ATM3404NSA

N-Channel Enhancement Mode Field Effect Transistor

Drain-Source Voltage: 30V Drain Current: 5A

Features

- Trench FET Power MOSFET
- Excellent $R_{DS(on)}$ and Low Gate Charge
- $R_{DS(ON)}$ < 28mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ < 40mΩ (V_{GS} = 4.5V)

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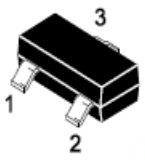
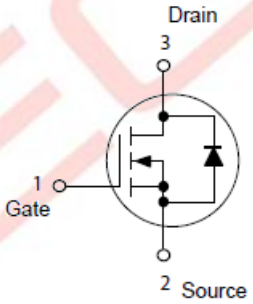


1 Gate 2 Source 3 Drain



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	30		V
V_{GS}	Gate-Source Voltage	±20		V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	5.8	5	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V[1]	4.6	4	A
I_{DM}	Pulsed Drain Current[2]	25		A
P_D@T_A=25°C	Total Power Dissipation[3]	1.32	1	W
P_D@T_A=70°C	Total Power Dissipation[3]	0.84	0.64	W
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	-55 to 150		°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	125	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	95	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	80	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.025	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=5A	---	24	28	mΩ
		V_{GS}=4.5V , I_D=4A	---	34	40	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=5A	---	7	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.5	5	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=5A	---	6	8.4	nC
Q_{gs}	Gate-Source Charge		---	2.5	3.5	
Q_{gd}	Gate-Drain Charge		---	2.1	2.9	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω I_D=5A	---	2.4	4.8	ns
T_r	Rise Time		---	7.8	14	
$T_{d(off)}$	Turn-Off Delay Time		---	22	44	
T_f	Fall Time		---	4	8	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	572	800	pF
C_{oss}	Output Capacitance		---	81	112	
C_{rss}	Reverse Transfer Capacitance		---	65	91	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	5	A
I_{SM}	Pulsed Source Current[2,4]		---	---	25	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=5A , dI/dt=100A/μs , T_J=25℃	---	19	---	nS
Q_{rr}	Reverse Recovery Charge		---	1.04	---	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics Curves

