PWDC042N10ESQ

Perfect MOS N-MOSFET 100V, 3.5mΩ, 124A

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 AECQ-101 criteria

Benefits

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

Applications

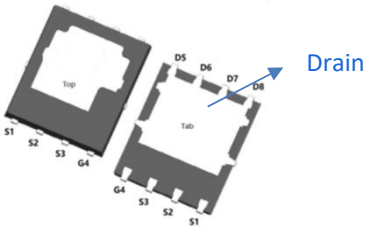
- General Automotive applications
- 48V Systems
- UPS (Uninterrupible Power Supplies)

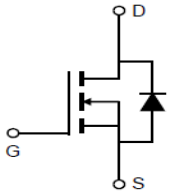
100% DVDS Tested
100% AvalancheTested

Product Summary

V_{DS}	100V
$R_{DS(on)@10V\ typ}$	3.5mΩ
I_D （Silicon)	124A

DFN5x6 Double Cooling





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
PWDC042N10ESQ	PW4210	DFN5x6Double Cooling	Tape&Reel	13 inches	12mm	5000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C (Silicon Limit) T_C = 25°C (Package Limit) T_C = 100°C (Silicon Limit) Ta = 25°C (See RthJA)	I_D	 124 150 88 21	A
Pulsed drain current (T_C = 25°C,tp = 100us)	$I_{D\ pulse}$	558	A
Avalanche energy, single pulse (L=0.1mH)	E_{AS}	173	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation T_C = 25°C Ta = 25°C (See RthJA)	P_{tot}	 136 3.8	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	-	-	1.1	°C/W	-
Thermal resistance, junction - ambient	RthJA	-	39	-	°C/W	1 inch²,2oz single copper FR-4 PCB

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}	100	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2	-	4	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=100V,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	$R_{DS(on)}$	-	3.5	4.2	mΩ	Vgs=10V,Id=50A
Transconductance	g_{fs}	-	120	-	S	V_{DS}=5V,I_D=50A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	4080	-	pF	V_{GS}=0V, V_{DS}=50V, f=100KHz
Output Capacitance	C_{oss}	-	1431	-		
Reverse Transfer Capacitance	C_{rss}	-	15	-		
Gate Total Charge	Q_G	-	47	-	nC	Vds=50V,Id=50A ,Vgs=10V
Gate-Source charge	Q_{gs}	-	14	-		
Gate-Drain charge	Q_{gd}	-	5	-		
Turn-on delay time	$t_{d(on)}$	-	10	-	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=3Ω,I_D=50A
Rise time	t_r	-	6	-		
Turn-off delay time	$t_{d(off)}$	-	32	-		
Fall time	t_f	-	9	-		
Gate resistance	R_G	-	2	-	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}=50A
Body Diode Continuous Forward Current	Is	-	-	124	A	TC = 25°C
Body Diode Pulsed Current	Is pulse	-	-	558	A	TC = 25°C,tp = 100us
Body Diode Reverse Recovery Time	t_{rr}	-	88	-	ns	I_F=30A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	195	-	nC	

1)A maximum of the RthJT measured at Pingwei's test environment is only used for reference. Beaware that the top-plate has the same electric potential as the sources; however, not intended for an Electrode.

