30V N-Channel MOSFETs

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

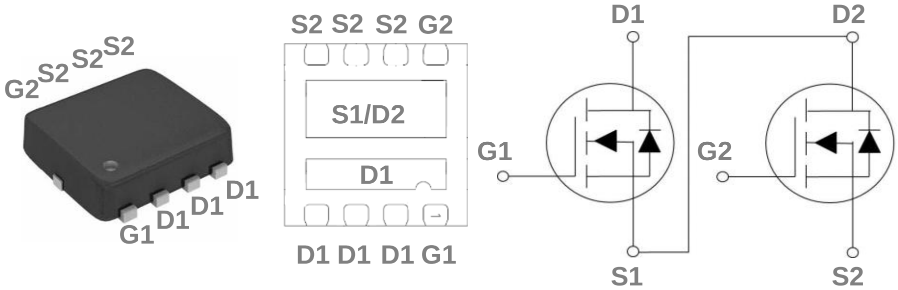
Features

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

Applications

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

DFN3x3 Asymmetric Dual Pin Configuration



Absolute Maximum Ratings (Tc=25℃ 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℃)	19.5	19.5	A
	Drain Current – Continuous (T_C=100℃)	12.3	12.3	A
	Drain Current – Continuous (T_A=25℃)	10.8	10.8	A
	Drain Current – Continuous (T_A=100℃)	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℃)	27	27	W
	Power Dissipation – Derate above 25℃	0.01	0.01	W/℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Electrical Characteristics (T_J=25℃, unless otherwise noted)

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

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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
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	Q1	---	0.04	---	V/℃
			Q2	---	0.04	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	Q1	---	---	1	uA
			Q2	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=125℃	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
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		Q1	---	-4	---	mV/℃
			Q2	---	-4	---	mV/℃
gfs	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]	V_{DS}=15V , V_{GS}=10V , I_D=5A	Q1	---	15.6	31	nC
			Q2	---	15.6	31	
Q_{gs}	Gate-Source Charge[3,4]		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]	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=1A	Q1	---	3.8	7	ns
			Q2	---	3.8	7	
T_r	Rise Time[3,4]		Q1	---	10	19	
			Q2	---	10	19	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		Q1	---	22	42	
			Q2	---	22	42	
T_f	Fall Time[3,4]		Q1	---	6.6	13	
			Q2	---	6.6	13	

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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℃	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℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

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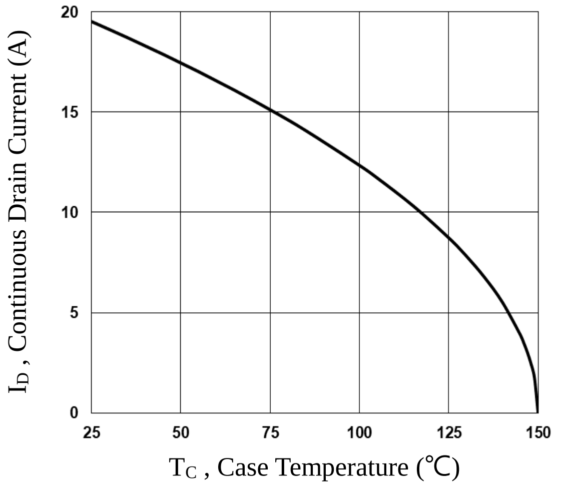