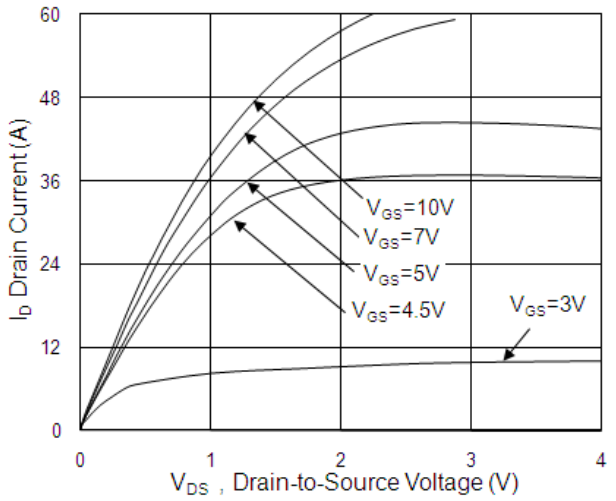


Fig.1 Typical Output Characteristics

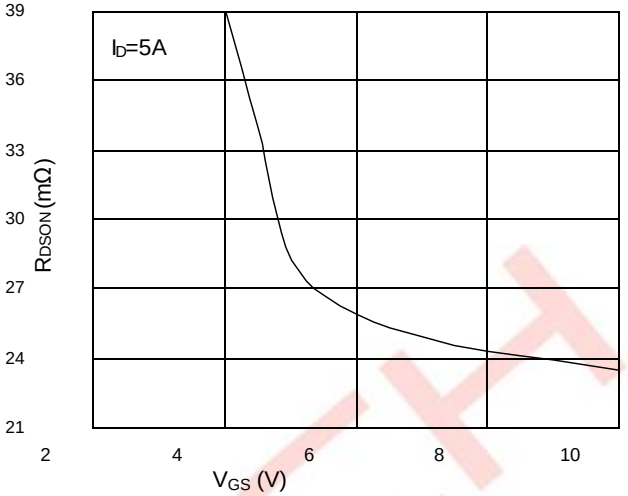
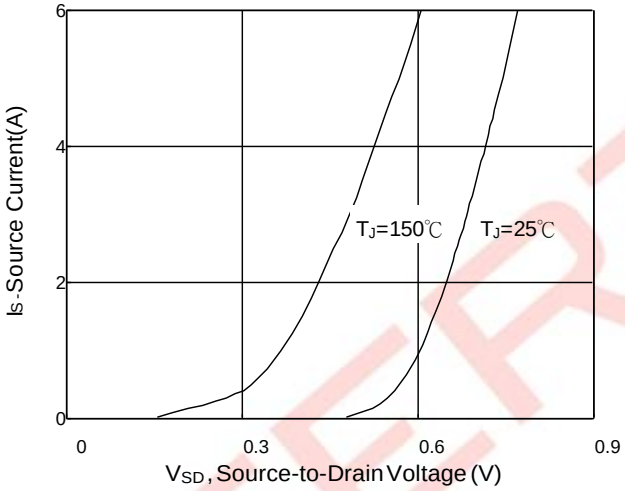


