PWC009N04UESQ

Perfect MOS N-MOSFET 40V, 0.67mΩ, 310A

重庆平伟实业股份有限公司

Features

- Uses PingWei advanced PerfectMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Qualified according to AEC-Q101 criteria

Benefits

- High robustness and reliability
- Increases maximum current capability
- Low power loss, high power density
- Easy paralleling

Applications

- General Automotive Applications
- Motor Drivers
- Switching Mode Power Supply

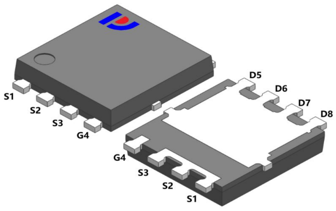
100% DVDS Tested

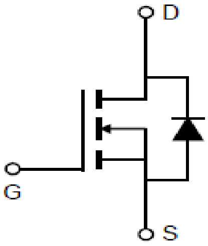
100% AvalancheTested

Product Summary

V_{DS}	40V
$R_{DS(on)@10V\ typ}$	0.67mΩ
I_D（Silison）	310A

UPDFN5*6-C





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
PWC009N04UESQ	C009N04UESQ	UPDFN5*6-C	Tape&Reel	13 inches	12mm	5000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 100°C(Silicon limit) T_C = 25°C(Package limit) Ta = 25°C (Note1)	I_D	310 219 150 40	A
Pulsed drain current (T_C = 25°C,tp = 100us)	$I_{D\ pulse}$	600	A
Avalanche energy, single pulse (L=0.5mH)	E_{AS}	635	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation T_C = 25°C	P_{tot}	156	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C
Reflow soldering temperature（10s）	Tsold	260	°C

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	RthJC	-	-	1.0	°C/W	-
Thermal resistance, junction - ambient	RthJA	-	-	57	°C/W	Note 1

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	**Symbol**	**Value**			**Unit**	**Test Condition**
		min.	**typ.**	**max.**		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	40	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th\ )}$	2	-	3	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=40V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	0.67	0.9	mΩ	Vgs=10V,Id=75A
Transconductance	g_{fs}	-	130	-	S	V_{DS}=5V,I_D=50A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	7184	-	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Output Capacitance	C_{oss}	-	2326	-		
Reverse Transfer Capacitance	C_{rss}	-	60	-		
Gate Total Charge	Q_G	-	98	-	nC	Vds=20V,Id=30A ,Vgs=10V
Gate-Source charge	Q_{gs}	-	35	-		
Gate-Drain charge	Q_{gd}	-	10	-		
Turn-on delay time	$t_{d(on)}$	-	18	-	ns	V_{GS}=10V, V_{DD}=20V, R_{G_ext}=1.6Ω,I_D=20A
Rise time	t_r	-	24	-		
Turn-off delay time	$t_{d(off)}$	-	67	-		
Fall time	t_f	-	20	-		
Gate resistance	R_G	-	2.9	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	**Symbol**	**Value**			**Unit**	**Test Condition**
		min.	**typ.**	**max.**		
Body Diode Forward Voltage	V_{SD}	-	-	1.2	V	V_{GS}=0V,I_{SD}=75A
Body Diode Continuous Forward Current	Is	-	-	150	A	TC = 25°C
Body Diode Pulsed Current	Is pulse	-	-	600	A	TC = 25°C,tp = 100us
Body Diode Reverse Recovery Time	t_{rr}	-	50	-	ns	IF=50A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	53	-	nC	

Note 1:1 inch²,2oz single copper FR-4 PCB.

