● General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. It combines one N channel MOSFET and one P channel MOSFET.

● Features

■ Advance high cell density Trench technology

■ Low $R_{DS(ON)}$ to minimize conductive loss

■ Low Gate Charge for fast switching

■ Dual DIE in one package

●Application

■ Power Management in Notebook Computer

■ BLDC Motor driver

● Product Summary

$V_{DS1} = 30V$
$V_{DS2} = -30V$
$R_{DS(ON)1} = 11m\Omega$
$R_{DS(ON)2} = 30m\Omega$
$I_{D1} = 16A$
$I_{D2} = -10A$

DFN3*3

●Ordering Information:

Part NO.	ZMC88303M
Marking	88303
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	7.3	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

●N Channel Absolute Maximum Ratings ($T_C = 25℃$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	20	V
Continuous Drain Current	$I_D @ T_C = 25℃$	16	A
	$I_D @ T_C = 75℃$	12	A
	$I_D @ T_C = 100℃$	10	A

Pulsed Drain Current [①]	I_{DM}	48	A
Total Power Dissipation	$P_D@T_C$=25℃	17	W
Total Power Dissipation	$P_D@T_A$=25℃	2.0	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	30	mJ

●**P Channel Absolute Maximum Ratings (T$_C$ =25℃)**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_D@T_C$ =25℃	-10	A
	$I_D@T_C$ =75℃	-7.6	A
	$I_D@T_C$=100℃	-6.3	A
Pulsed Drain Current [①]	I_{DM}	-30	A
Total Power Dissipation	$P_D@T_C$=25℃	17	W
Total Power Dissipation	$P_D@T_A$=25℃	2.0	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	67	mJ

●**N Channel Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250uA	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V $_{DS}$, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	VGS=10V, ID=12A		11	14	mΩ
		VGS=4.5V, ID=10A		13	17	mΩ
Forward Trans conductance	g_{FS}	V_{DS} =25V, I_D=5A		9		s
Source-drain voltage	V_{SD}	Is=23A			1.28	V

●**Dynamic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit

Parameter	Symbol	Condition				Unit
Input capacitance	Ciss	f = 1MHz V_{DS}=25V	-	560	-	pF
Output capacitance	Coss		-	81	-	
Reverse transfer capacitance	Crss		-	49	-	
Total gate charge	Qg	V_{DD} = 25V I_D = 5A V_{GS} = 10V	-	10	-	nC
Gate - Source charge	Qgs		-	1.6	-	
Gate - Drain charge	Qgd		-	2.8	-	

●**P Channel Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV$_{DSS}$	V_{GS} =0V, I_D =-250uA	-30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =-250uA	-1.2		-2.5	V
Drain-Source Leakage Current	I$_{DSS}$	V_{DS}=-30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I$_{GSS}$	V_{GS}=±20V, V_{DS} =0V			±100	nA
Static Drain-source On Resistance	R$_{DS(ON)}$	V_{GS}=-10V, I_D=-9A		30	42	mΩ
		V_{GS}=-4.5V, I_D=-7A		40	52	mΩ
Forward Transconductance	g$_{FS}$	V_{DS} =-10V, I_D=-5A		9		s

●**Dynamic Characteristics**

Parameter	Symbol	Condition		Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V_{DS}=-25V		-	850	-	pF
Output capacitance	Coss			-	125	-	
Reverse transfer capacitance	Crss			-	115	-	
Total gate charge	Qg	V_{DD} = -25V I_D = -5A V_{GS} = -10V		-	12	-	nC
Gate - Source charge	Qgs			-	5	-	
Gate - Drain charge	Qgd			-	6	-	