Typical Performance Characteristics

Fig 1: Output Characteristics

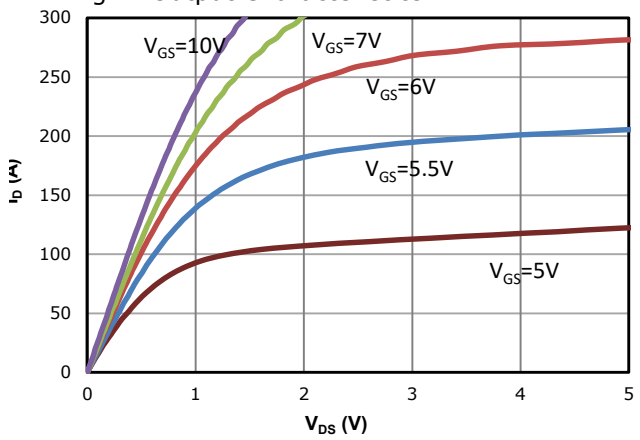


Fig 2: Transfer Characteristics

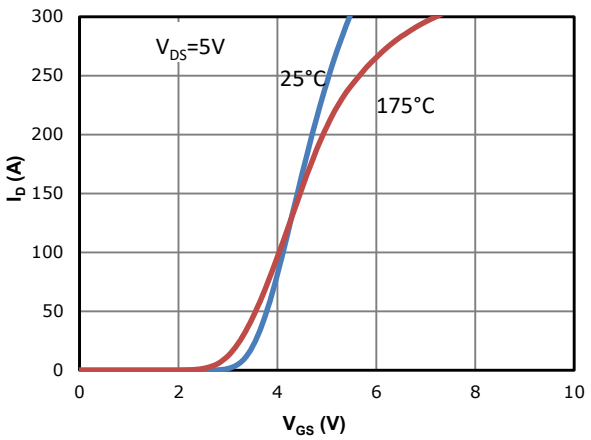


Fig 3: Rds(on) vs Drain Current and Gate Voltage

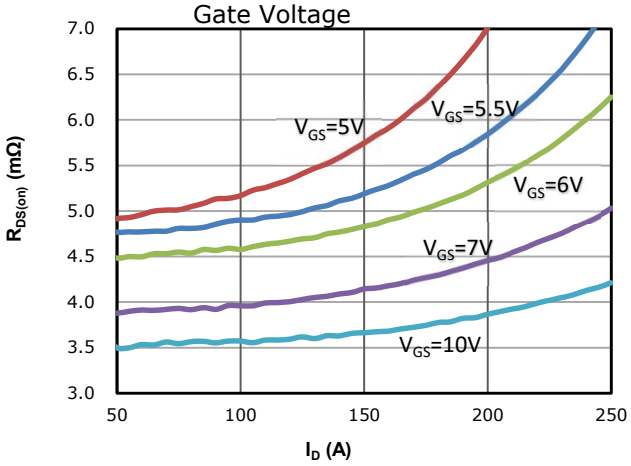


Fig 4: Rds(on) vs Gate Voltage

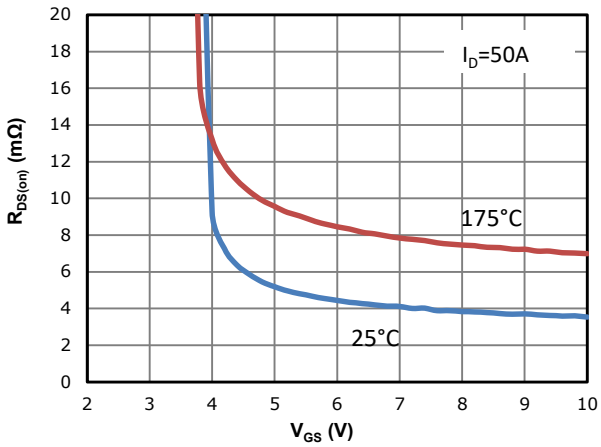


Fig 5: Rds(on) vs. Temperature