Typical Performance Characteristics

Fig 1: Output Characteristics

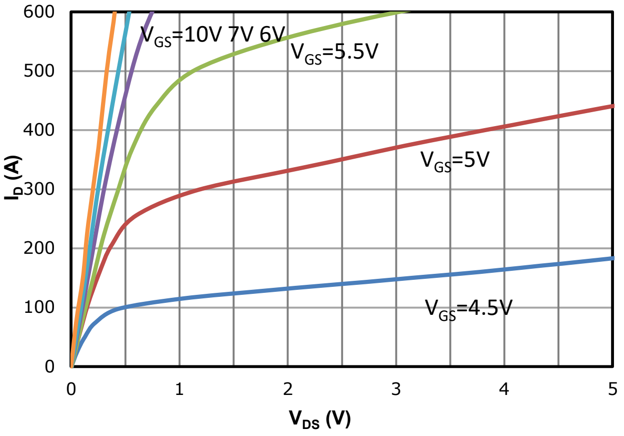


Fig 2: Transfer Characteristics

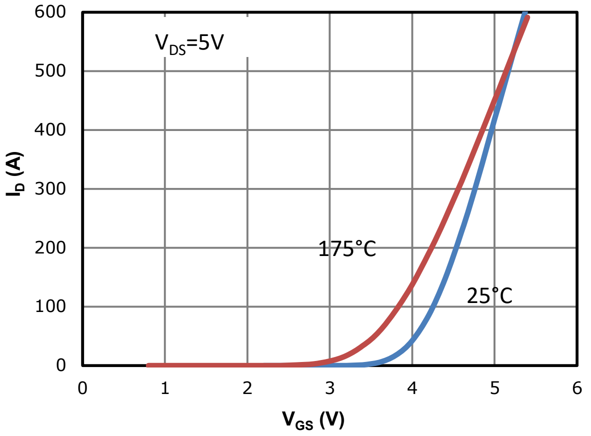


Fig 3: Rds(on) vs Drain Current and Gate Voltage

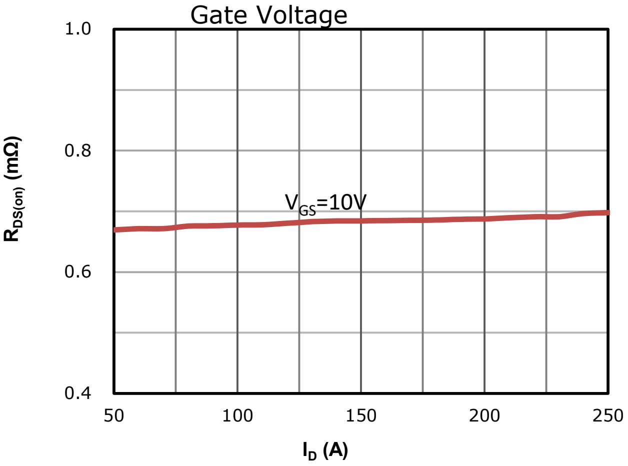