Fig.1 Q1 Continuous Drain Current vs. T_C

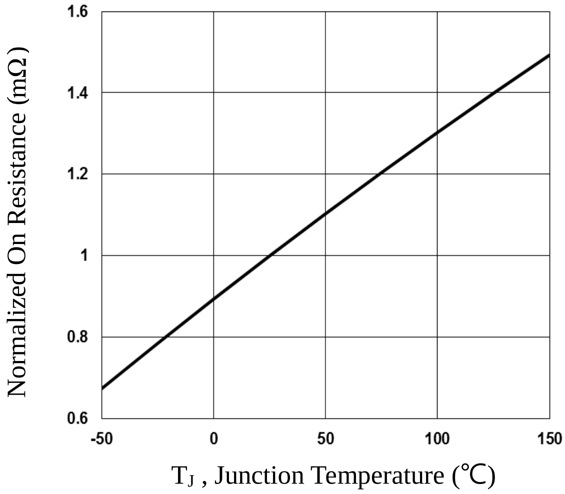

Fig.2 Q1 Normalized RDSON vs. T_J

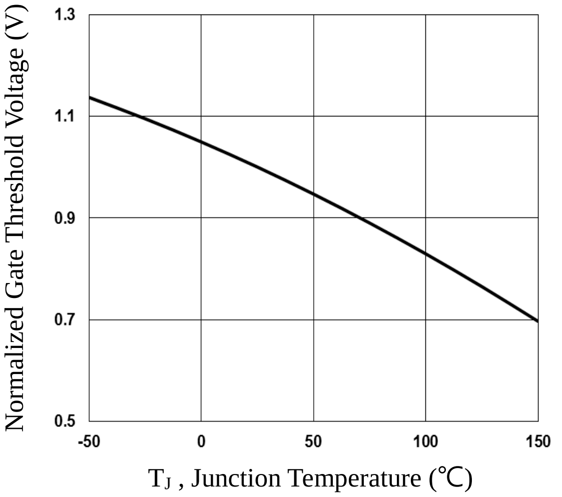

Fig.3 Q1 Normalized V_{th} vs. T_J

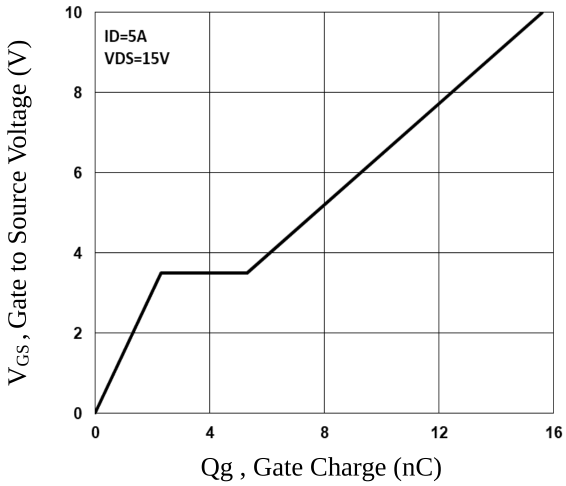

Fig.4 Q1 Gate Charge Waveform

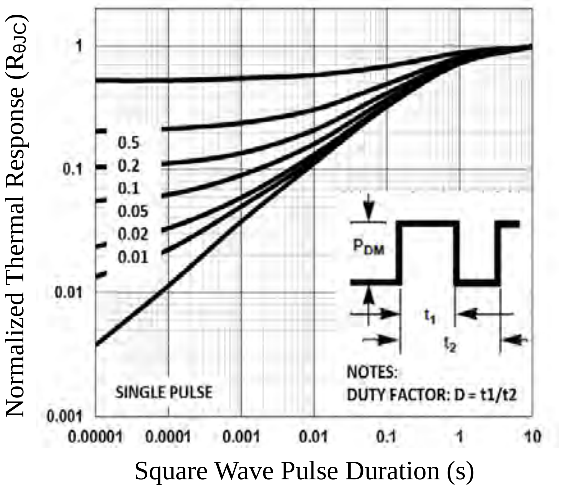

Fig.5 Q1 Normalized Transient Impedance

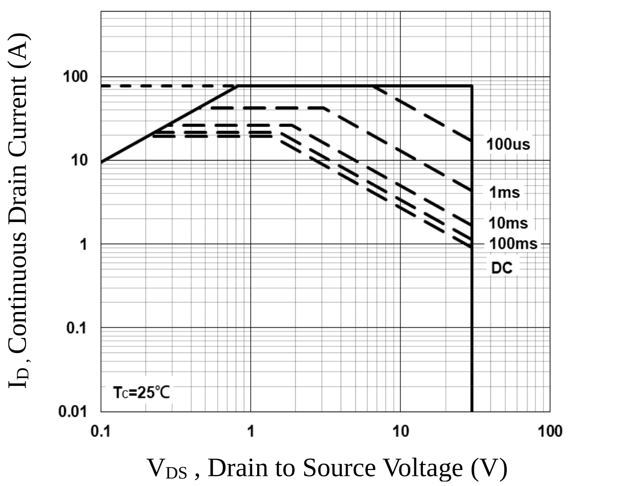

Fig.6 Q1 Maximum Safe Operation Area

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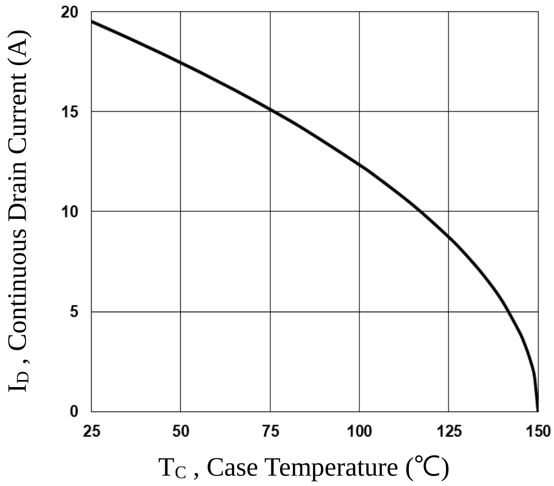