Fig.2 On-Resistance vs. Gate-Source



Forward Characteristics Of Reverse

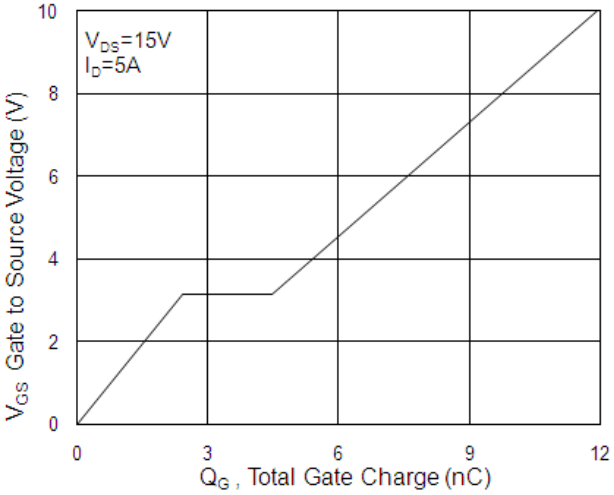


Fig.4 Gate-Charge CharacteristicsFig.3

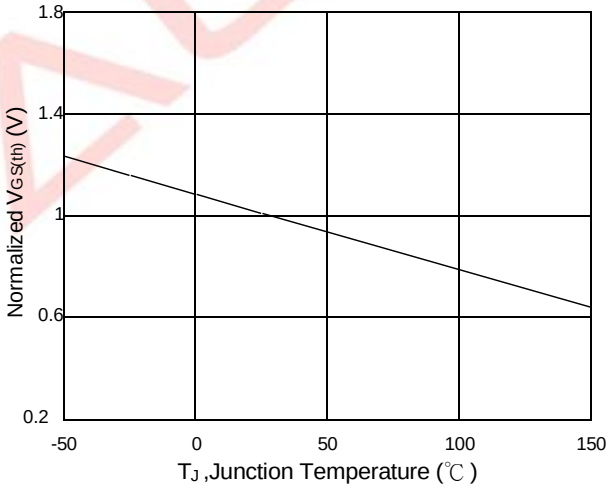


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

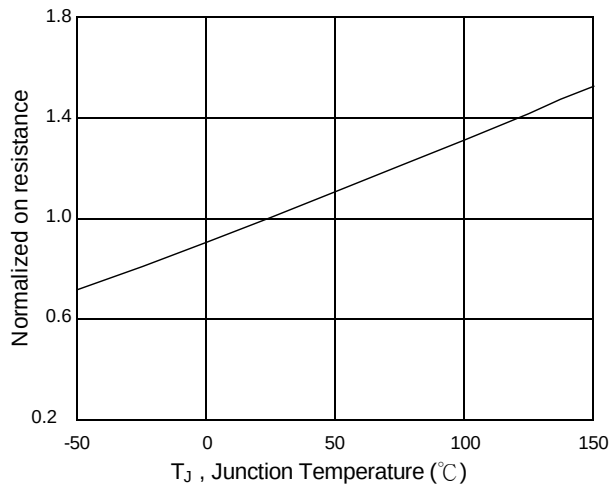


