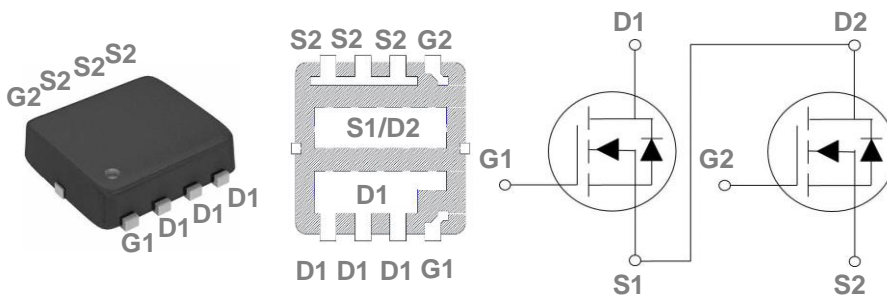


General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

	BVDSS	RDSON	ID
Q1	30V	10.5mΩ	19.5A
Q2	30V	10.5mΩ	19.5A

PPAK3x3 Asymmetric Dual Pin Configuration



Features

- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Halogen free

Applications

- MB / VGA / Vcore
- POL Buck Applications
- SMPS 2nd SR

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Q1	Q2	Units
V_{DS}	Drain-Source Voltage	30	30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	19.5	19.5	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	12.3	12.3	A
	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	10.8	10.8	A
	Drain Current – Continuous ($T_A=100^\circ\text{C}$)	6.8	6.8	A
I_{DM}	Drain Current – Pulsed ¹	78	78	A
EAS	Single Pulse Avalanche Energy ²	13	13	mJ
IAS	Single Pulse Avalanche Current ²	16	16	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	27	27	W
	Power Dissipation – Derate above 25°C	0.01	0.01	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ\text{C}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$ Q1	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$ Q2		---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$ Q1	Thermal Resistance Junction to Case	---	4.6	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$ Q2		---	4.6	$^\circ\text{C}/\text{W}$

Static State Characteristics

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	Q1	30	---	---	V
			Q2	30	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =1mA	Q1	---	0.04	---	V/°C
			Q2	---	0.04	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V , V _{GS} =0V , T _J =25°C	Q1	---	---	1	uA
			Q2	---	---	1	uA
		V _{DS} =24V , V _{GS} =0V , T _J =125°C	Q1	---	---	10	uA
			Q2	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	Q1	---	---	±100	nA
			Q2	---	---	±100	nA
R _{DS(ON)}	Static Drain-Source On-Resistance ³	V _{GS} =10V , I _D =10A	Q1	---	8.5	10.5	mΩ
		V _{GS} =10V , I _D =10A	Q2	---	8.5	10.5	mΩ
		V _{GS} =4.5V , I _D =5A	Q1	---	11	14	mΩ
		V _{GS} =4.5V , I _D =5A	Q2	---	11	14	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	Q1	1.2	1.6	2.5	V
			Q2	1.2	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =250uA	Q1	---	-4	---	mV/°C
			Q2	---	-4	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =5A	Q1	---	12	---	S
		V _{DS} =5V , I _D =5A	Q2	---	12	---	S

Dynamic Characteristics

Q _g	Total Gate Charge ^{3, 4}		Q1	---	15.6	31	nC
			Q2	---	15.6	31	
Q _{gs}	Gate-Source Charge ^{3, 4}	V _{DS} =15V , V _{GS} =10V , I _D =5A	Q1	---	2.3	5	
			Q2	---	2.3	5	
Q _{gd}	Gate-Drain Charge ^{3, 4}		Q1	---	3	6	
			Q2	---	3	6	
T _{d(on)}	Turn-On Delay Time ^{3, 4}		Q1	---	3.8	7	ns
			Q2	---	3.8	7	
T _r	Rise Time ^{3, 4}	V _{DD} =15V , V _{GS} =10V , R _G =6Ω	Q1	---	10	19	
			Q2	---	10	19	
T _{d(off)}	Turn-Off Delay Time ^{3, 4}	I _D =1A	Q1	---	22	42	
			Q2	---	22	42	
T _f	Fall Time ^{3, 4}		Q1	---	6.6	13	
			Q2	---	6.6	13	