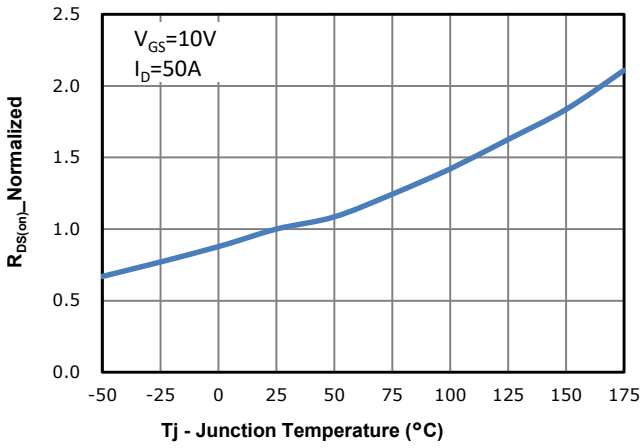


Fig 6: Vgs(th) vs. Temperature

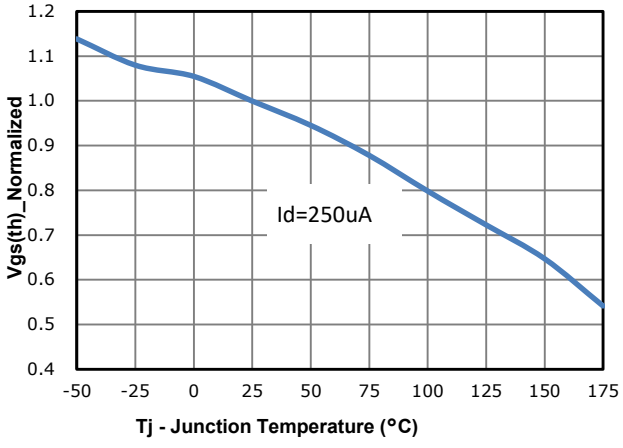


Fig 7: BVdss vs. Temperature

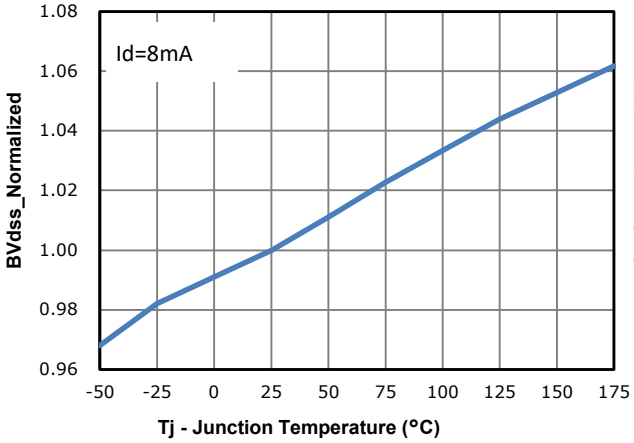


Fig 8: Capacitance Characteristics

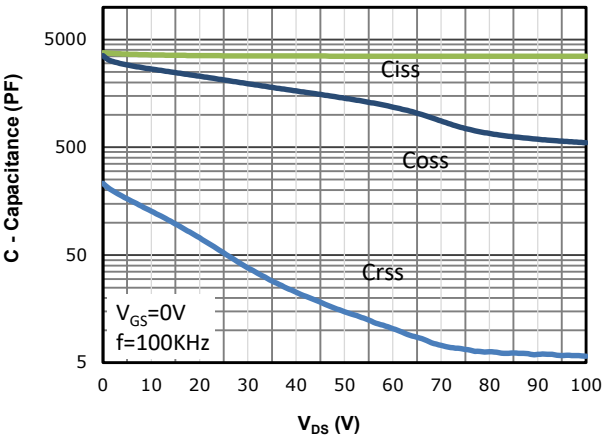


Fig 9: Gate ChargeCharacteristics

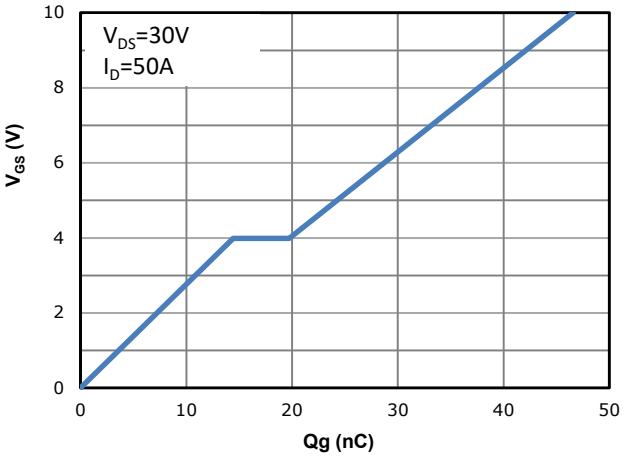