Fig 4: Rds(on) vs Gate Voltage

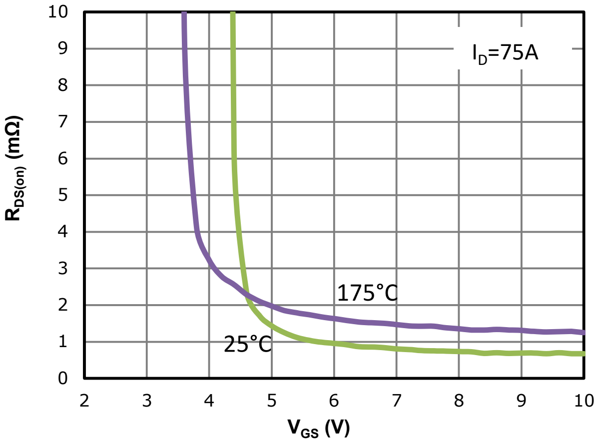


Fig 5: Rds(on) vs. Temperature

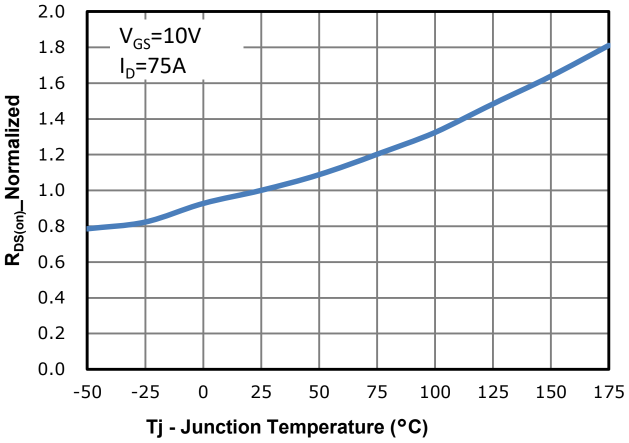


Fig 6: Vgs(th) vs. Temperature

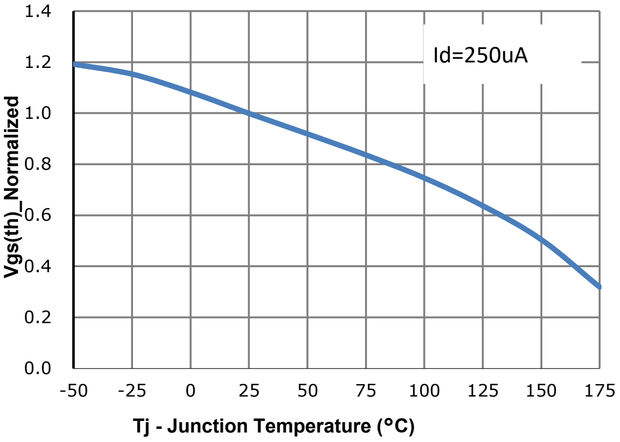


Fig 7: BVdss vs. Temperature

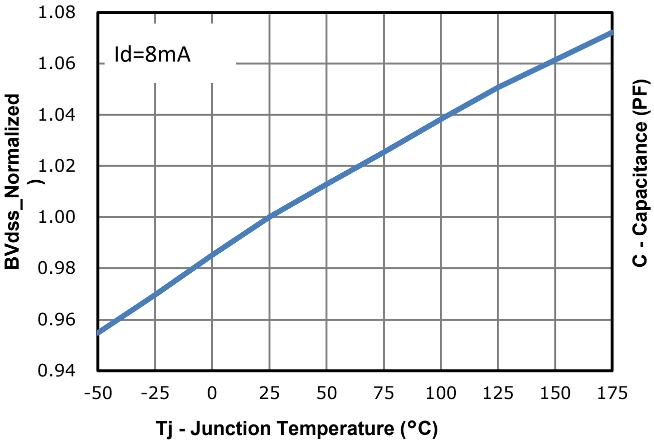