C _{iss}	Input Capacitance	V _{DS} =25V , V _{GS} =0V , F=1MHz	Q1	---	620	900	pF		
			Q2	---	620	900			
C _{oss}	Output Capacitance		Q1	---	85	125			
			Q2	---	85	125			
C _{rss}	Reverse Transfer Capacitance		Q1	---	60	90			
			Q2	---	60	90			
R _g	Gate resistance		V _{GS} =0V, V _{DS} =0V, F=1MHz	Q1	---	2.8		5.6	Ω
				Q2	---	2.8		5.6	Ω

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit		
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	Q1	---	---	19.5	A	
			Q2	---	---	19.5	A	
I _{SM}	Pulsed Source Current ³		Q1	---	---	39	A	
			Q2	---	---	39	A	
V _{SD}	Diode Forward Voltage ³		V _{GS} =0V , I _S =1A , T _J =25°C	Q1	---	---	1	V
				Q2	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, Q1: I_{AS}=16A, Q2: I_{AS}=42A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

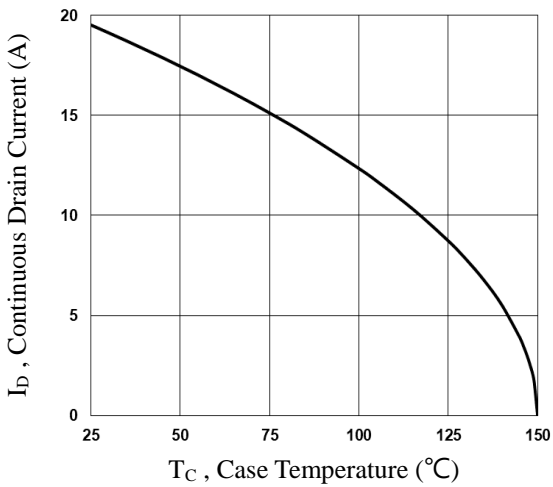


Fig.1 Q1 Continuous Drain Current vs. T_c

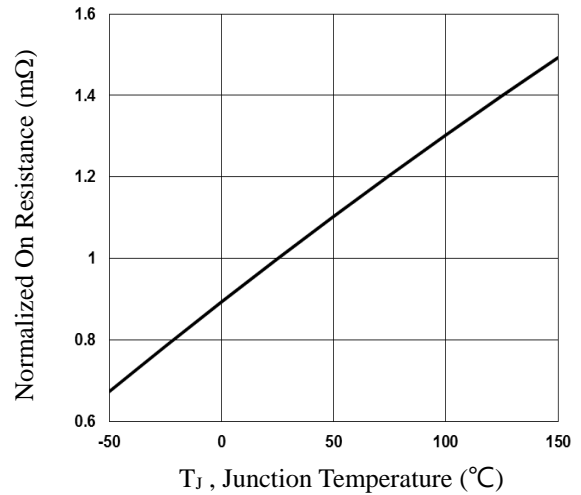


Fig.2 Q1 Normalized R_{DS(on)} vs. T_j