●**N Channel characteristics curve**

Fig.1 Power Dissipation Derating Curve
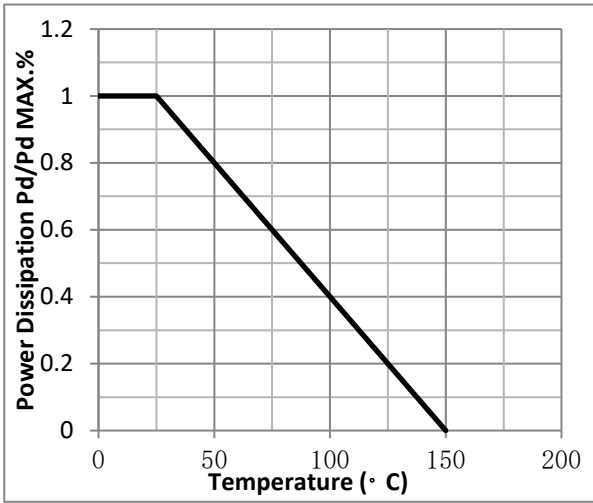
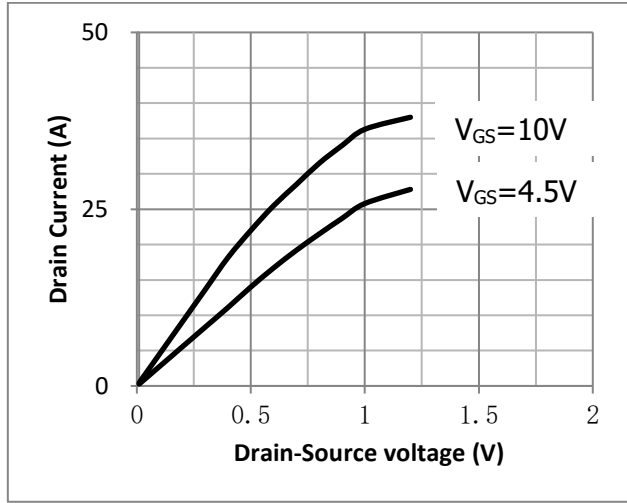Fig.2 Typical output Characteristics

Fig.3 Threshold Voltage V.S Junction Temperature

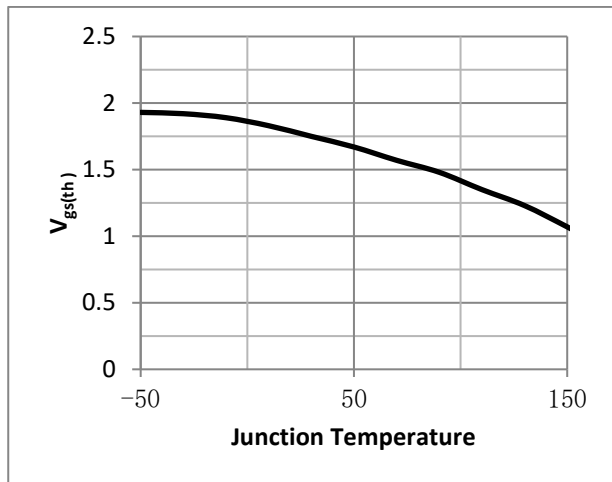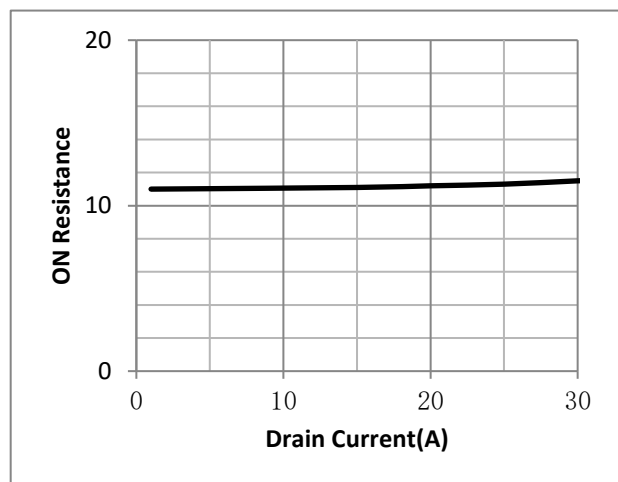Fig.4 Resistance V.S Drain Current
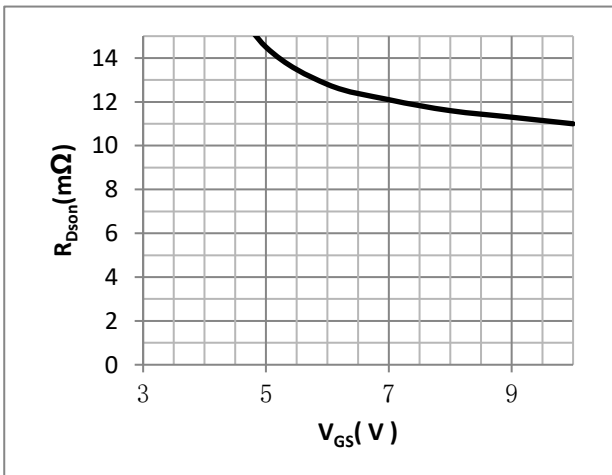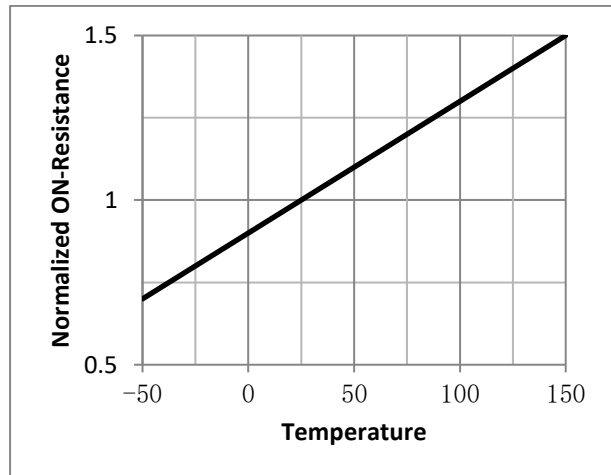

