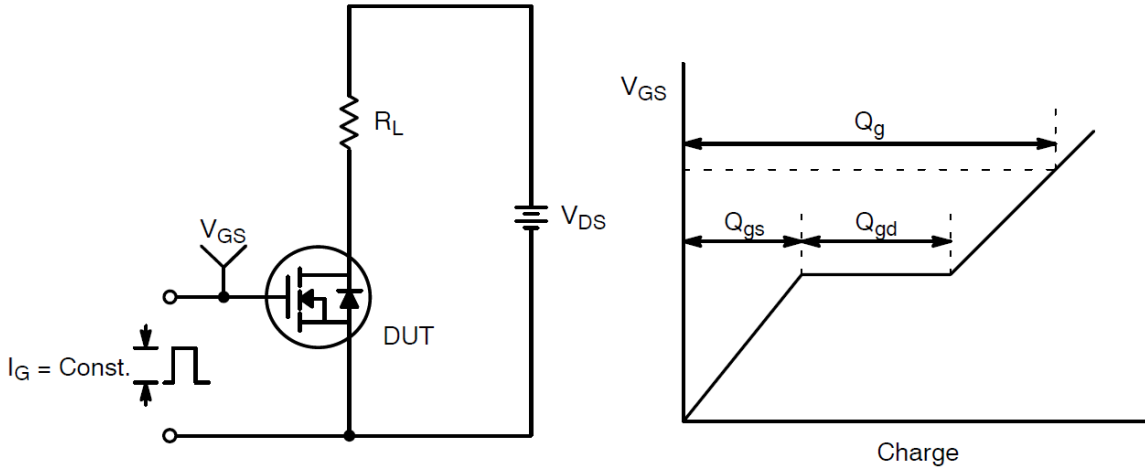


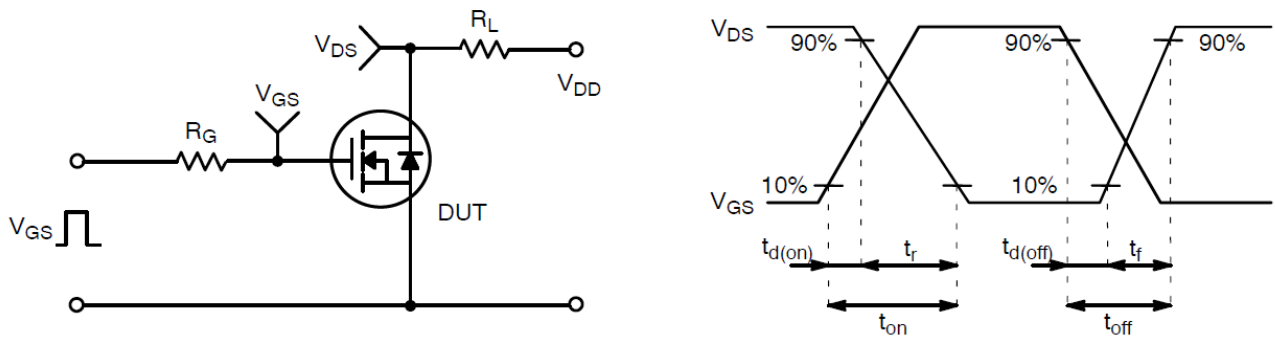
Fig 12: Max. Transient Thermal Impedance



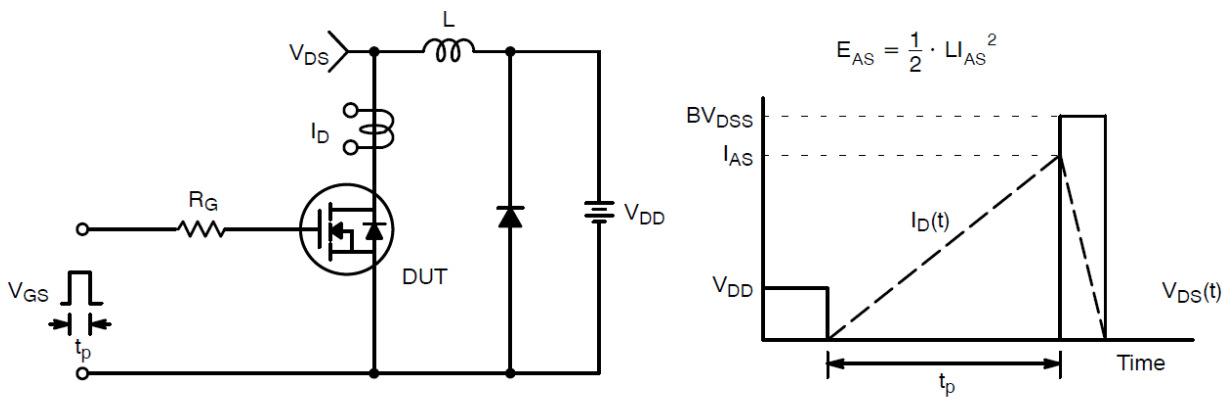
**Test Circuit and Waveform:**



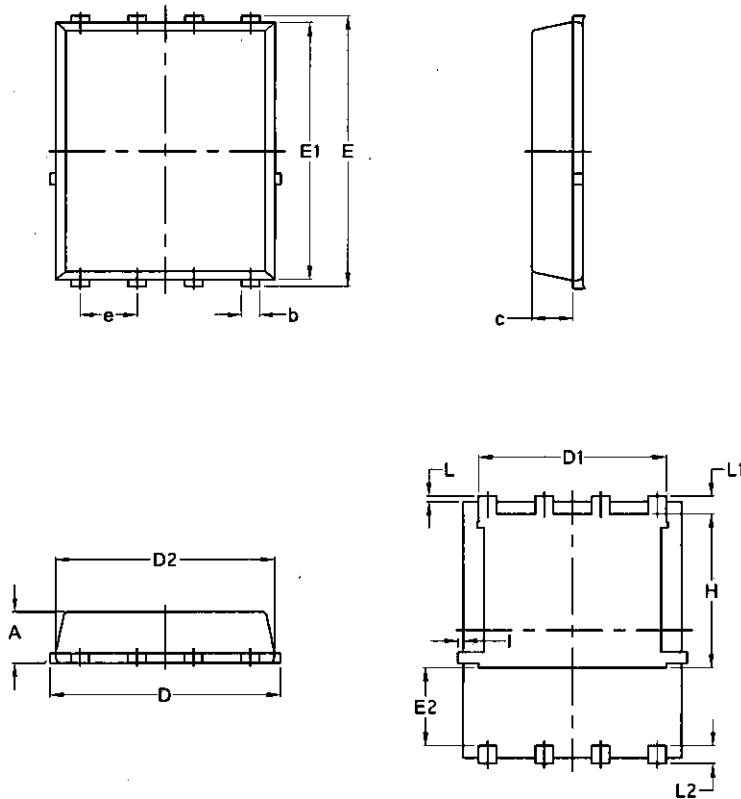
**Gate Charge Test Circuit & Waveform**



**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

**Package Mechanical Data-DFN5\*6-8L-Single**


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