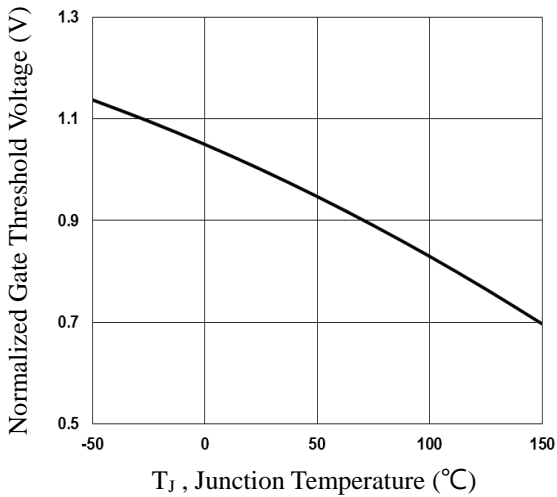


Fig.3 Q1 Normalized V_{th} vs. T_j

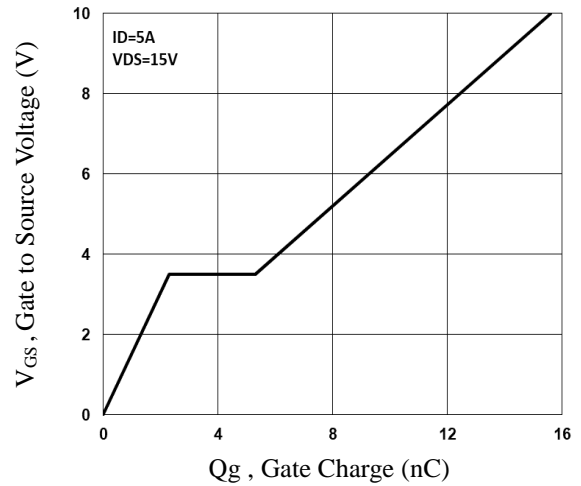


Fig.4 Q1 Gate Charge Waveform

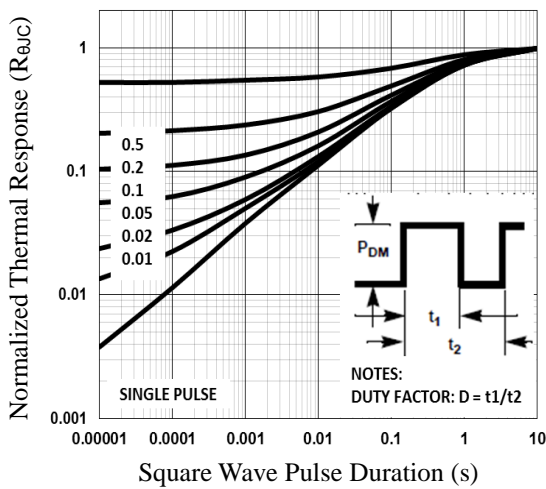


Fig.5 Q1 Normalized Transient Impedance

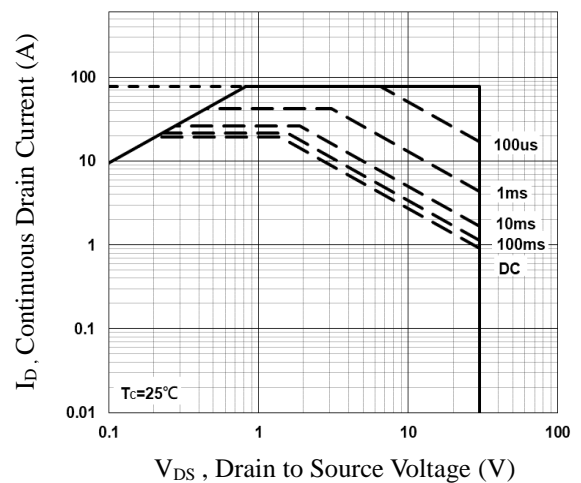


Fig.6 Q1 Maximum Safe Operation Area

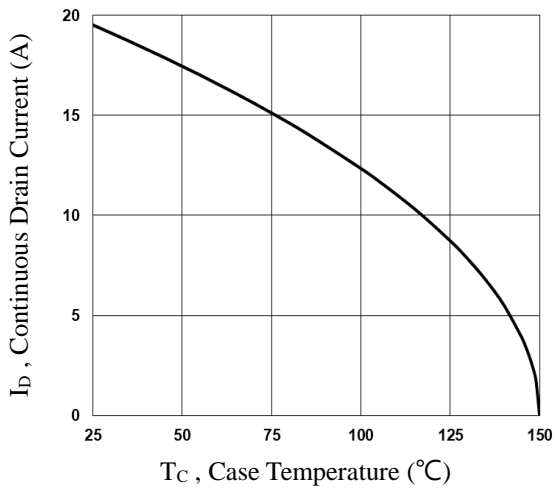


Fig.7 Q2 Continuous Drain Current vs. T_c

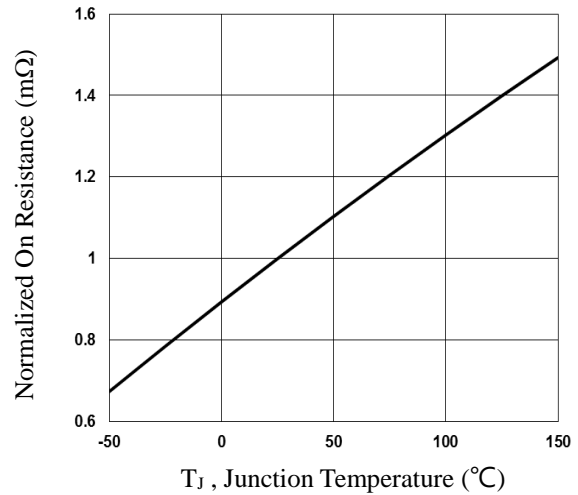


Fig.8 Q2 Normalized R_{DS(on)} vs. T_j