Fig.7 Q2 Continuous Drain Current vs. T_C

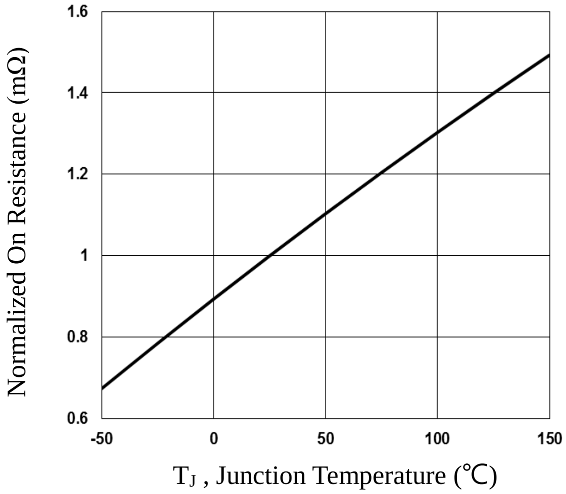

Fig.8 Q2 Normalized RDSON vs. T_J

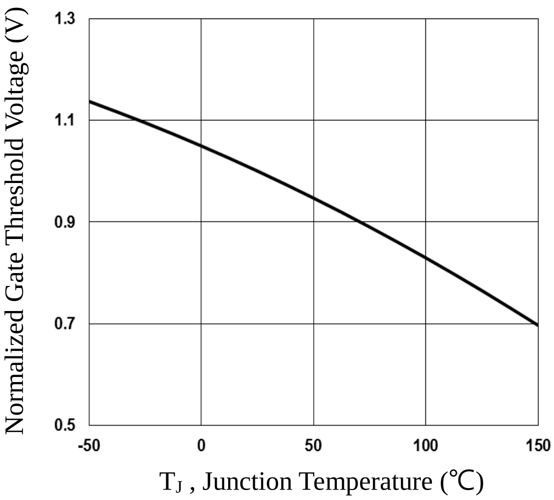

Fig.9 Q2 Normalized V_{th} vs. T_J

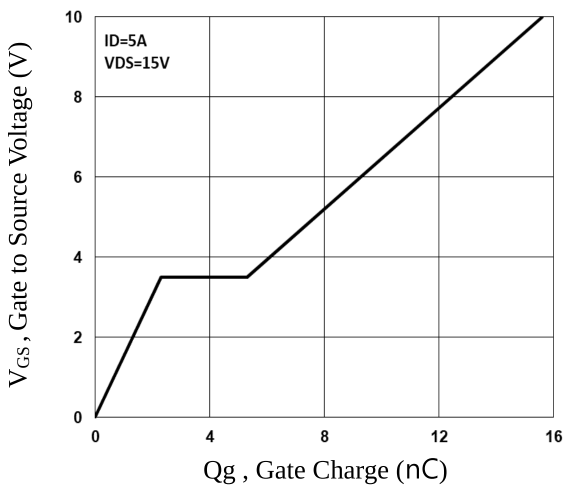

Fig.10 Q2 Gate Charge Waveform

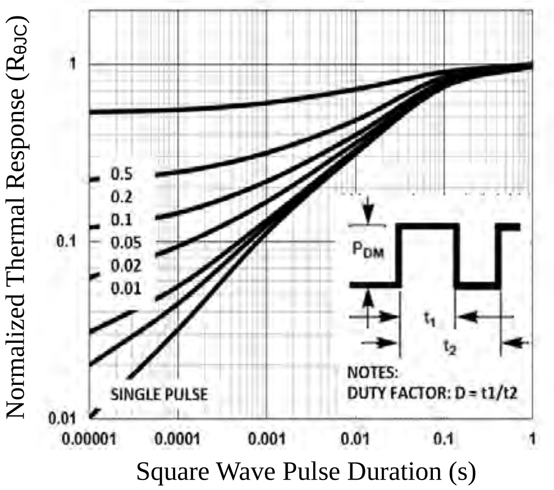

Fig.11 Q2 Normalized Transient Impedance

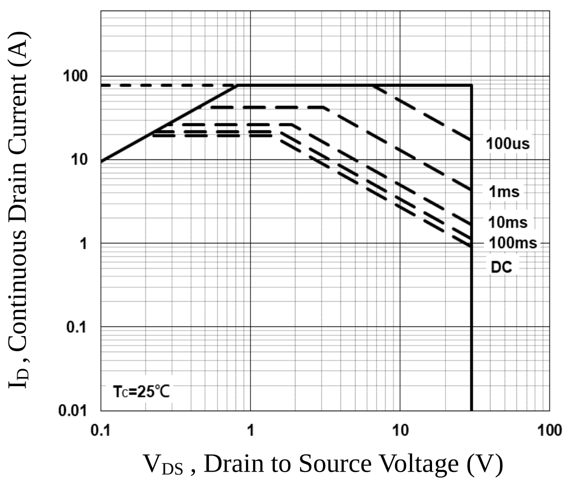