Fig.5 On-Resistance VS Gate Source Voltage

Fig.6 On-Resistance V.S Junction Temperature

● P Channel characteristics curve
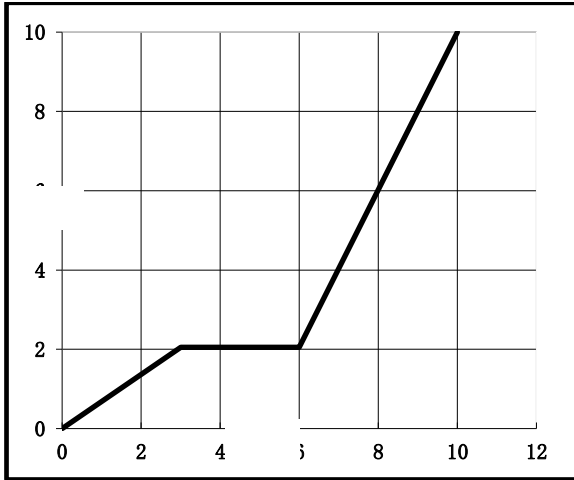
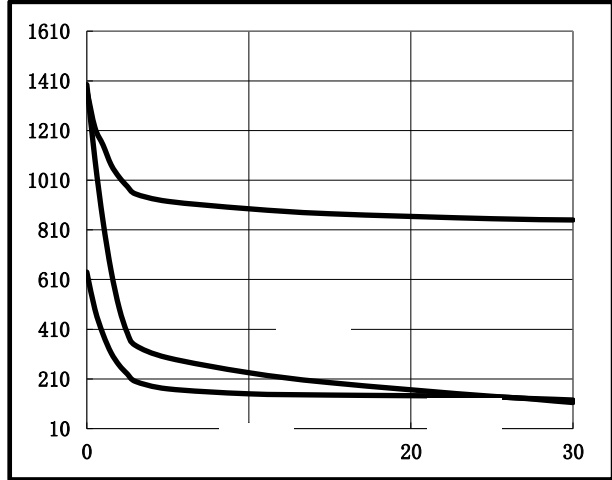Fig.1 Gate-Charge Characteristics