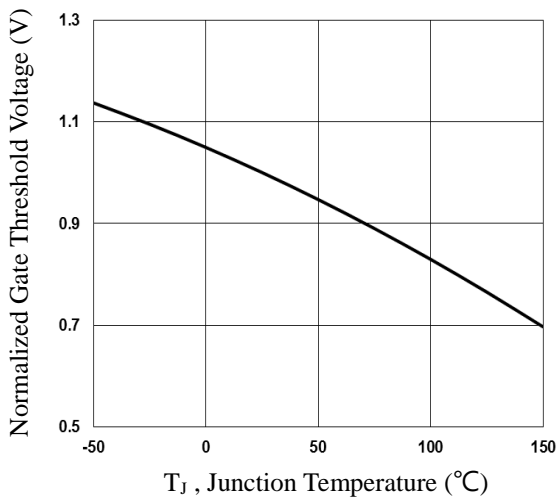


Fig.9 Q2 Normalized V_{th} vs. T_j

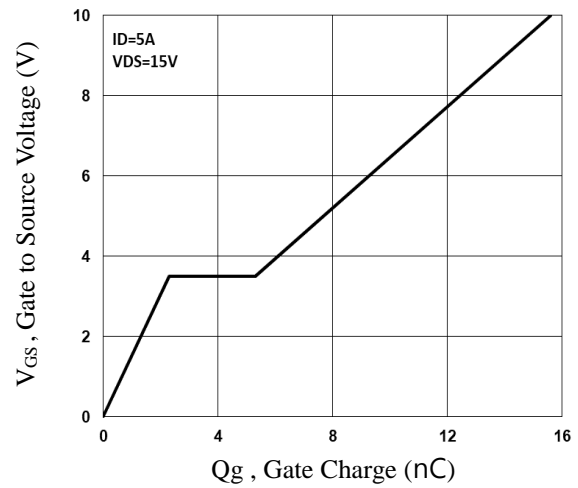


Fig.10 Q2 Gate Charge Waveform

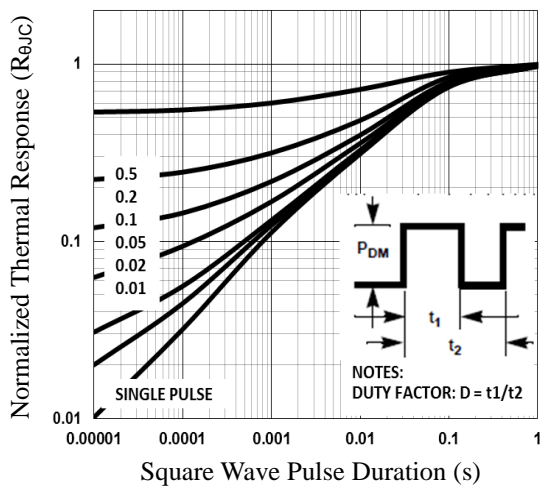


Fig.11 Q2 Normalized Transient Impedance

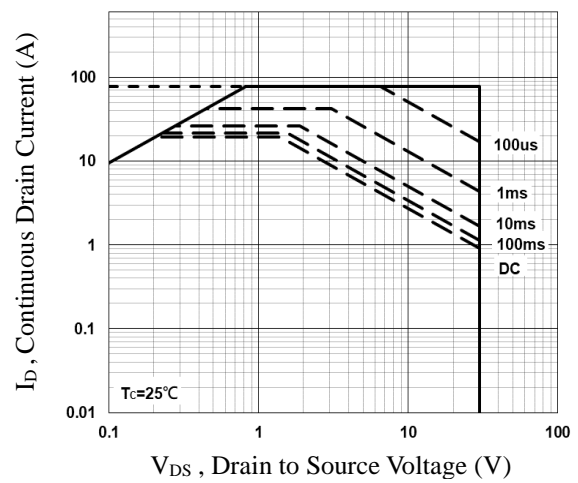


Fig.12 Q2 Maximum Safe Operation Area

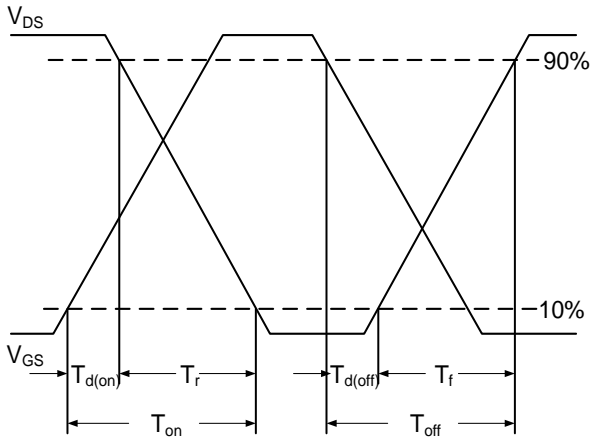


Fig.13 Switching Time Waveform

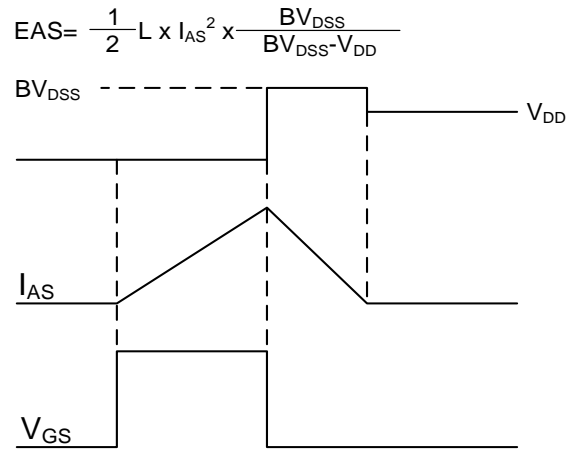
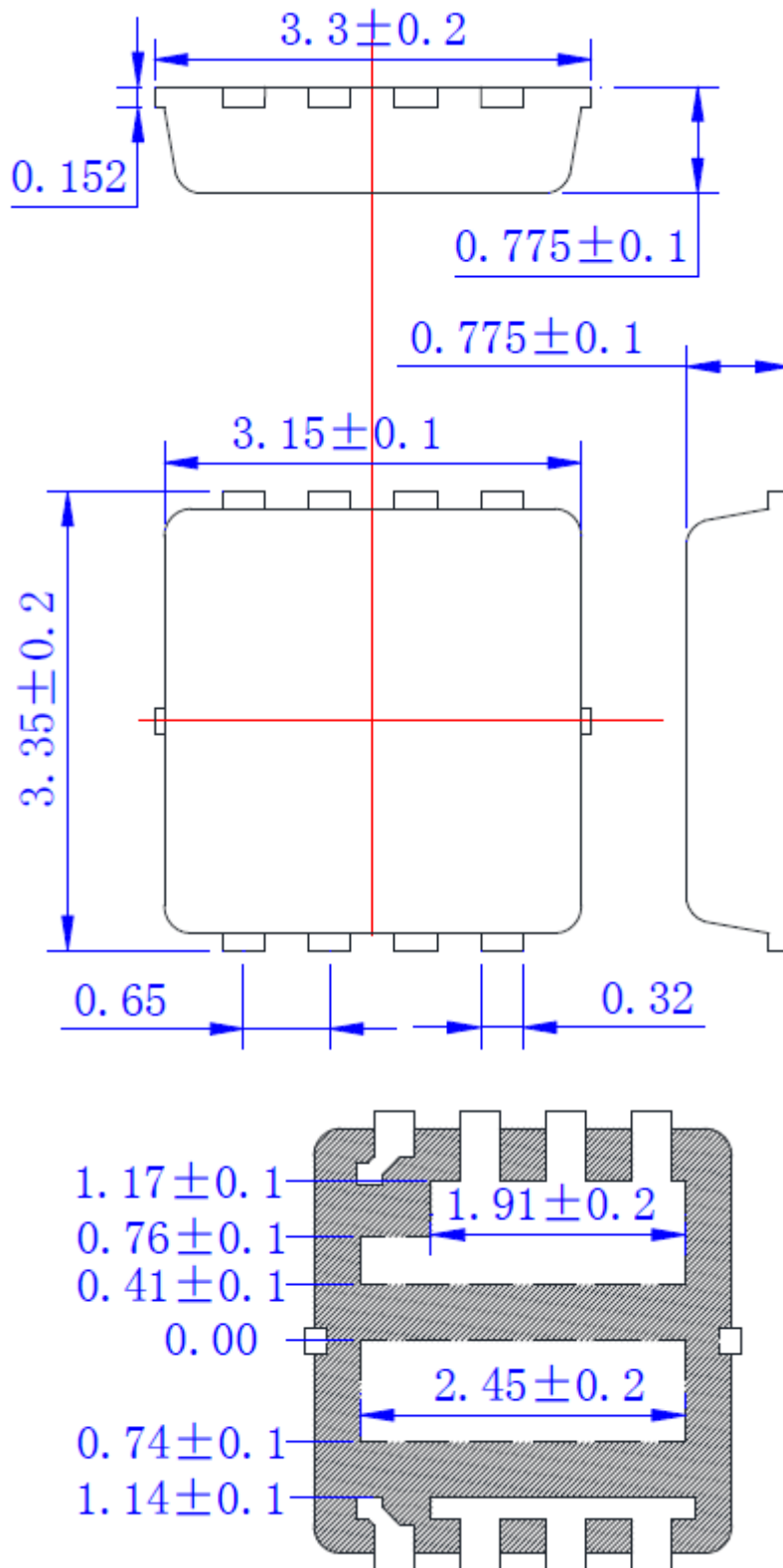