Fig 10: Body-diode Forward Characteristics

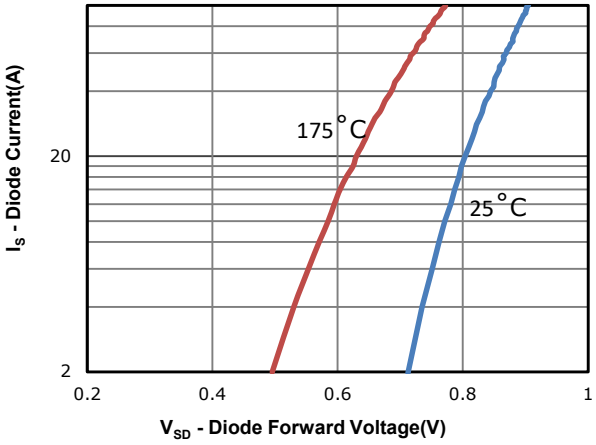


Fig 11: Power Dissipation

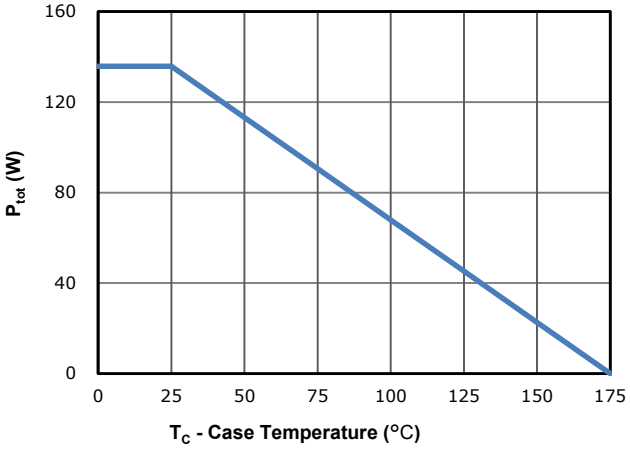


Fig 12: Drain Current Derating

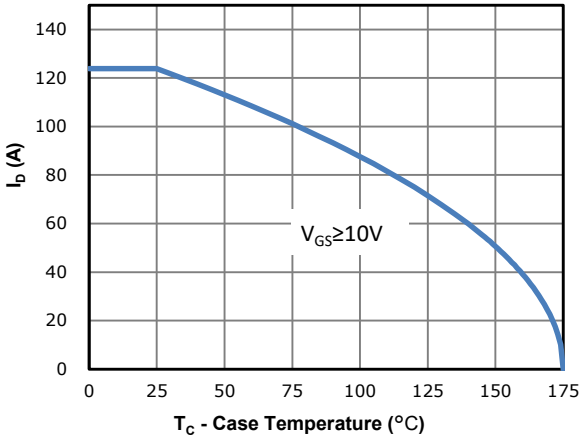


Fig 13: Safe Operating Area

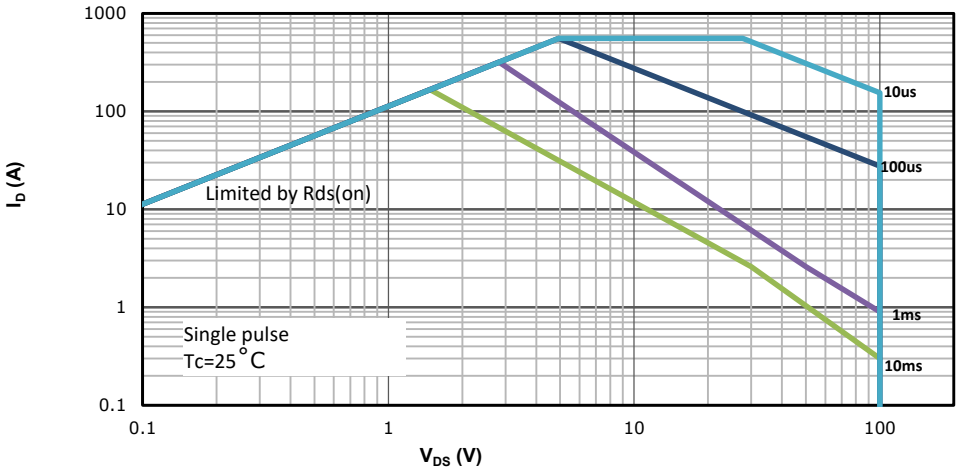
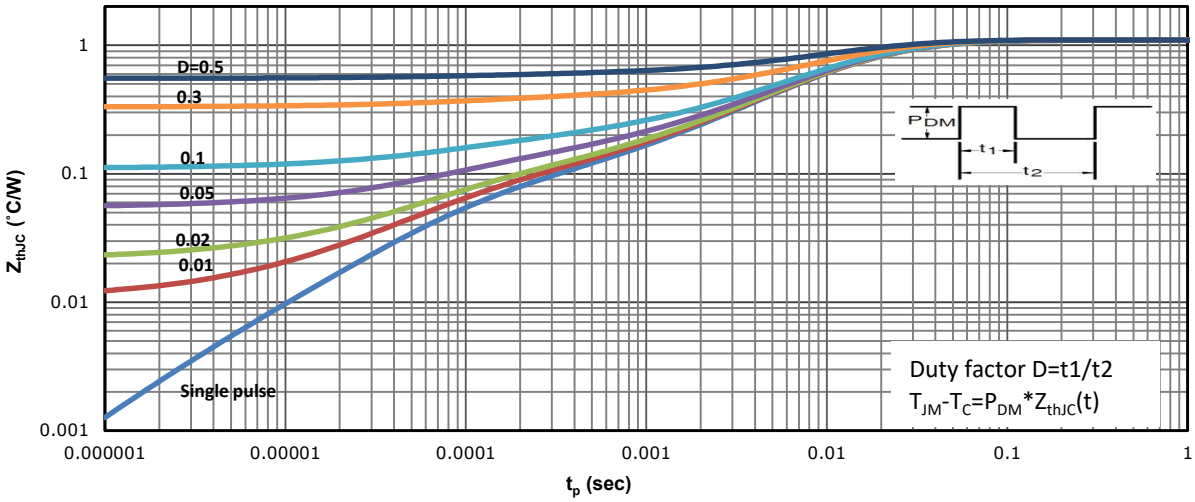
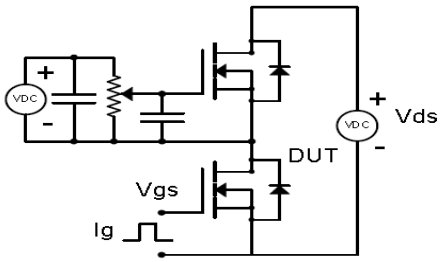