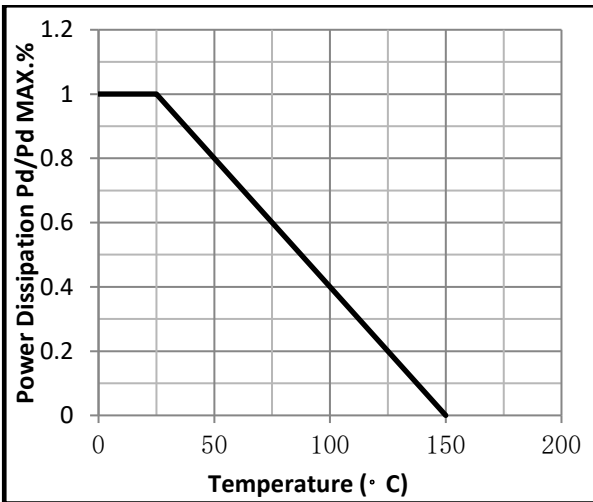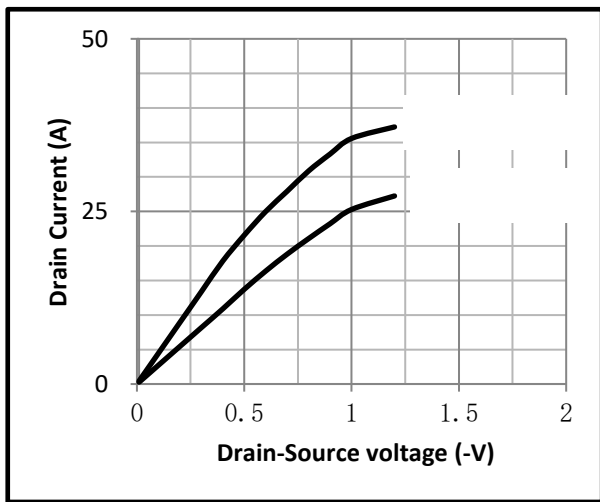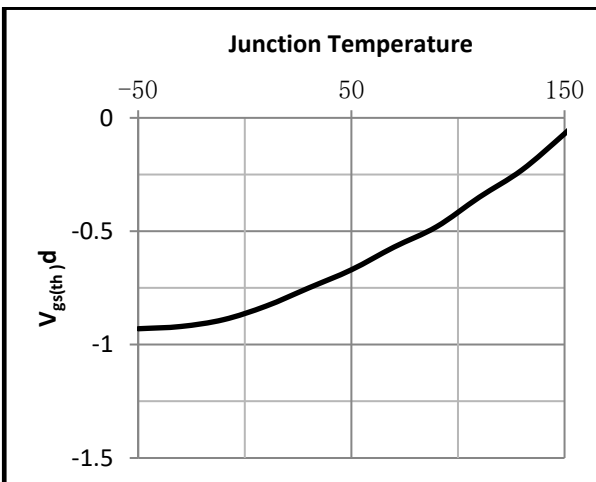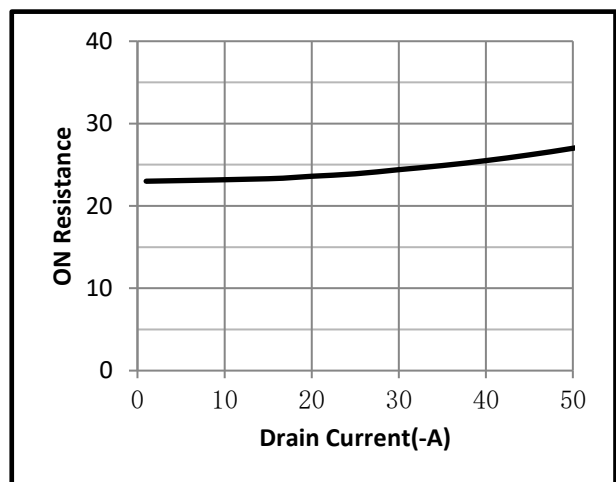Fig.2 Capacitance Characteristics

