Features

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

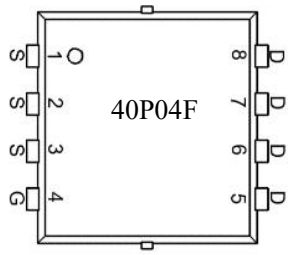
Bvdss	Rdson	ID
-40V	10mΩ	-40A

RoHS

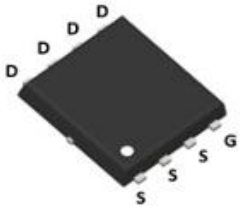
Application

- PWM applications
- Power management functions
- Synchronous-rectification applications

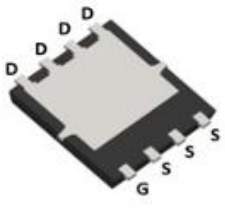
Package

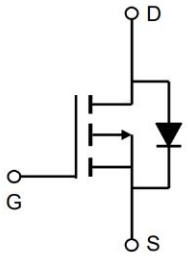


Marking and pin assignment



PDFN5*6-8L top view





Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
40P04	40P04F	PDFN5*6-8L	5000

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{Gs}	±20	V
Continuous Drain Current[1]	(T_C =25℃)	I_D	-40	A
Continuous Drain Current[1]	(T_C =100℃)	I_D	-25	A
Pulsed Drain Current[2]		I_{DM}	-160	A
Single Pulsed Avalanche Energy[3]		E_{As}	144	mJ
Avalanche Current		I_{AS}	-30	A
Power Dissipation[4]		P_d	45	W
Junction Temperature		T_J	-55~+150	℃
Storage Temperature		T_{STG}	-55~+150	℃

Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance,Junction-to-Case[1]	$R_{\theta JC}$	--	3.6	℃/W
Thermal Resistance,Junction-to-Ambient[1]	$R_{\theta JA}$	--	62	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL40P04F	PDFN5*6	4	5,6,7,8	1,2,3	Tape Reel

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V_{DSS}	V_{GS}=0V I_D=-250μA	-40	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-40V,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	-1.0	-1.7	-2.5	V
Drain-Source On-State Resistance[3]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	10	13	mΩ
		V_{GS}=-4.5V, I_D=-10A	-	14	17	
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=-20V,V_{GS}=0V, F=1.0MHz	-	3800	-	pF
Output Capacitance	C_{oss}		-	329	-	pF
Reverse Transfer Capacitance	C_{rss}		-	289	-	pF
Resistive Switching Characteristics						
Turn-on Delay Time	$T_{d(on)}$	V_{DD}=-20V,I_D=-20A, V_{GS}=-10V,R_{GEN}=2.4Ω	-	10	-	nS
Turn-on Rise Time	tr		-	82	-	nS
Turn-Off Delay Time	$T_{d(off)}$		-	93	-	nS
Turn-Off Fall Time	T_f		-	74	-	nS
Total Gate Charge	Q_g	V_{DS}=-20V,I_D=-20A, V_{GS}=-10V	-	68	-	nC
Gate-Source Charge	Q_{gs}		-	10	-	nC
Gate-Drain Charge	Q_{gd}		-	14	-	nC
Source-Drain Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=-30A	-	-0.8	-1.2	V
Maximum Continuous Drain to Source Diode Forward Current	I_S	-	-	-	-40	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}		-	-	-160	A
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_S =-30A	-	20	-	nS

Reverse Recovery Charge	Q_{rr}	di/dt = 300A/μs	-	13	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J= 25℃, V_{DD}= -20V, V_G= -10V, L= 0.5mH, R_G= 25Ω, IAS= -24A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Typical Performance Characteristics