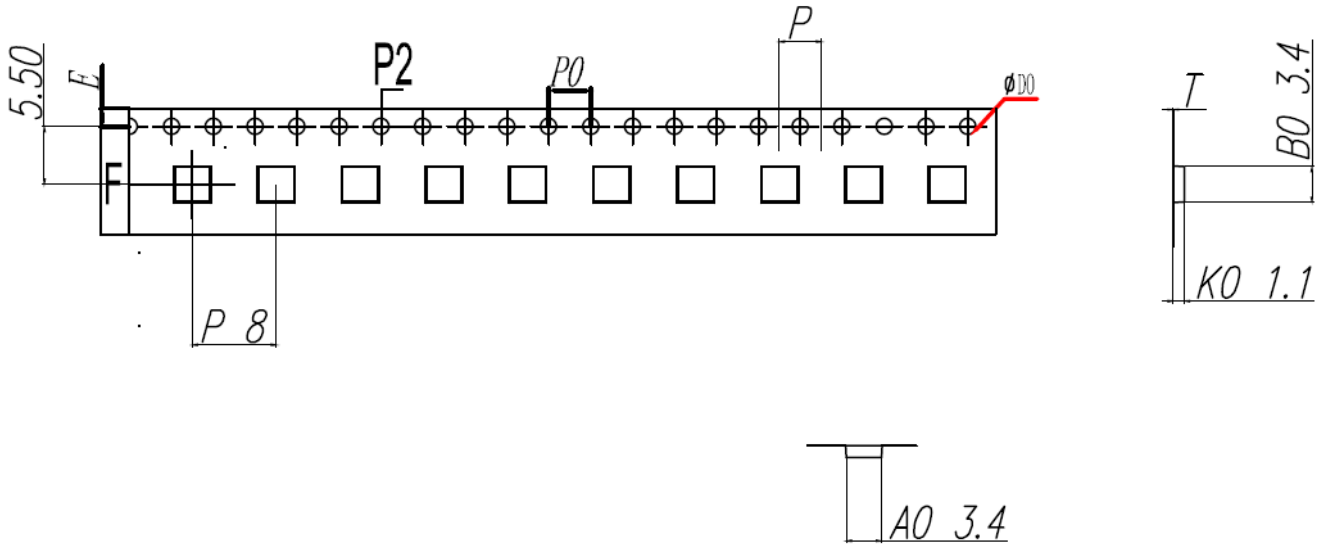
Fig.14 EAS Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

PPAK3x3 Asymmetric Dual Package Information



TAPE & REEL Information



ITEM	W	A0	B0	KO	P	F	E	S0	D0	P0	P2	T
DIM	12.00 ^{+0.30}	3.40 ^{+0.10}	3.40 ^{+0.10}	1.10 ^{+0.10}	8.00 ^{+0.10}	5.50 ^{+0.15}	1.75 ^{+0.10}	0.00 ^{+0.15}	1.50 ^{+0.00}	4.00 ^{+0.10}	2.00 ^{+0.10}	0.30 ^{+0.05}
ALTERNATE												

RECOMMEND FOOTPRINT Information