Fig 8: Capacitance Characteristics

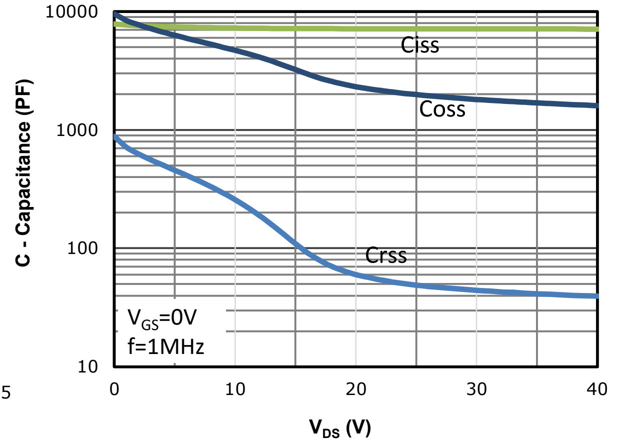


Fig 9: Gate ChargeCharacteristics

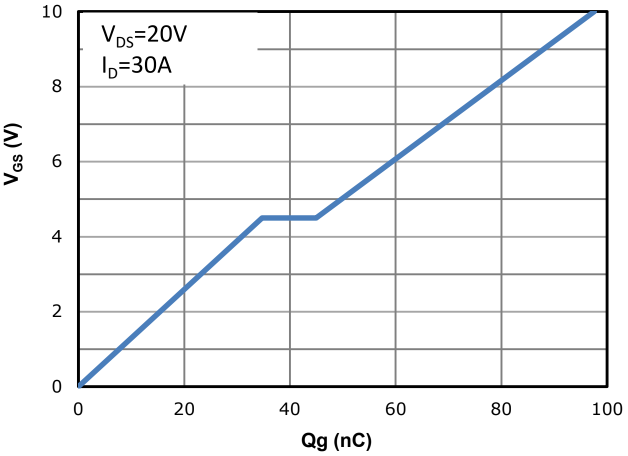


Fig 10: Body-diode Forward Characteristics

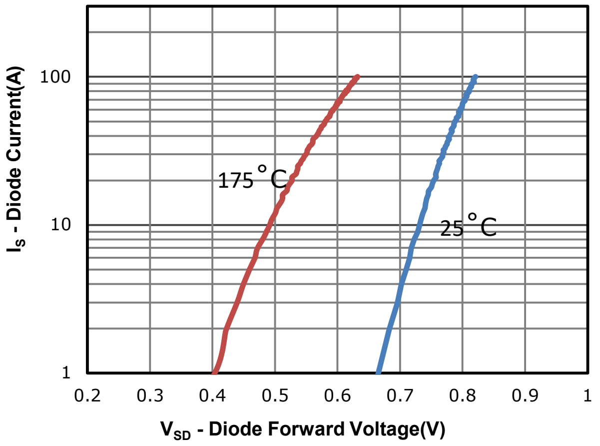


Fig 11: Power Dissipation