Figure 1. Output Characteristics

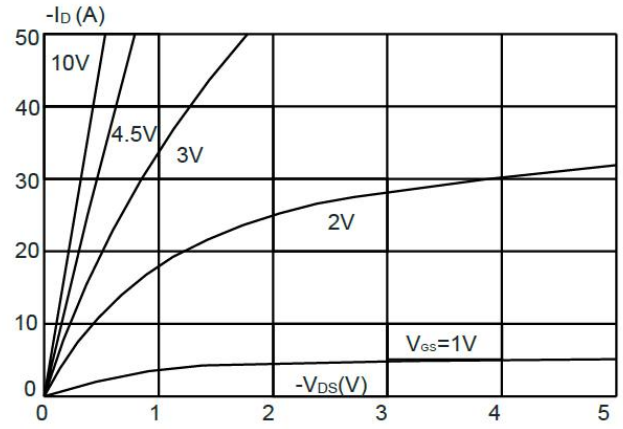


Figure 2. Typical Transfer Characteristics

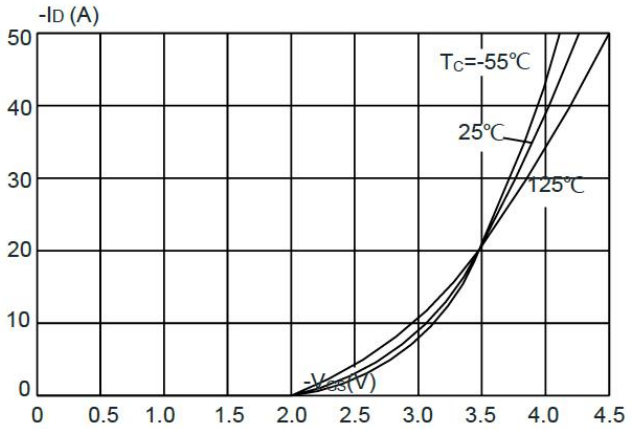


Figure 3. On-resistance vs. Drain Current

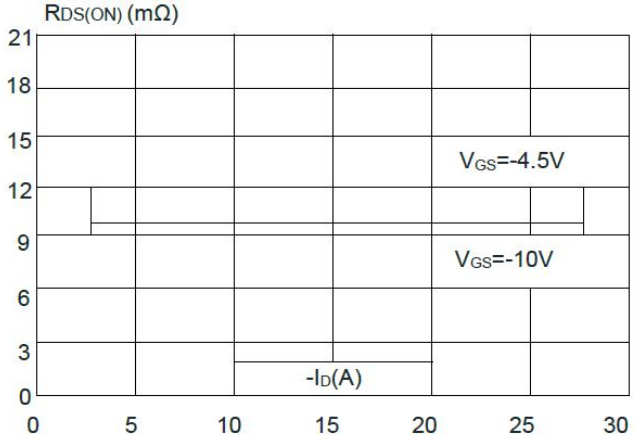


Figure 4. Body Diode Characteristics

