20V Input, 2uA Ultra-Low I_Q, High PSRR, 200mA LDO

DESCRIPTION

ETA5120 is a fixed output, low-dropout (LDO), low-power linear voltage regulator that features ultra-low standby current as low as 2uA. It can withstand input voltage up to 20V and deliver 200mA output current, at least. Therefore, ETA5120 is an ideal power supply for low power applications such as IoT, wearables and multi-cell battery powered system, and etc.

ETA5120 is available in SOT23-5.

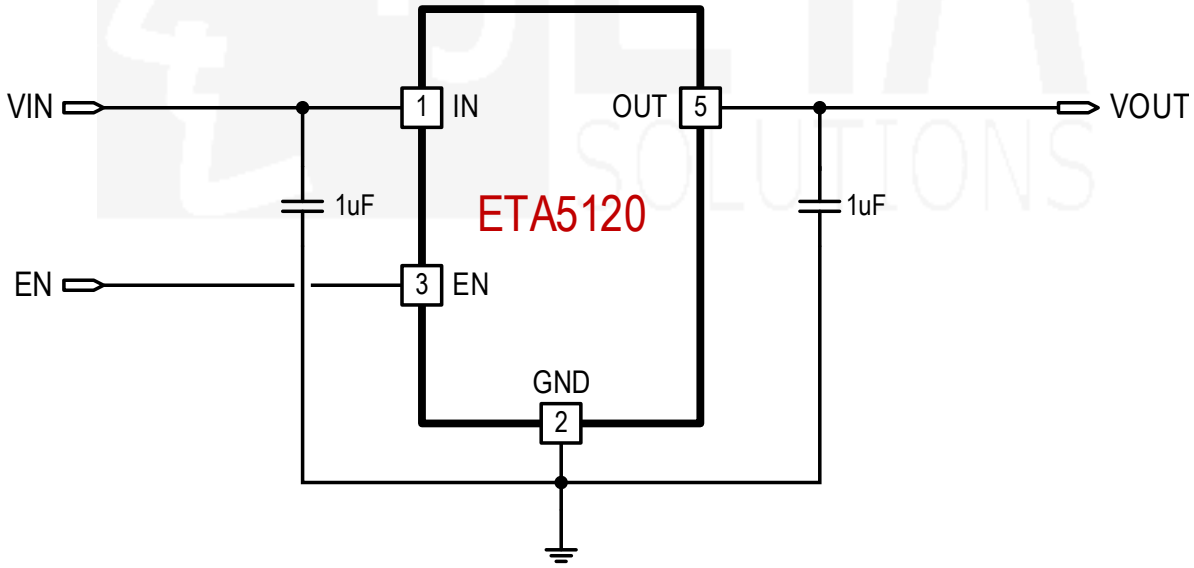
FEATURES

- 20V Input Voltage
- 2uA Ultra-low IQ
- 200mA Output Current
- Stable with a Wide Range of Ceramic Capacitor
- 300mV Dropout Voltage for 100mA at V_{OUT} = 2.8V
- RoHS Compliant

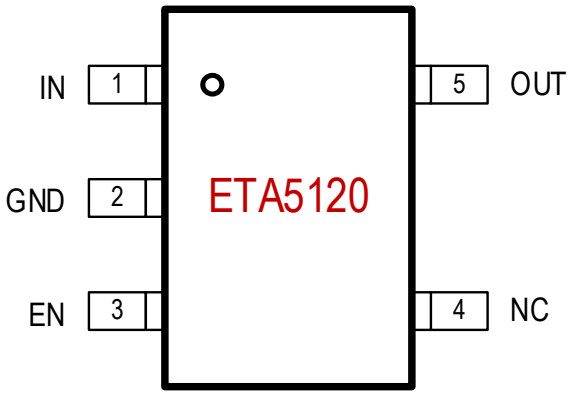
APPLICATIONS

- NB-IoT Module
- Wearables
- Multi-cell Battery Powered System

TYPICAL APPLICATION



PIN CONFIGURATION



SOT23-5

ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

VIN, EN, VOUT Voltage .....–0.3V to 30V
Operating Temperature Range.....–40°C to 85°C
Storage Temperature Range .....–55°C to 150°C

Thermal Resistance	θ_{JA}	θ_{JC}	
SOT23-5	180	90	°C/W

Lead Temperature (Soldering 10 sec) .....260°C
ESD HBM (Human Body Mode).....3KV

ELECTRICAL CHARACTERISTICS

(V_{IN} = 9V, V_{OUT} = 2.8V, unless otherwise specified. Typical values are at TA = 25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage Range (1)		2.5		20	V
Ground Current	No Load		2		µA
Shutdown Current	V_{EN} = 0V		1		µA
Dropout Voltage	I_{OUT} =100mA, V_{OUT}=2.8V		300		mV
Continuous Output Current		200			mA
Output Current Limit	V_{OUT} = 95%		600		mA
Output Foldback Current Limit	V_{OUT} = 0V		150		mA
Line Regulation	V_{OUT} + 1V ≤ V_{IN} ≤ 20V, I_{OUT}=10mA		0.15		%/V
Load Regulation	0µA ≤ I_{OUT} ≤ 200 mA		50		mV
Output Voltage Range(Fixed V_{OUT})	Available in 100mV steps	1.2		5	V
Vout Voltage Accuracy	I_{OUT} =30mA, V_{OUT} > 1.8V	-2		+2	%
Power Supply Rejection Ratio	Freq = 100Hz, I_{OUT} = 30mA		82		dB
	Freq = 1kHz, I_{OUT} = 30mA		66		
Start-up time			100		µs
EN pin Logic Low	2.5V ≤ V_{IN} ≤ 20V			0.4	V
EN pin Logic High	2.5V ≤ V_{IN} ≤ 20V	50%			VIN
Input current at EN pin	V_{EN}=3V		0		µA
Thermal Shutdown	Rising, Hysteresis =60°C		150		°C