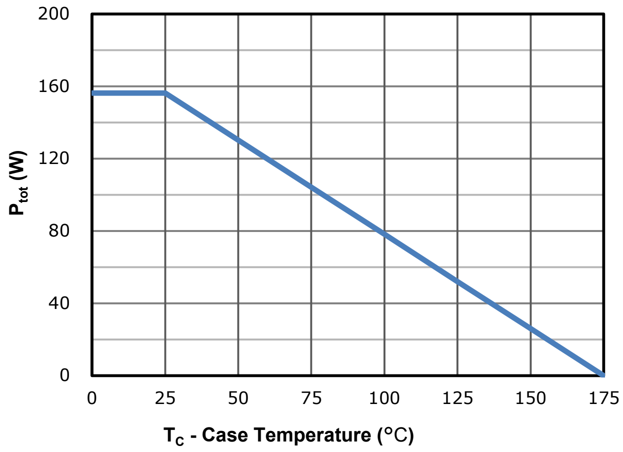


Fig 12: Drain Current Derating

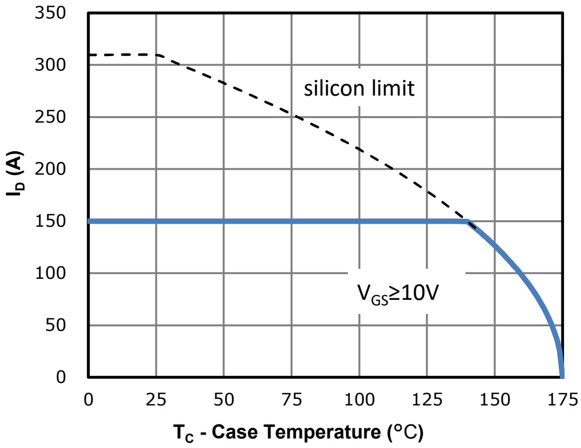


Fig 13: Safe Operating Area

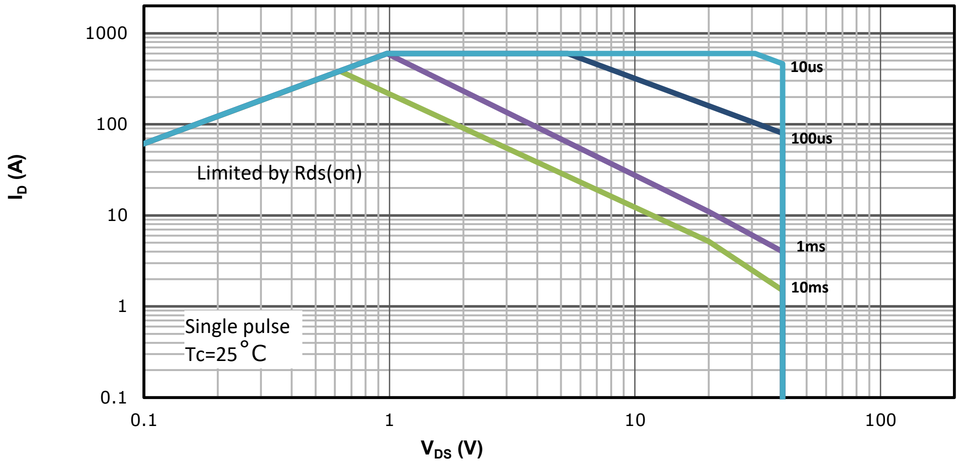
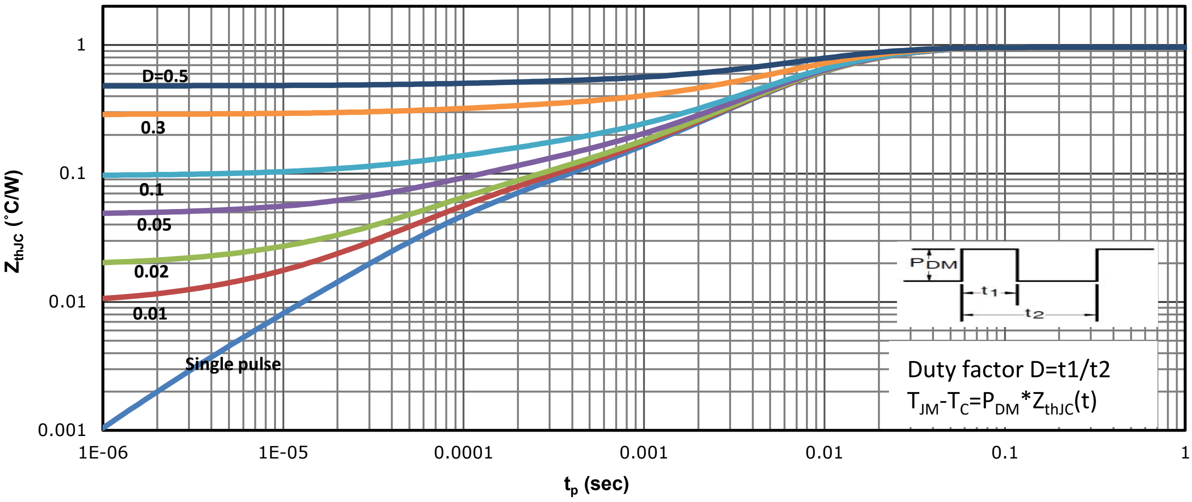
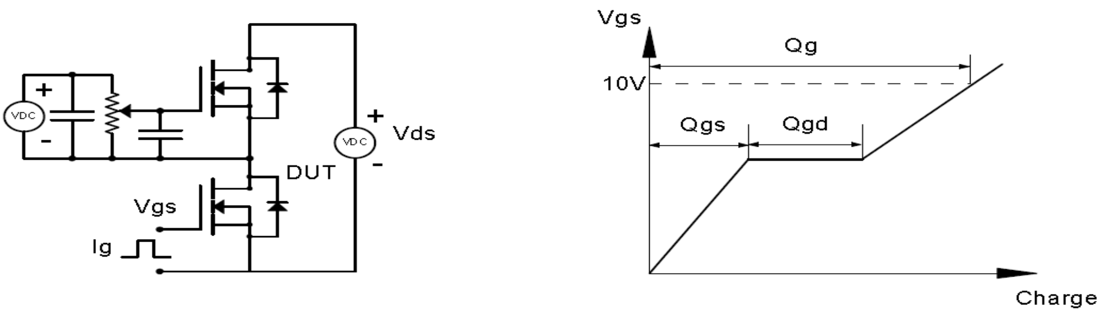