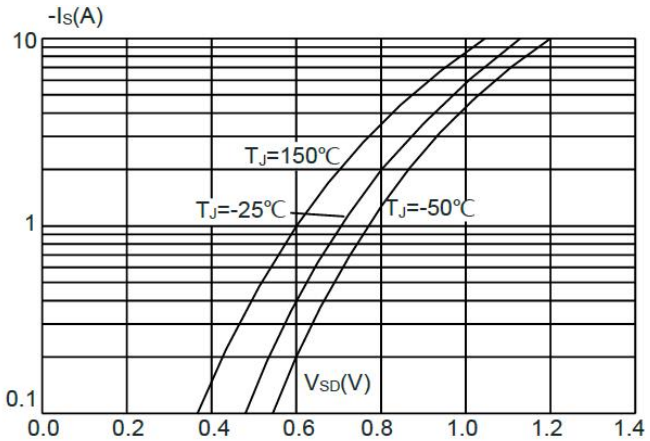


Figure 5: Gate Charge Characteristics

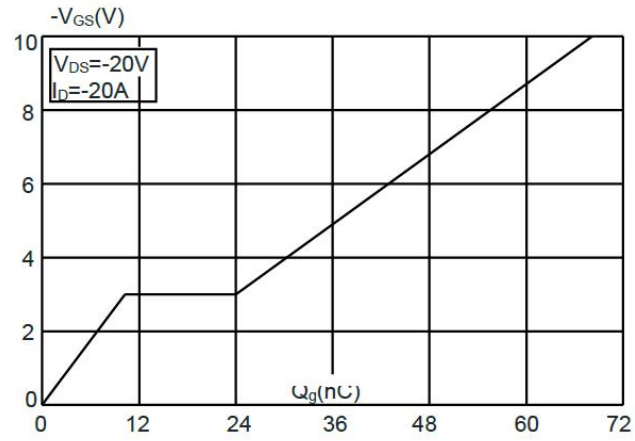


Figure 6: Capacitance Characteristics

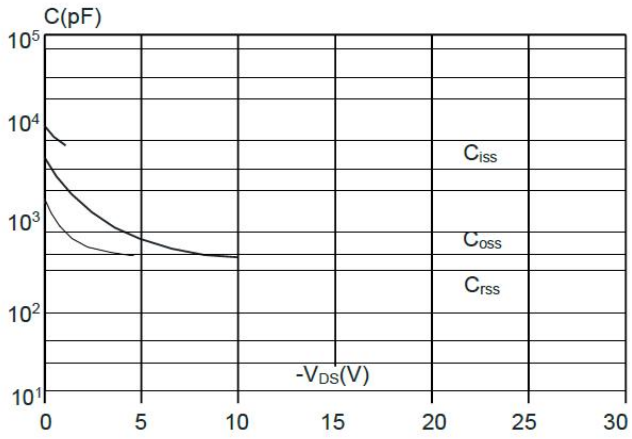


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

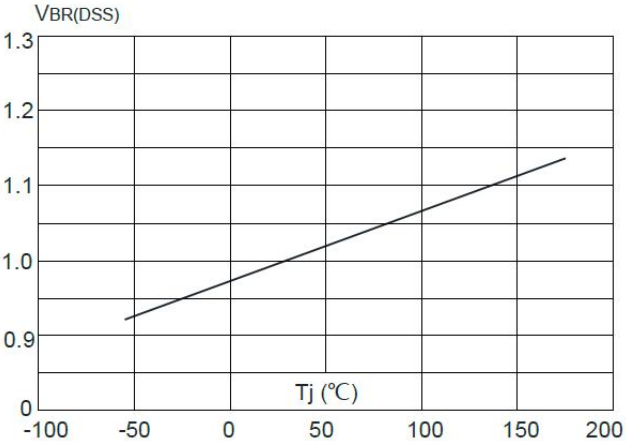


