

### ● General Description

The AGM204AP combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

This device is ideal for load switch and battery protection applications.

### ● Features

- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

### ● Application

- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

### Product Summary

BVDSS	RDSON	ID
20V	3.1mΩ	55A

### PDFN3.3\*3.3 Pin Configuration

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM204AP	AGM204AP	PDFN3.3*3.3	330mm	12mm	5000

**Table 1. Absolute Maximum Ratings (TA=25°C)**

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	20	V
VGS	Gate-Source Voltage (VDS=0V)	±12	V
ID	Drain Current-Continuous(Tc=25°C) <b>(Note 1)</b>	55	A
	Drain Current-Continuous(Tc=100°C)	35	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed <b>(Note 2)</b>	220	A
PD	Maximum Power Dissipation(Tc=25°C)	39	w
	Maximum Power Dissipation(Tc=100°C)	16	w
EAS	Avalanche energy <b>(Note 3)</b>	88	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	50	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	3.2	°C/W

**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	20	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=20V,VGS=0V	--	--	1.0	μA
IGSS	Gate-Body Leakage Current	VGS=±12V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	0.5	--	0.9	V
gFS	Forward Transconductance	VDS=5V,ID=15A	--	5	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=4.5V, ID=20A	--	3.1	4.0	mΩ
		VGS=2.5V, ID=15A	--	4.0	6.0	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=10V,VGS=0V, F=1MHZ	--	2944	--	pF
Coss	Output Capacitance		--	423	--	pF
Crss	Reverse Transfer Capacitance		--	409	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=4.5V,VDS=10V Rg=1.8Ω,ID=30A	--	8.9	--	nS
tr	Turn-on Rise Time		--	34	--	nS
td(off)	Turn-Off Delay Time		--	58	--	nS
tf	Turn-Off Fall Time		--	48	--	nS
Qg	Total Gate Charge	VGS=4.5V, VDS=10V, ID=30A	--	44	--	nC
Qgs	Gate-Source Charge		--	3.3	--	nC
Qgd	Gate-Drain Charge		--	7.5	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	55	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25°C	--	21	--	ns
Qrr	Reverse Recovery Charge		--	9.0	--	nc

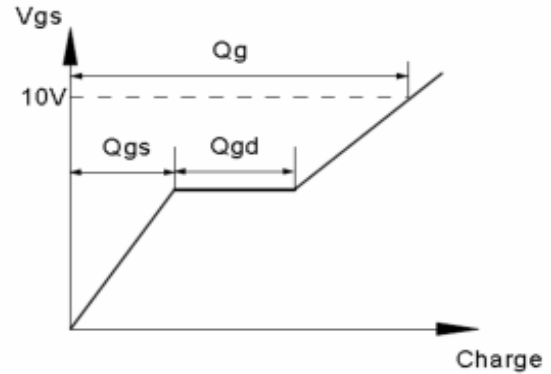
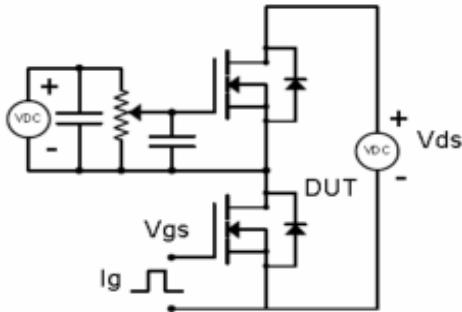
Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

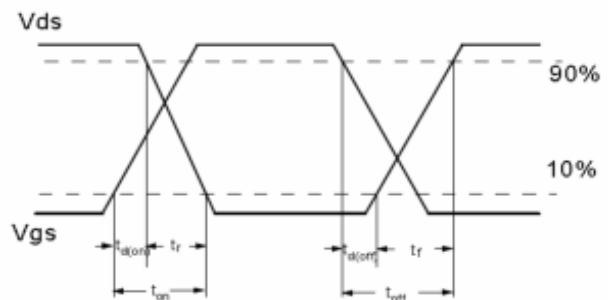
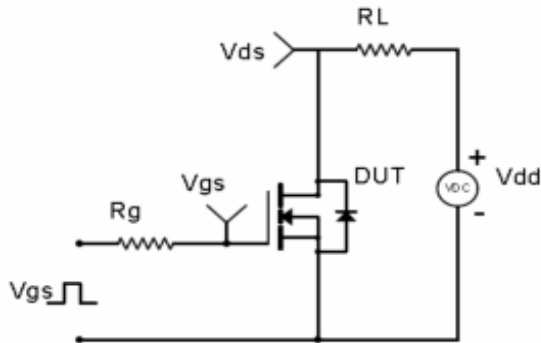
Notes 3.EAS condition: T<sub>J</sub>=25°C