Fig.12 Q2 Maximum Safe Operation Area

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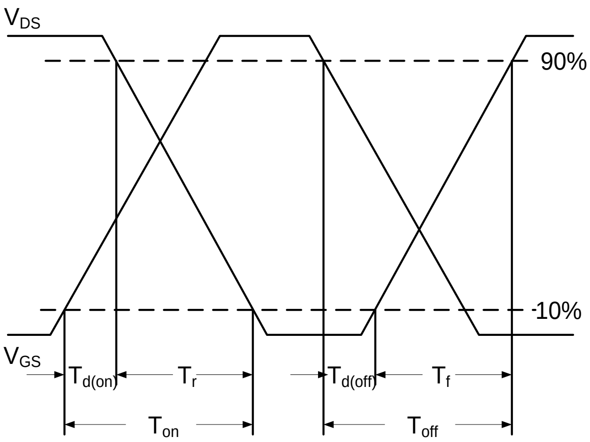

Fig.13 Switching Time Waveform

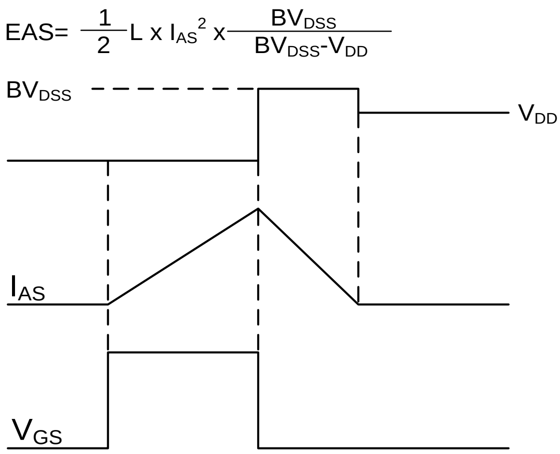

Fig.14 EAS Waveform

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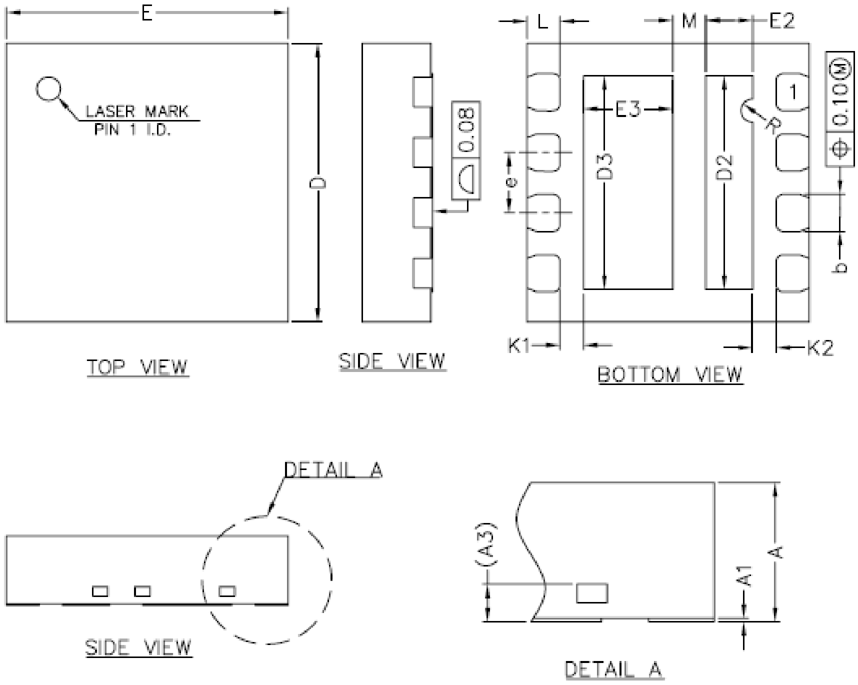
DFN3x3 Asymmetric Dual Package Information



Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3	0.20REF		
b	0.35	0.40	0.45
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	2.20	2.30	2.40
E2	0.40	0.50	0.60
D3	2.20	2.30	2.40
E3	0.85	0.95	1.05
e	0.55	0.65	0.75
K1	0.15	0.25	0.35
K2	0.15	0.25	0.35
L	0.30	0.35	0.40
M	0.25	0.35	0.45
R	0.125REF		

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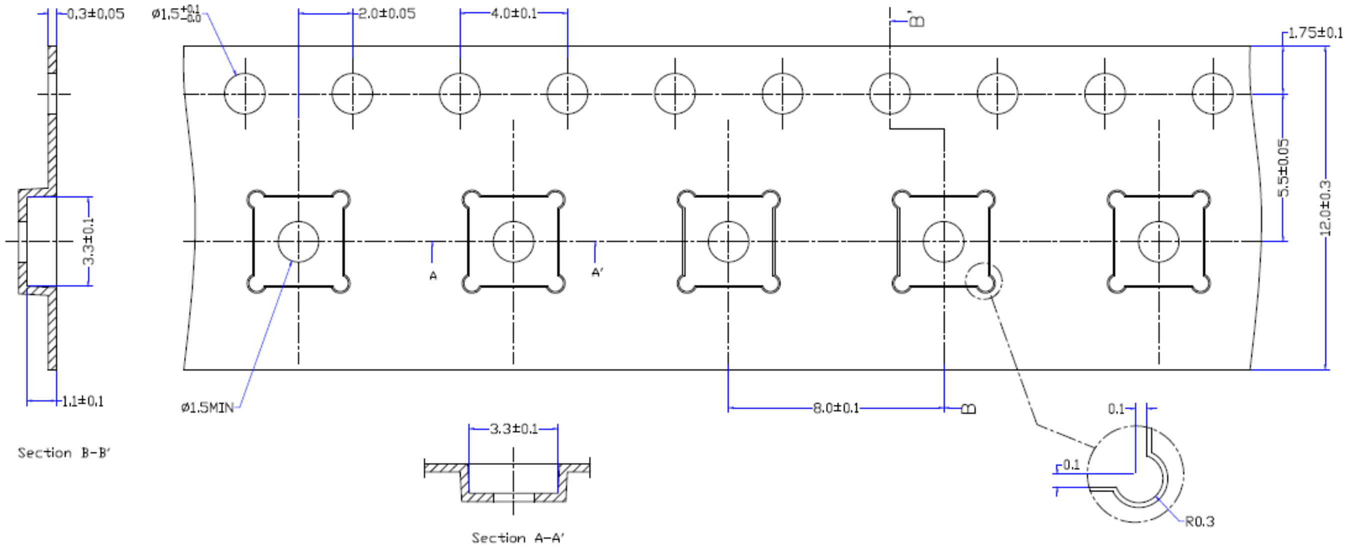
TAPE & REEL Information



NOTES:
1.10 procket hole pitch cumulative tolerance ±0.2
2.The meander of the tape is assumed with 1mm or less every 100mm between 250mm
3.MATERIAL:CONDUCTIVE POYSTYRENE
4.ALL DIMS IN MM
5.There must not be foreign body adhesion and the state of the surface must be excellent
△2 6.17" PAPER-Reel, 77500pockets(620m)
7.Surface resistance 1X10E5~1X10E9 OHMS/SQ

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RECOMMEND FOOTPRINT Information