Fig 14: Max. Transient Thermal Impedance

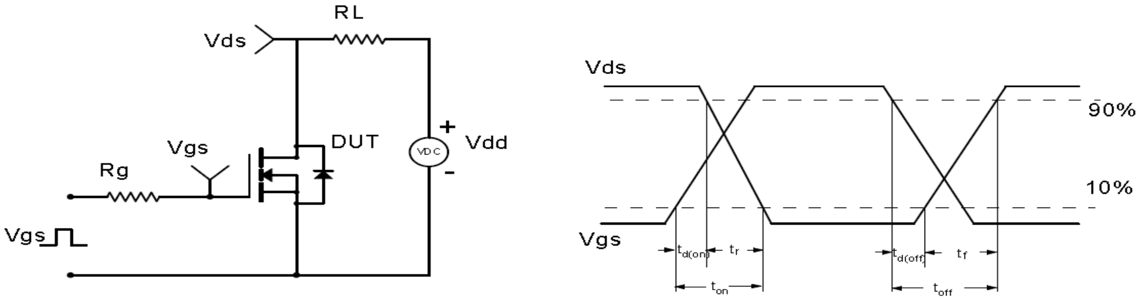


Test Circuit & Waveform

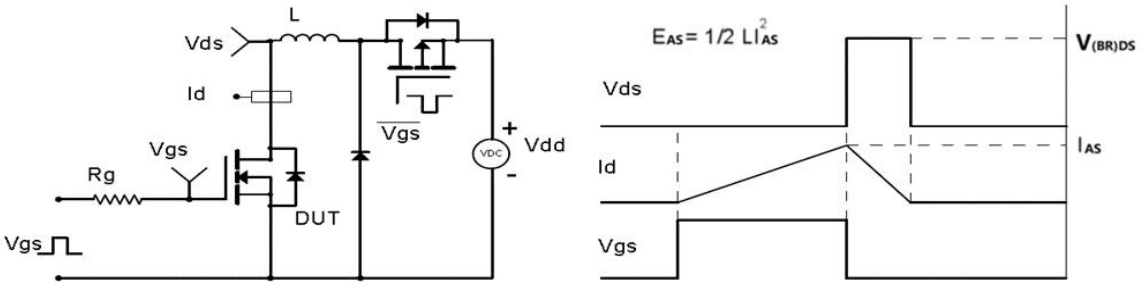
Gate Charge Test Circuit & Waveform



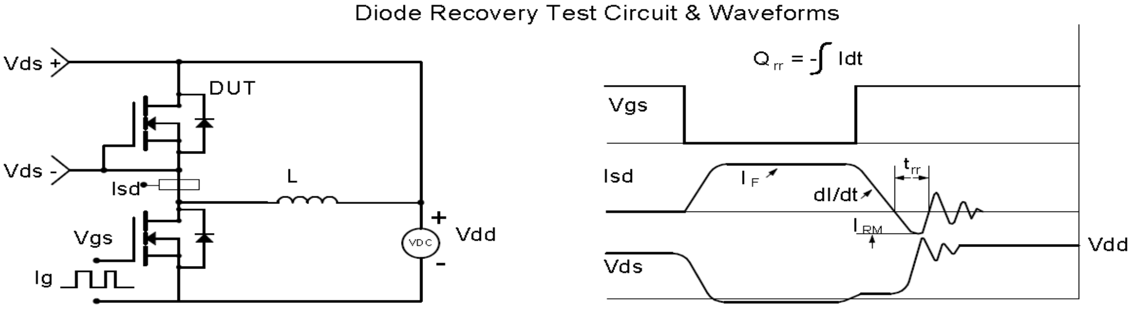
Resistive Switching Test Circuit & Waveforms



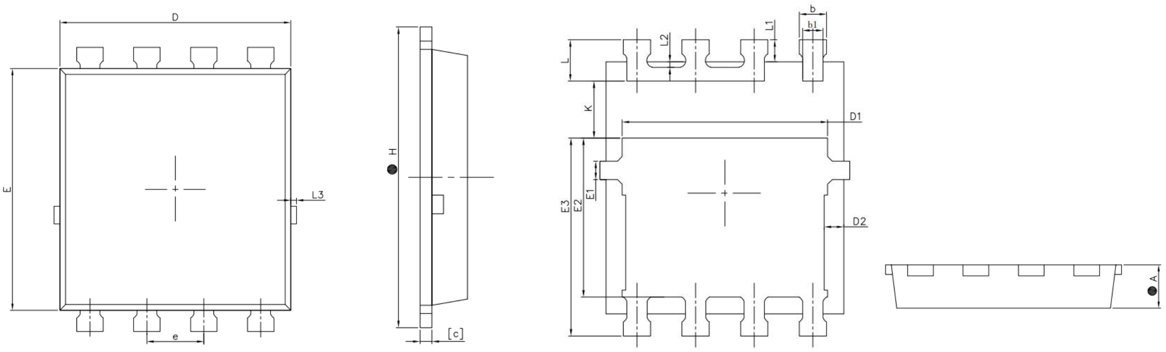
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: UPDFN5*6-C



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.10	0.035	0.043
b	0.49	0.69	0.019	0.027
b1	0.34	0.54	0.013	0.021
c	0.20	0.30	0.008	0.012
D	4.95	5.35	0.195	0.211
D1	4.45	4.85	0.175	0.191
D2	0.23	0.63	0.009	0.025
E	5.28	5.68	0.208	0.224
E1	0.25	0.60	0.010	0.024
E2	3.20	3.70	0.126	0.146
E3	4.05	4.55	0.159	0.179
e	1.27		0.050	
H	6.19	6.69	0.244	0.263
L	0.65	1.15	0.026	0.045
L1	0.28	0.68	0.011	0.027
L2	1.20		0.047	
L3	-	0.13	-	0.005
K	1.04	1.44	0.041	0.057

Revision History

Revison	Date	Major changes
1.0	2025/6/4	Release of Formal Version

Disclaimer

Any and all semicondutor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

The product is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation/aerospace and life-support devices or systems.

Buyer is responsible for its products and applications using PingWei products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by PingWei.

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