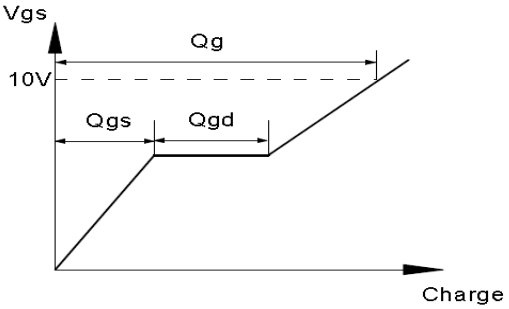
Fig 14: Max. Transient Thermal Impedance



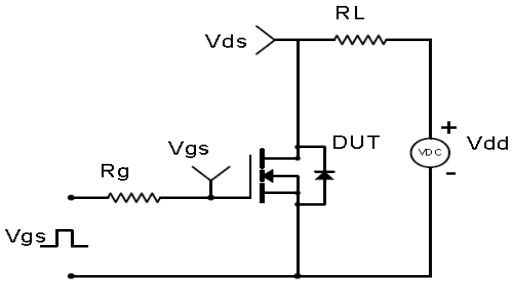
Test Circuit & Waveform

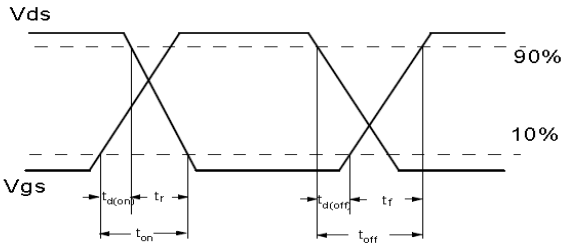
Gate Charge Test Circuit & Waveform



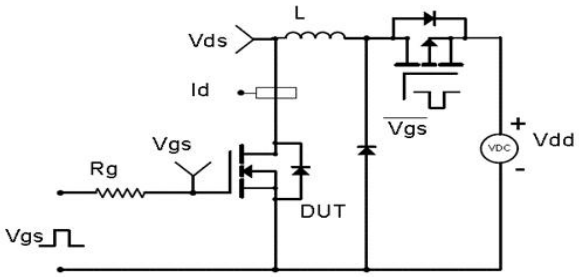


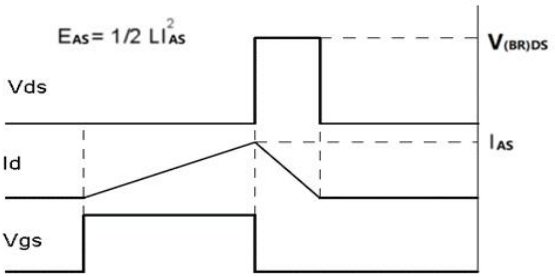
Resistive Switching Test Circuit & Waveforms