## Test Circuit & Waveform

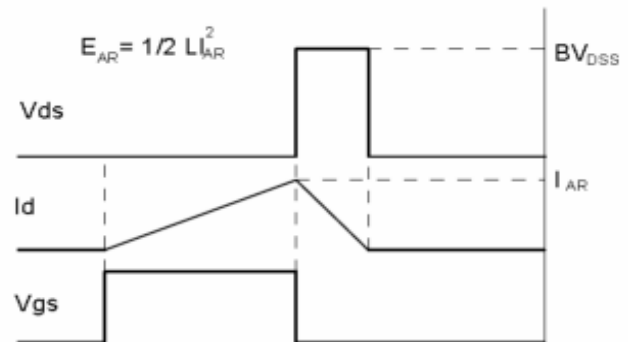
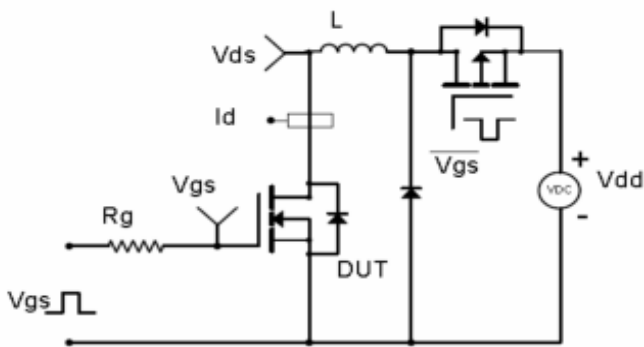
### Gate Charge Test Circuit & Waveform



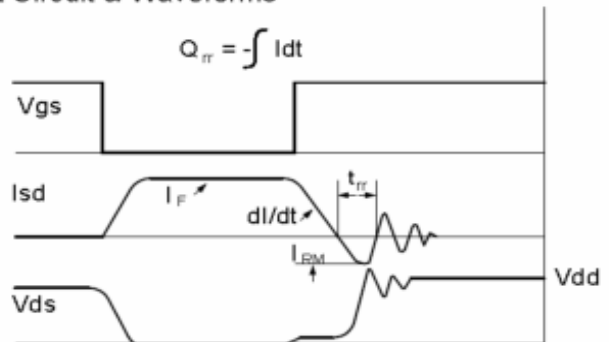
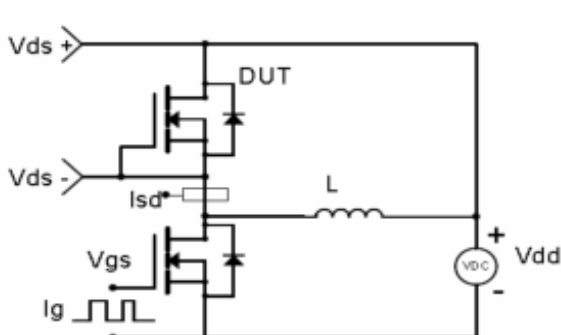
### Resistive Switching Test Circuit & Waveforms