Figure 8: Normalized on Resistance vs. Junction Temperature

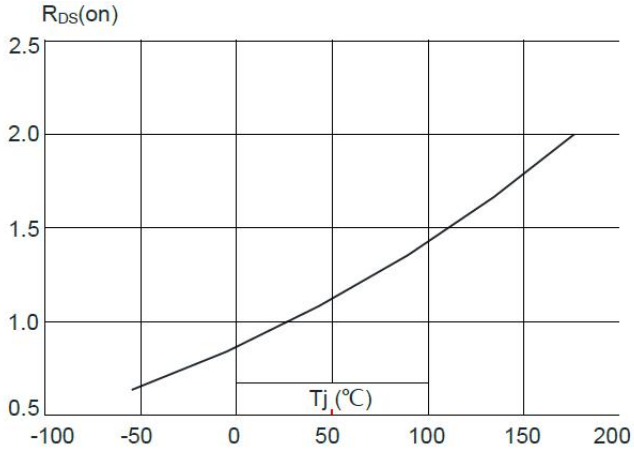


Figure 9: Maximum Safe Operating Area

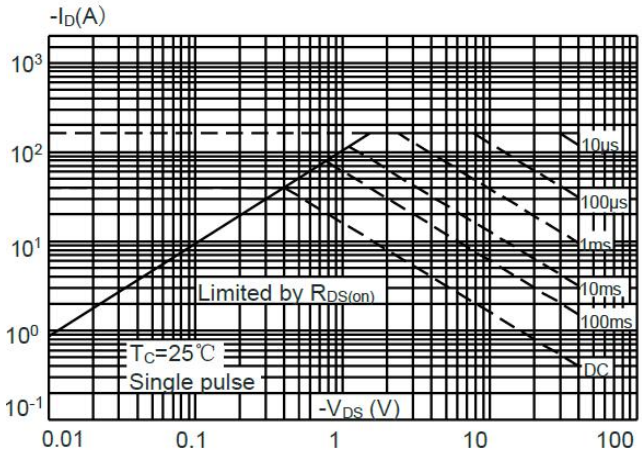


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

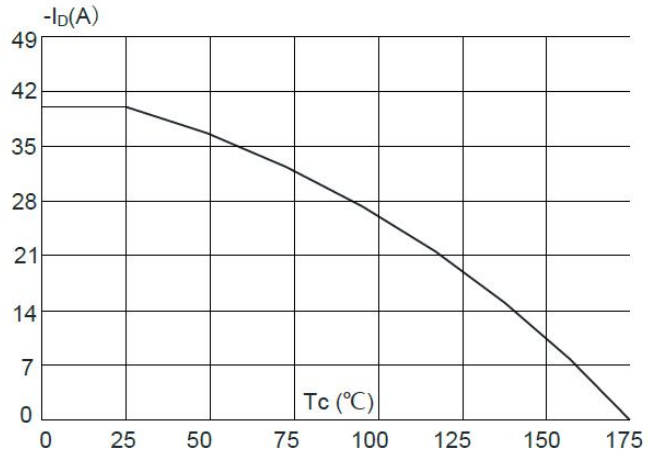
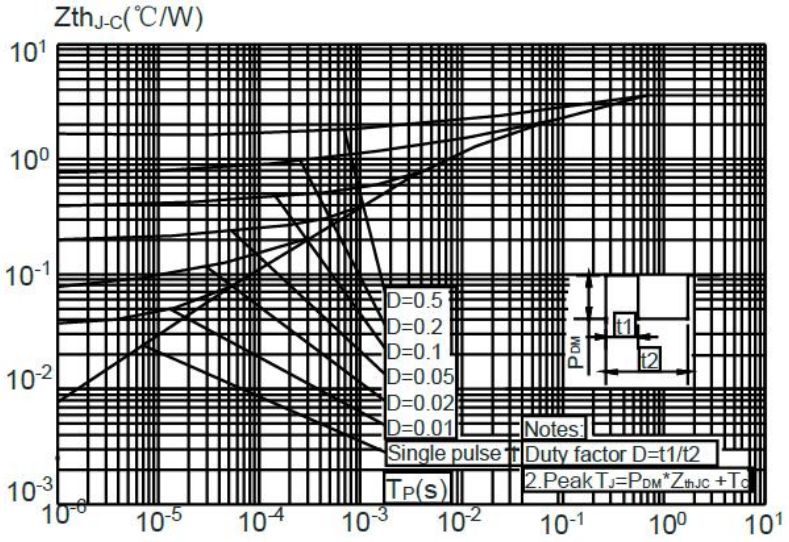