Fig.3 Power Dissipation Derating Curve

Fig.4 Typical output Characteristics

Fig.5 Threshold Voltage V.S Junction Temperature

Fig.6 Resistance V.S Drain Current
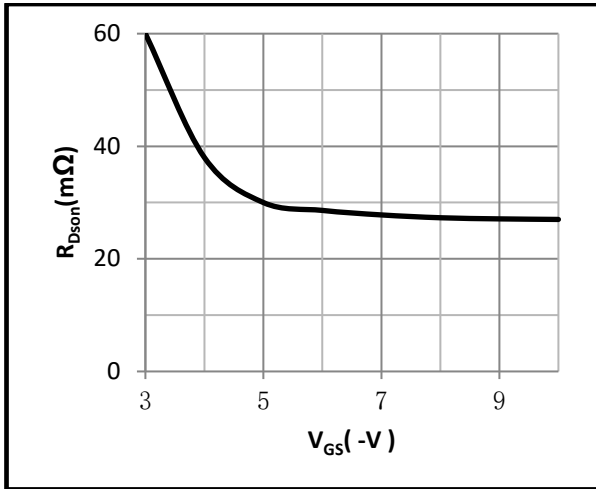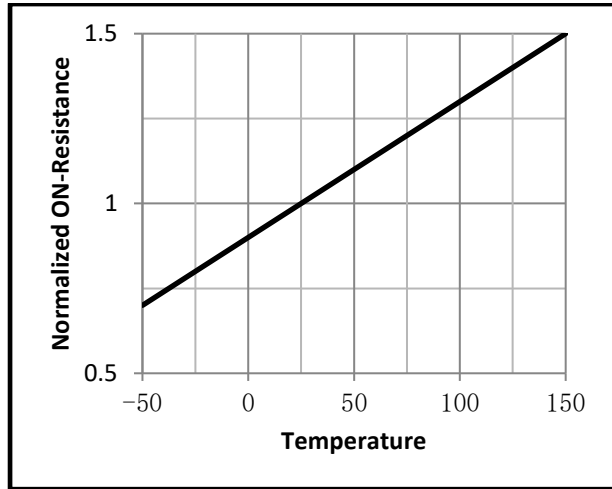
Fig.7 On-Resistance VS Gate Source Voltage

Fig.8 On-Resistance V.S Junction Temperature

Fig.9 Maximum Forward Biased Safe Operating Area   Fig.10 ID-Junction Temperature

●Test Circuit

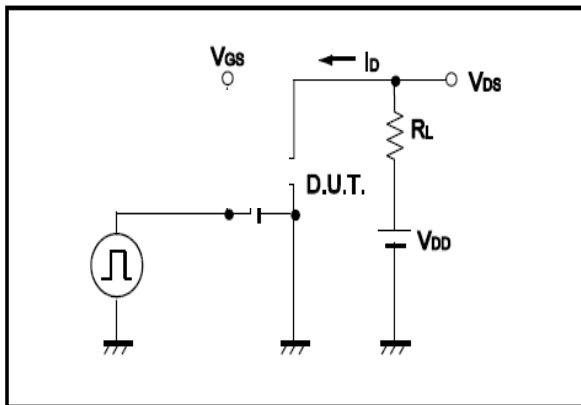Fig.1 Switching Time Measurement Circuit
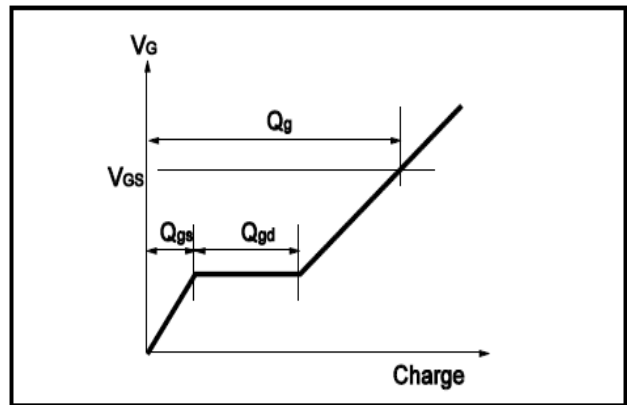
Fig.2 Gate Charge Waveform
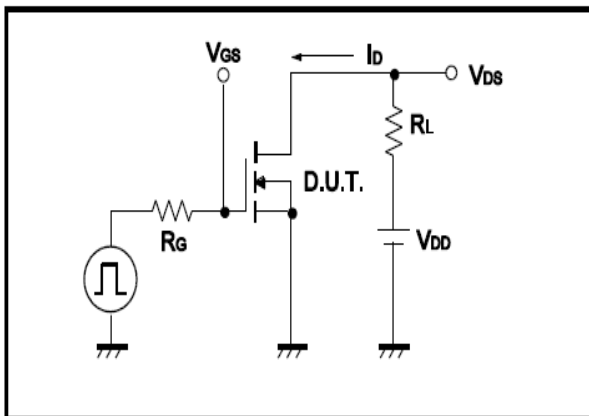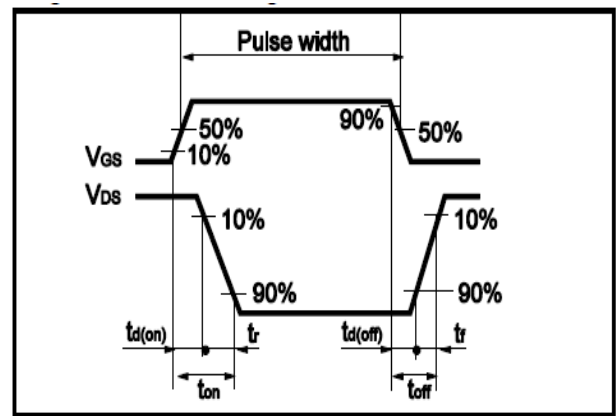