Fig.6 Normalized R_{DSON} vs. T_J

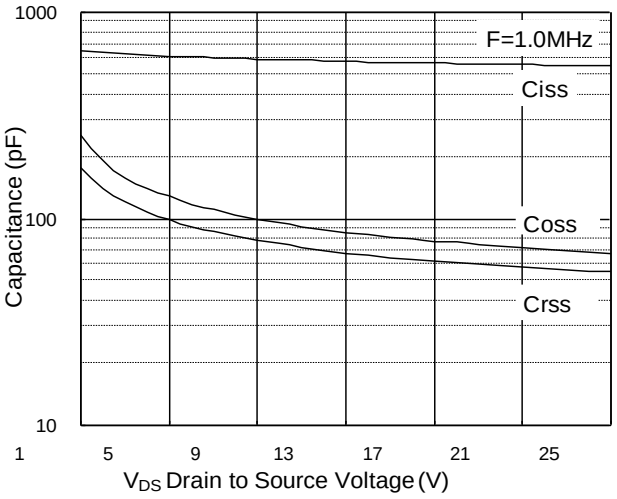


Fig.7 Capacitance

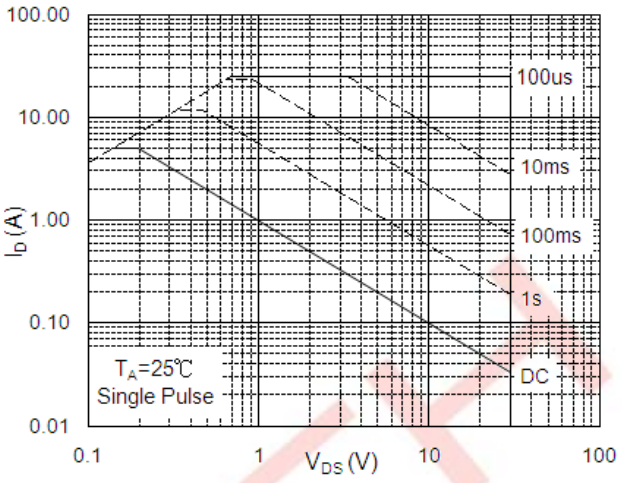


Fig.8 Safe Operating Area

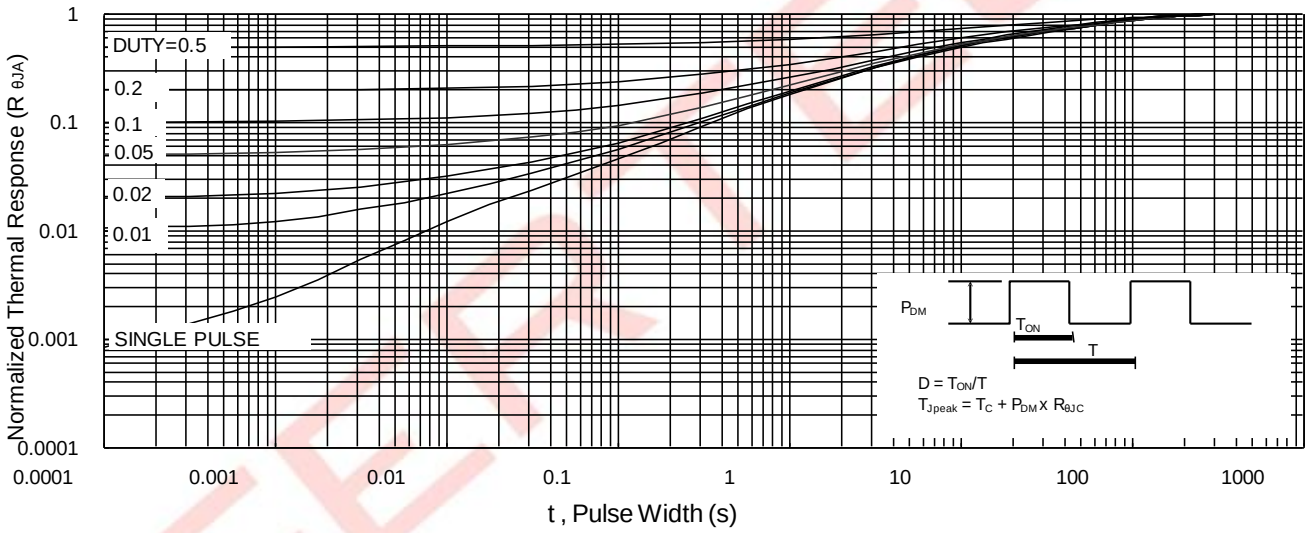


Fig.9 Normalized Maximum Transient Thermal Impedance