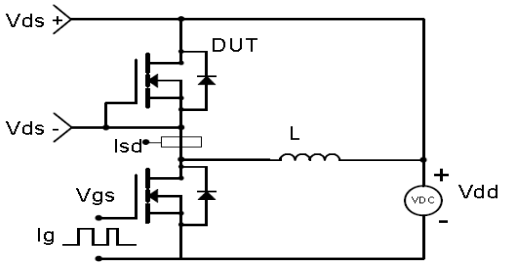


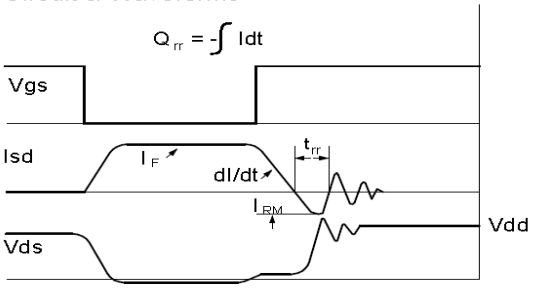
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



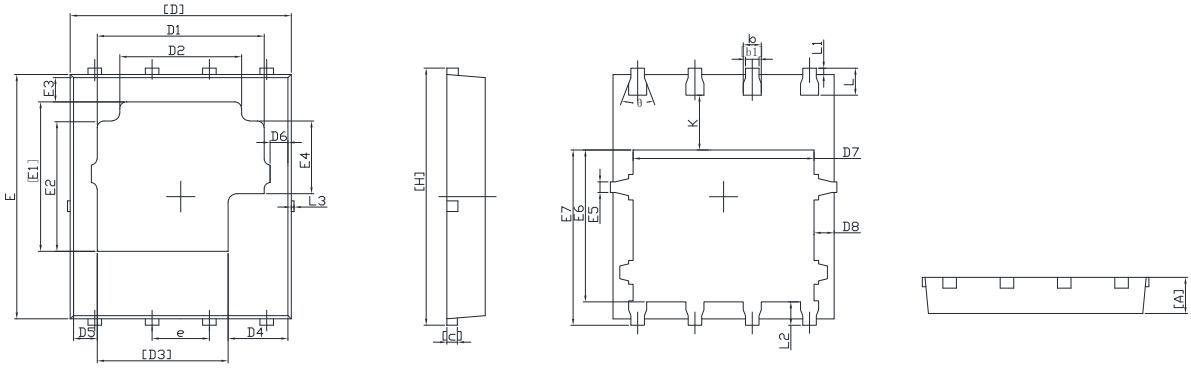


Diode Recovery Test Circuit & Waveforms





Package Outline: DFN5X6 Double Cooling



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.75	0.95	0.030	0.037
b	0.30	0.50	0.012	0.020
b1	0.20	0.40	0.008	0.016
c	0.20	0.30	0.008	0.012
D	4.80	5.20	0.189	0.205
D1	3.45	3.95	0.136	0.156
D2	2.45	2.95	0.096	0.116
D3	2.65	3.15	0.104	0.124
D4	1.08	1.58	0.043	0.062
D5	0.28	0.78	0.011	0.031
D6	0.20	0.60	0.008	0.024
D7	3.81	4.21	0.150	0.166
D8	0.24	0.64	0.009	0.025
E	5.55	5.95	0.219	0.234
E1	3.27	3.77	0.129	0.148
E2	2.80	3.30	0.110	0.130
E3	0.32	0.82	0.013	0.032
E4	1.46	1.96	0.057	0.077
E5	0.15	0.45	0.006	0.018
E6	3.32	3.82	0.131	0.150
E7	3.875	4.375	0.153	0.172
e	1.27		0.050	
H	5.80	6.30	0.228	0.248
L	0.435	0.835	0.017	0.033
L1	0.05	0.25	0.002	0.010
L2	0.35	0.75	0.014	0.030
L3	-	0.85	-	0.033
K	1.09	1.49	0.043	0.059
θ	35°	45°	35°	45°

Revision History

Revison	Date	Major changes
1.2	2025/8/7	Update ID (Pakage limit) from 100A to 150A; ID (pulse) from 400A to 558A;Update SOA

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.

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