Fig.3 Switching Time Measurement Circuit

Fig.4 Gate Charge Waveform

Fig.5 Avalanche Measurement Circuit
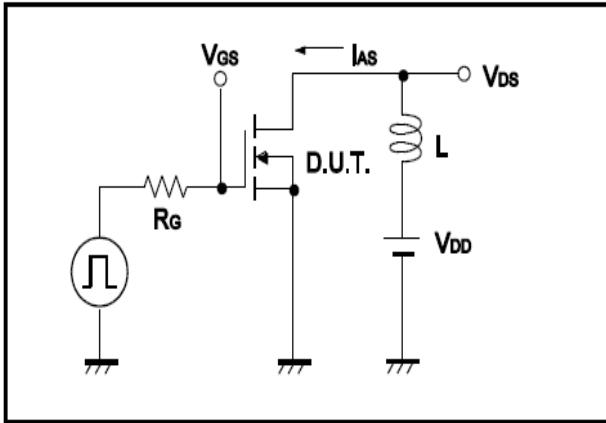
Fig.6 Avalanche Waveform

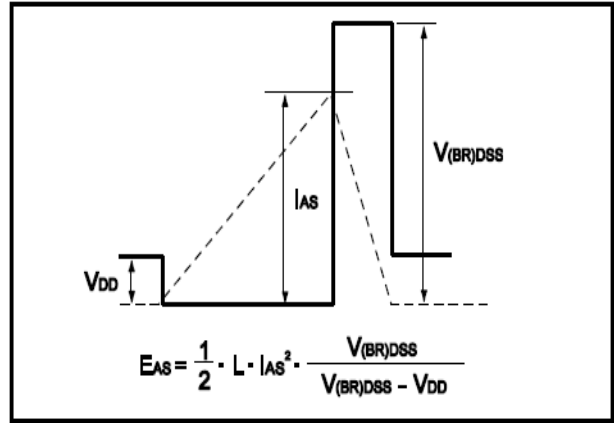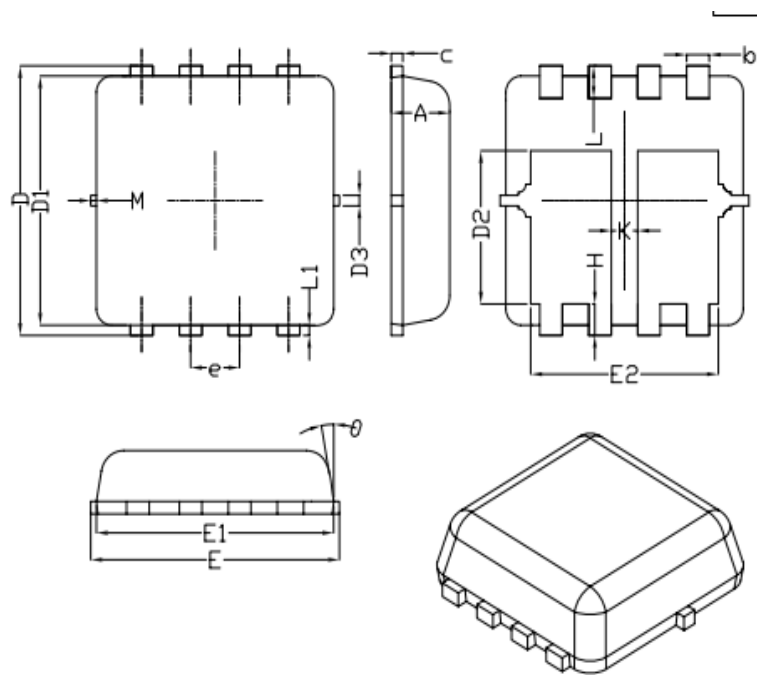$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AS}^2 \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

●**Dimensions（DFN3×3）**

Unit：mm

SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
K	0.30	---	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			