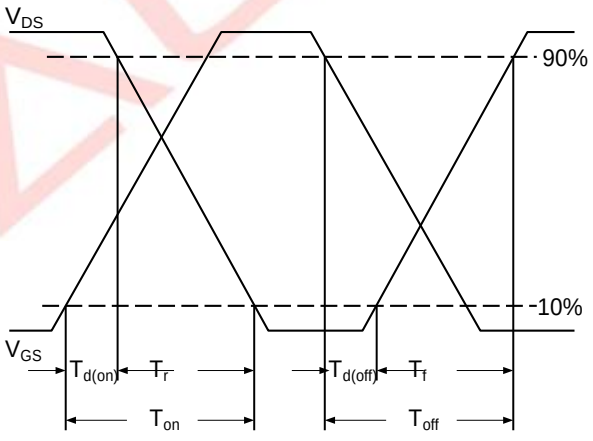


Fig.10 Switching Time Waveform

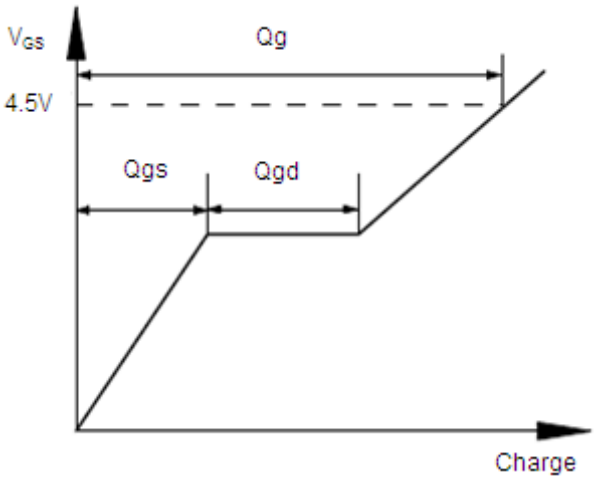


Fig.11 Gate Charge Waveform

Package Outline

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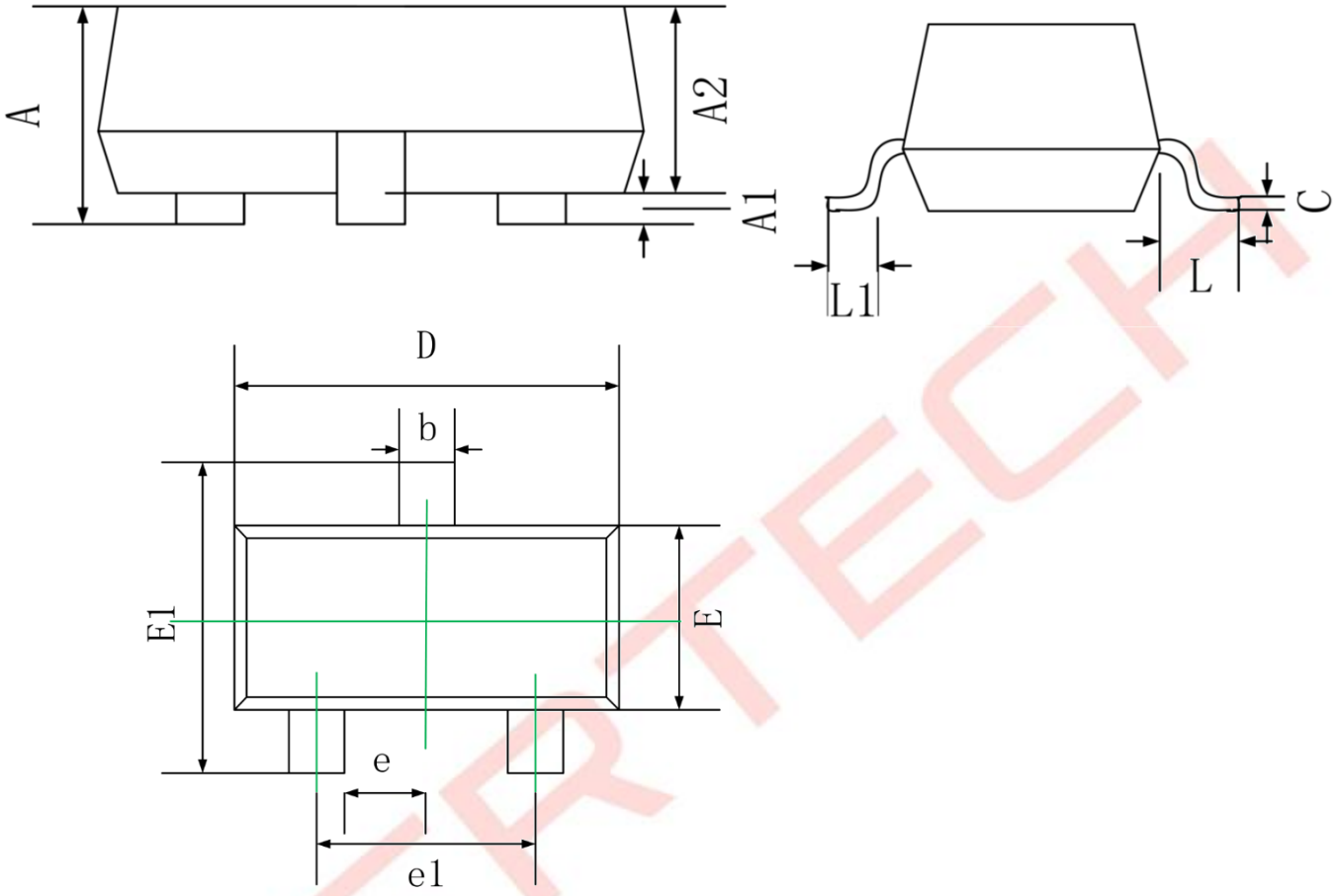
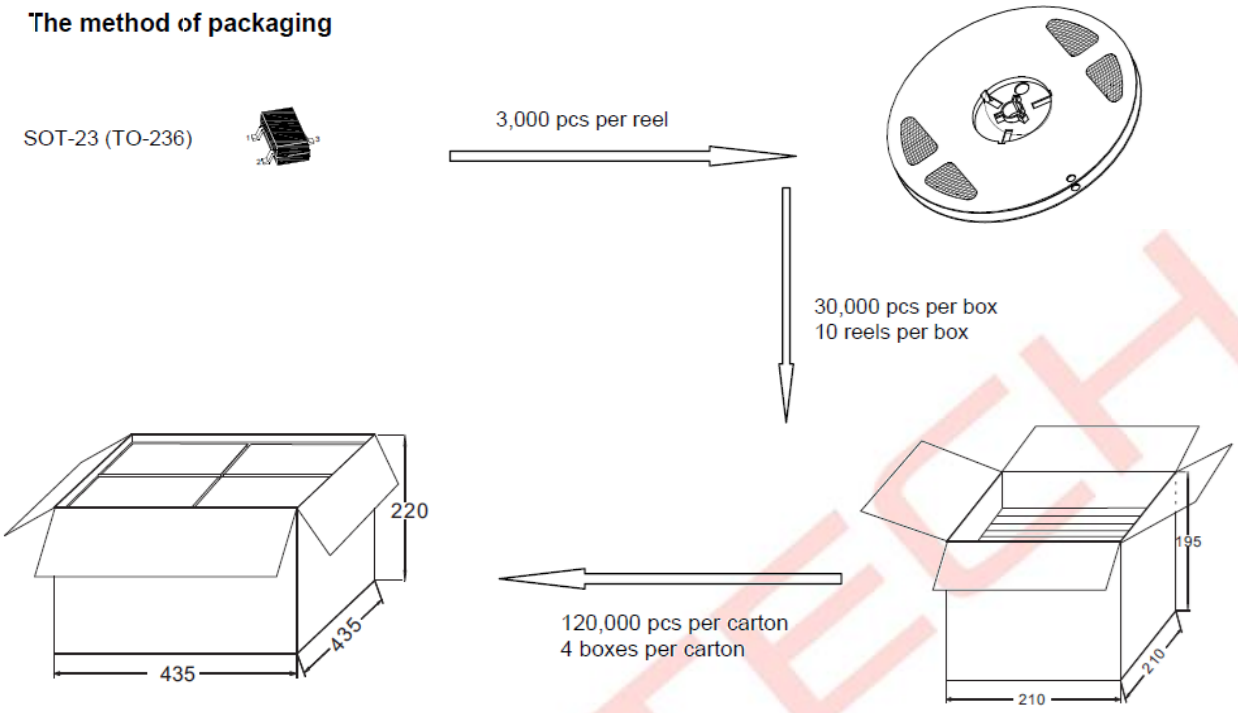