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

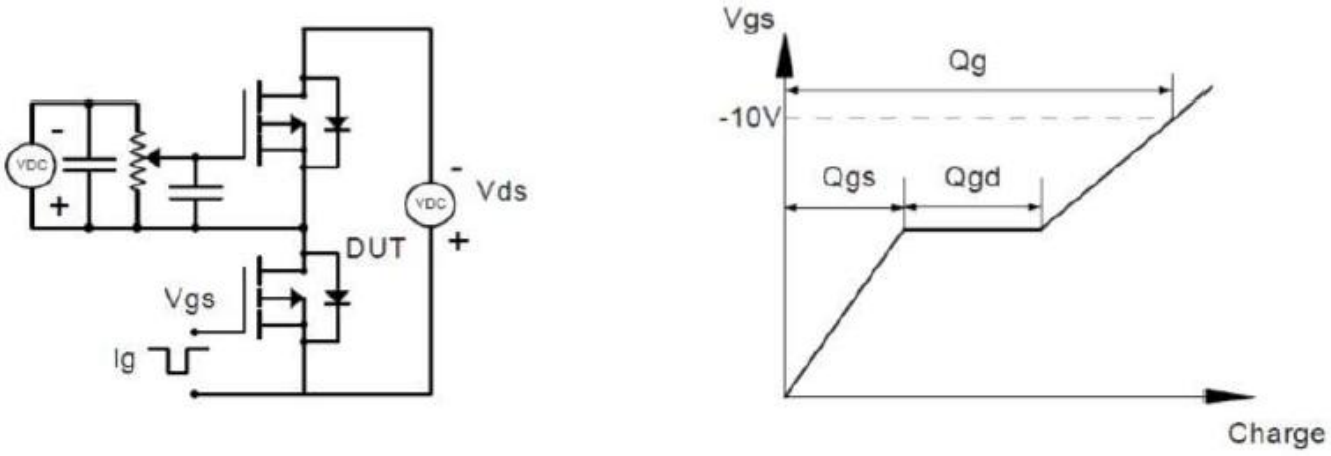


Figure.1： Gate Charge Test Circuit & Waveform

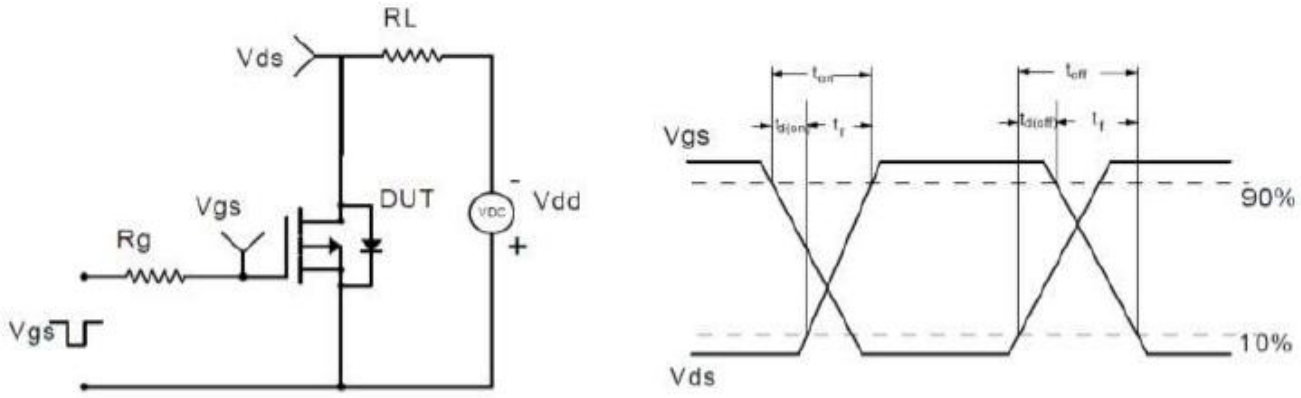


Figure.2： Resistive Switching Test Circuit & Wave forms

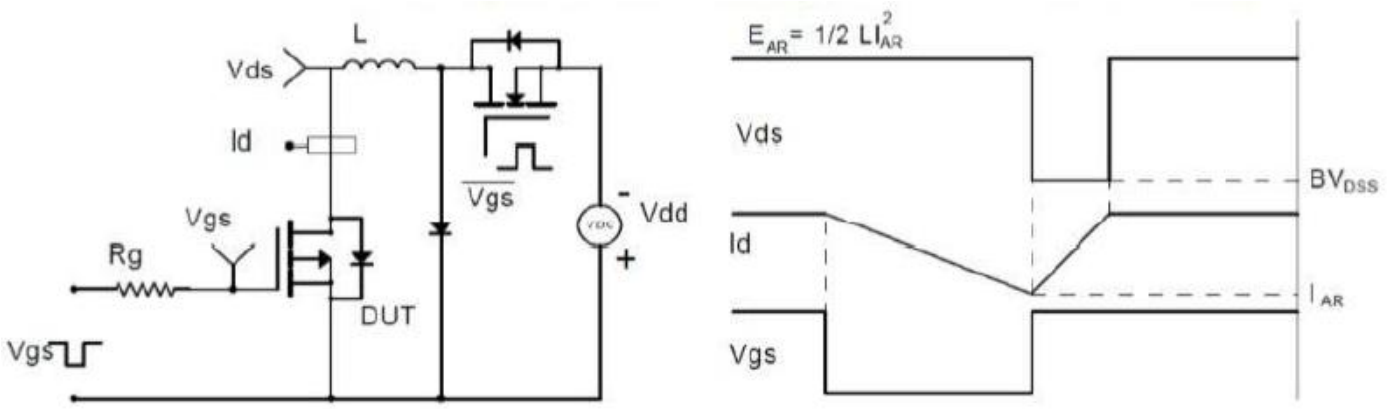