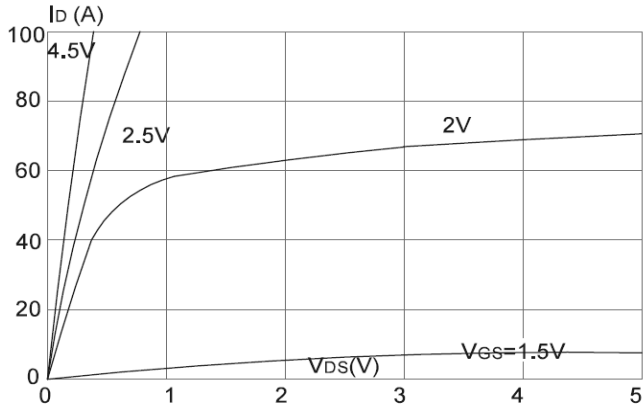
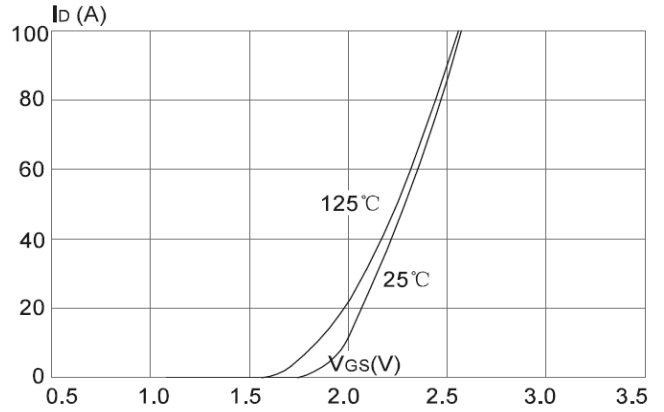
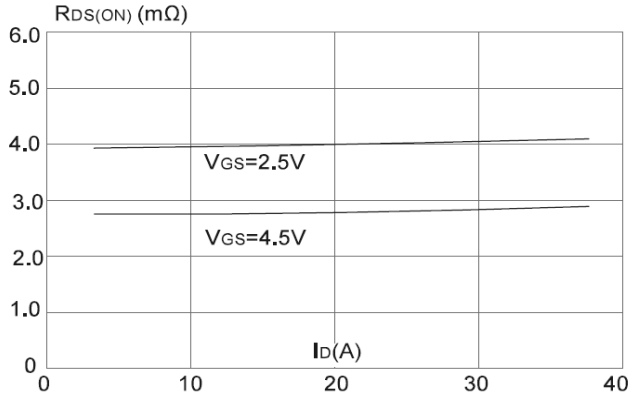
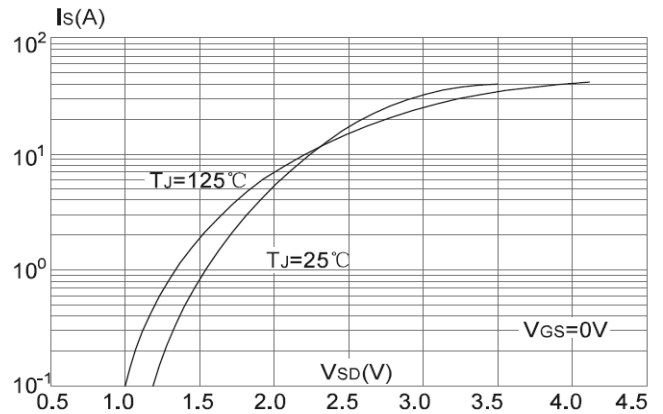
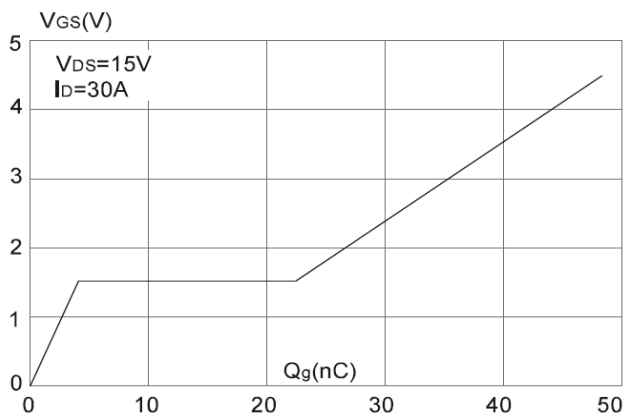
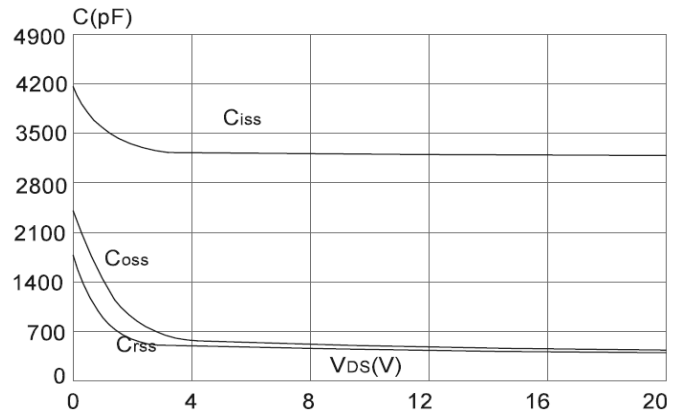


### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

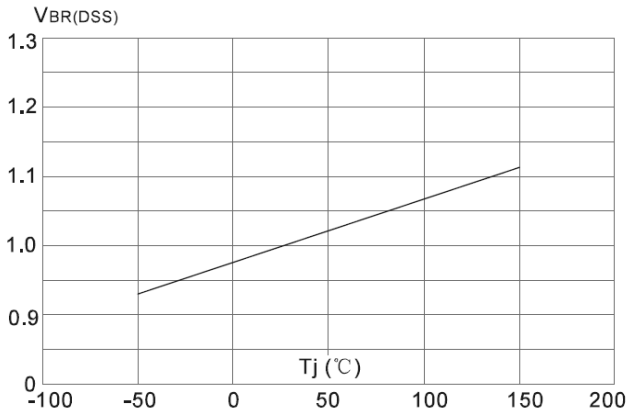


### Diode Recovery Test Circuit & Waveforms

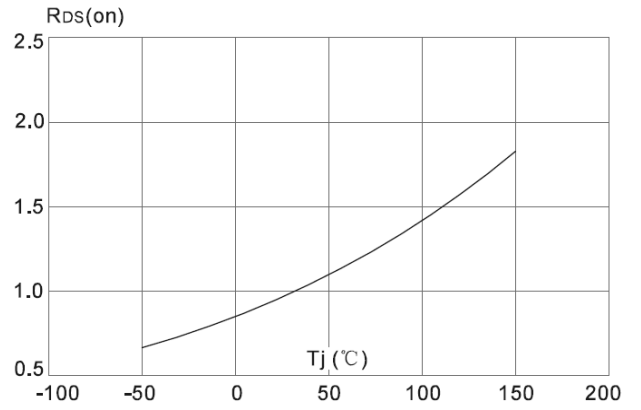


**Figure 1: Output Characteristics**

**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 Drain Current vs. Case Temperature**

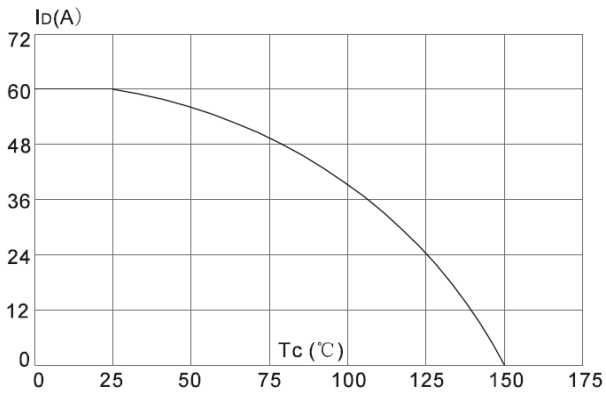


Fig.10 Safe Operating Area