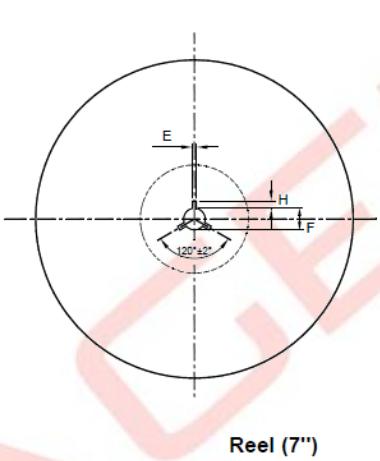
Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.90	1.15
A1	0.00	0.10
A2	0.90	1.05
b	0.30	0.50
c	0.08	0.15
D	2.80	3.00
E	1.20	1.40
E1	2.25	2.55
e	0.95 REF.	
e1	1.80	2.00
L	0.55 REF.	
L1	0.30	0.50

Package Specifications

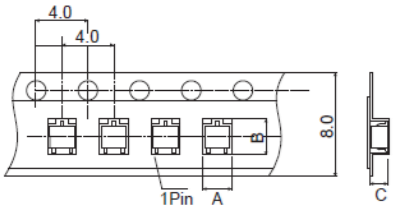
◆ **The method of packaging**



◆ **Embossed tape and reel data**



Reel (7")



Tape (8mm)

Symbol	Value (unit: mm)
A	3.15 ± 0.1
B	2.7 ± 0.1
C	1.25 ± 0.1
E	2 ± 0.5
F	13 ± 0.5
D	178 ± 2.0
G	8.4 ± 1.5
H	4 ± 0.5
N	60
T	< 14.9