Figure.3： Unclamped inductive Switching (UIS) Test Circuit & Wave forms

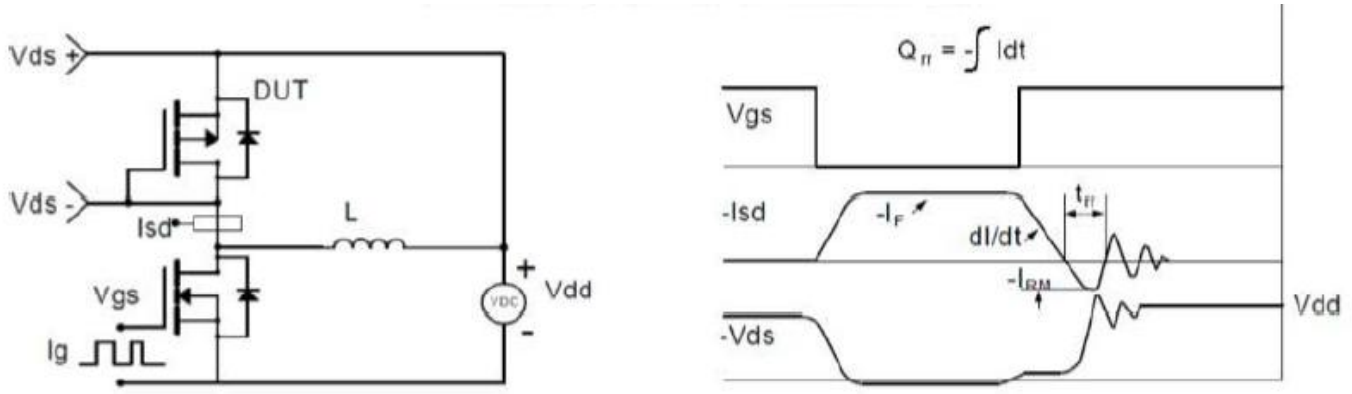
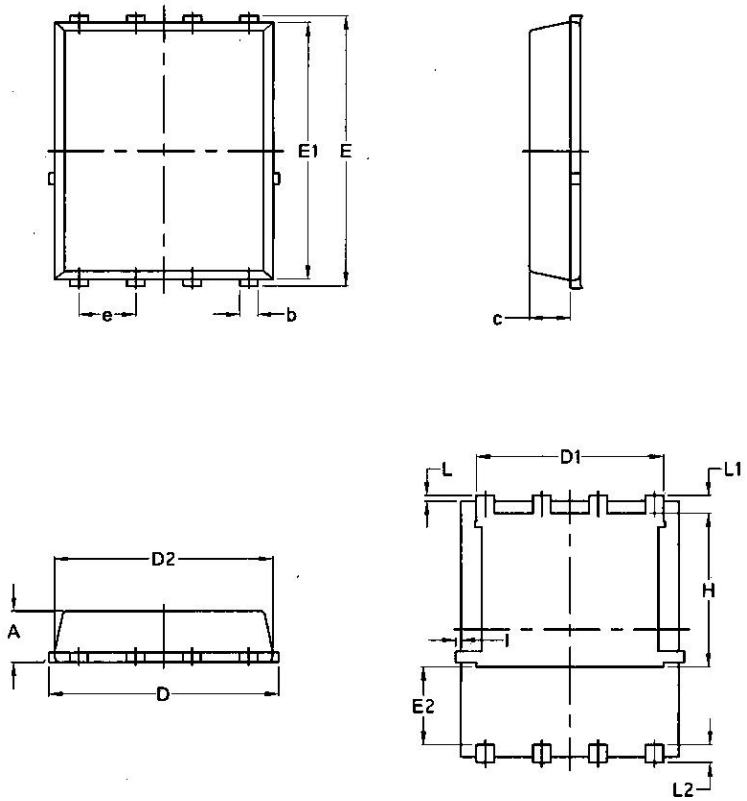


Figure.4： Diode Recovery Test Circuit & Wave form

Package Dimensions PDFN5x6-8L



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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