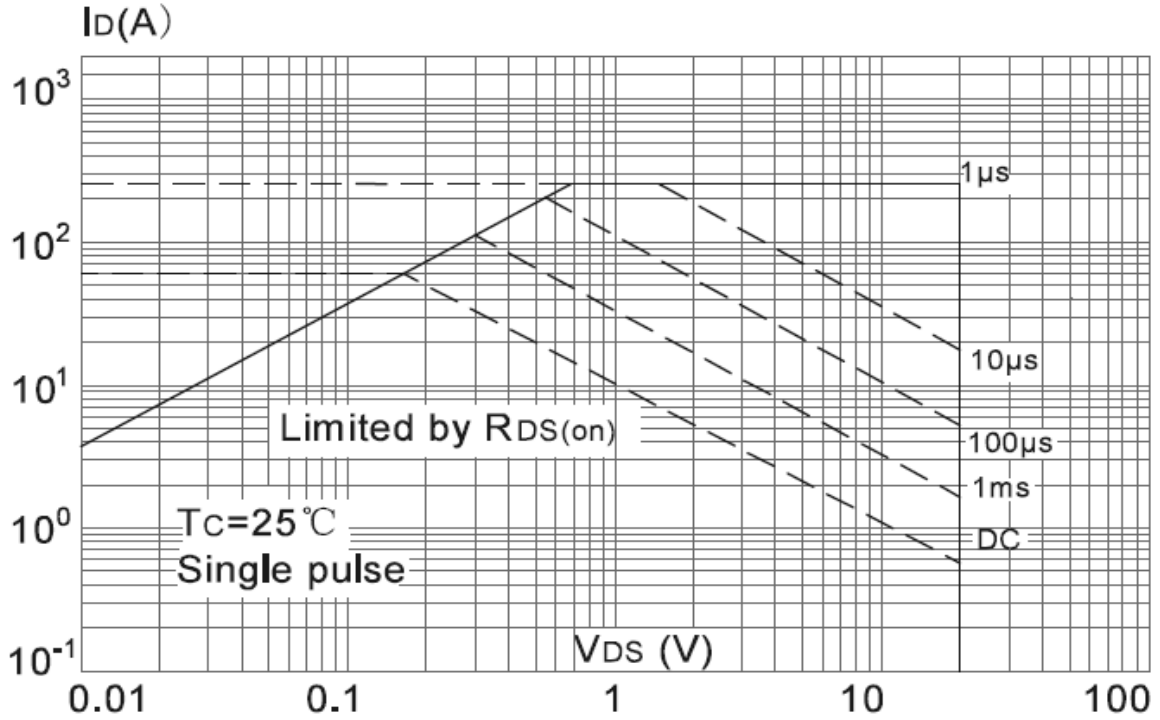
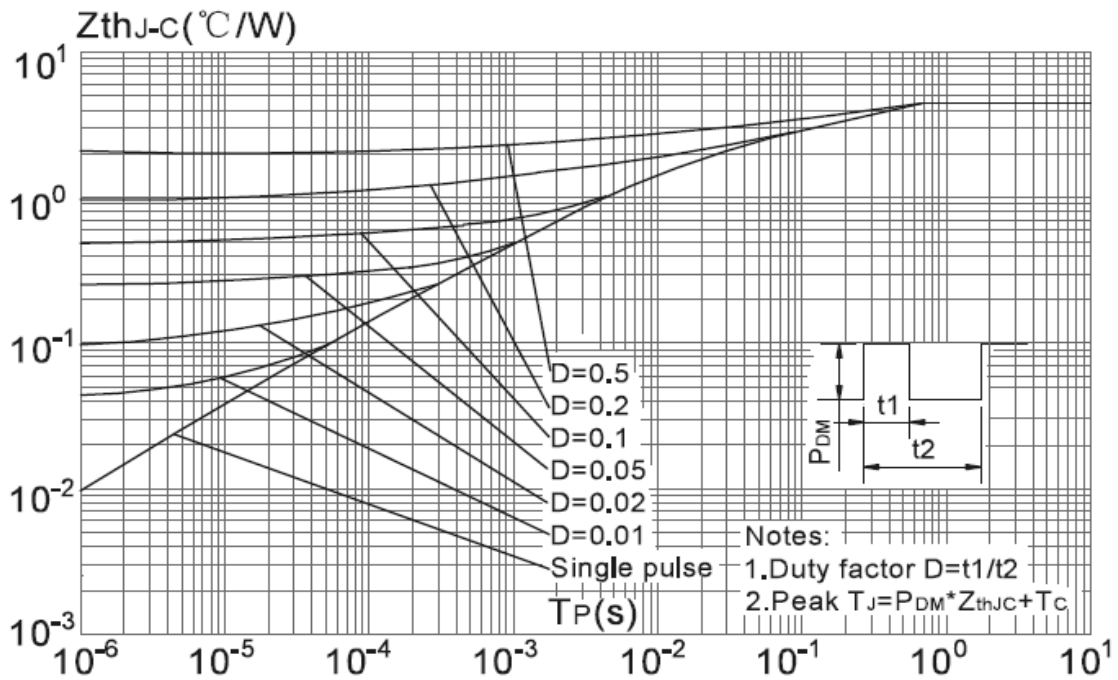
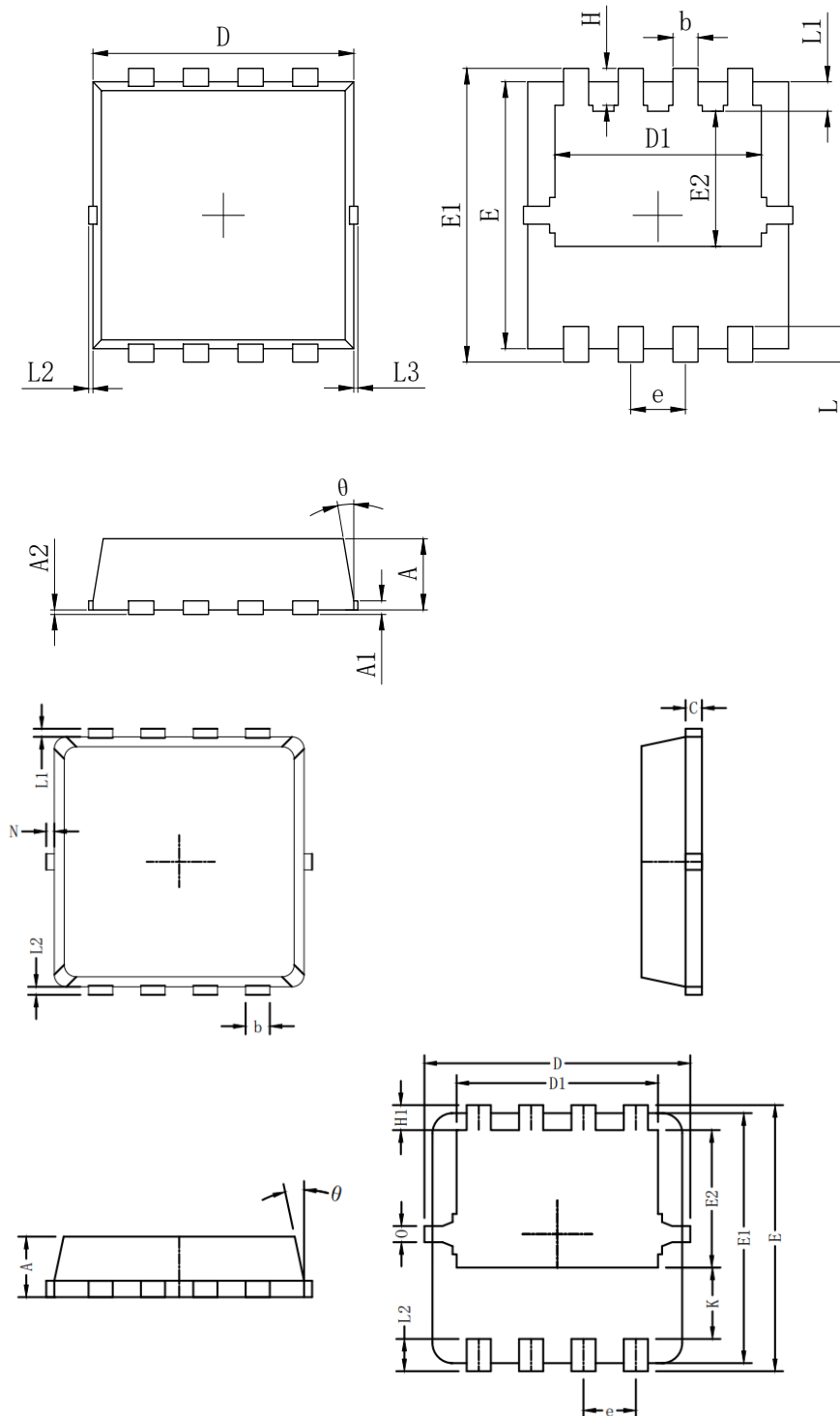


Fig. 11 Transient Thermal Response Curve



**•Dimensions (PDFN3.3×3.3)**


SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.700	0.800	0.900
A1	0.152 REF.		
A2	0°0.05		
D	3.000	3.100	3.200
D1	2.300	2.450	2.600
E	2.900	3.000	3.100
E1	3.150	3.300	3.450
E2	1.320	1.520	1.720
b	0.200	0.300	0.400
e	0.550	0.650	0.750
L	0.300	0.400	0.500
L1	0.180	0.330	0.480
L2	0°0.100		
L3	0°0.100		
H	0.315	0.415	0.515
θ	8°	10°	12°

Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.60	1.70	1.80
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.78	0.88	0.98
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
O	0.2 REF.		


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