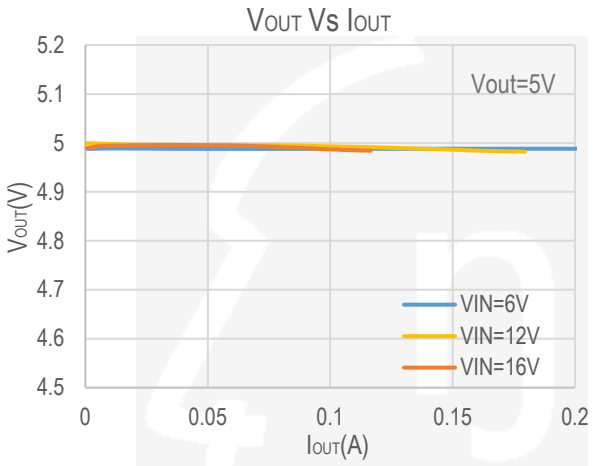
(1): Minimum V_{IN} is V_{OUT} + $V_{DROPOUT}$, whichever is greater.

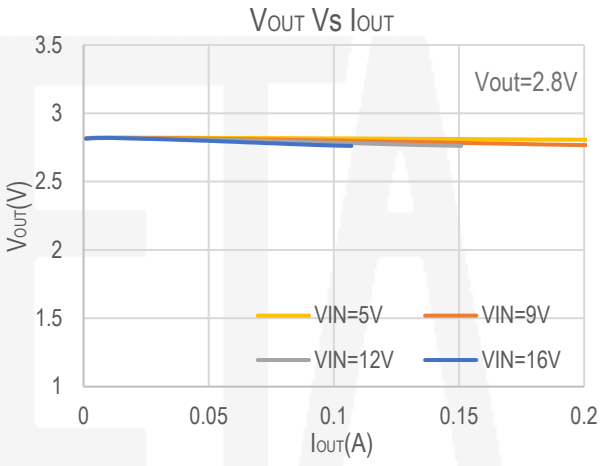
PIN DESCRIPTION

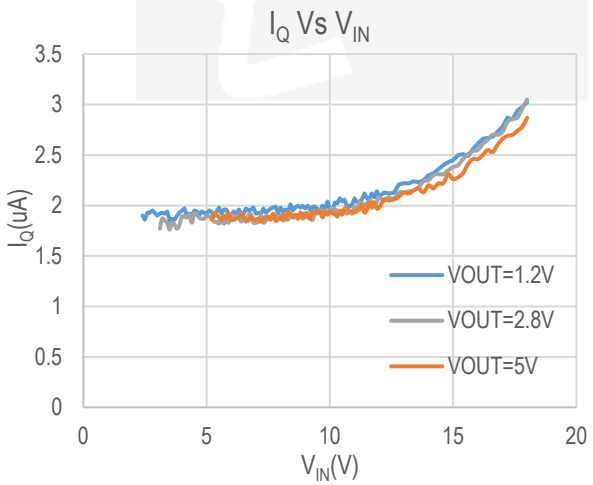
SOT23-5 PIN#	NAME	DESCRIPTION
1	IN	Input Supply Pin
2	GND	Ground Pin
3	EN	Enable Pin. Drive it high to enable IC, drive it low to disable. EN can be connected to IN if not used.
4	NC	Not Connected
5	OUT	Output Pin of the regulator

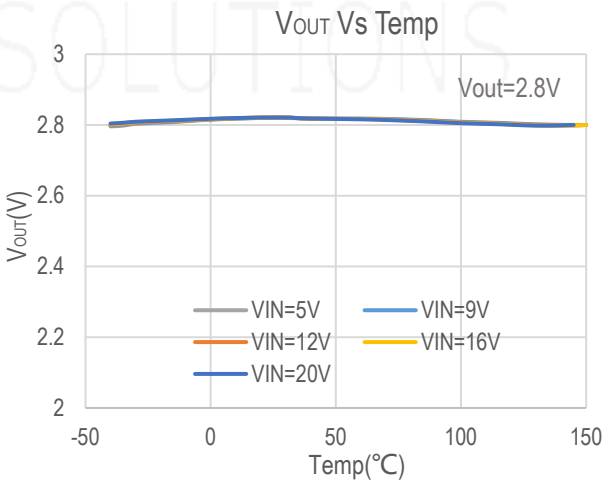
TYPICAL CHARACTERISTICS

(Typical values are at T_A = 25°C unless otherwise specified.)

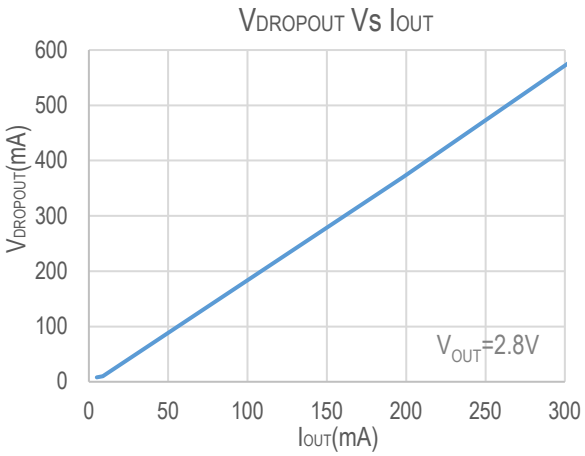


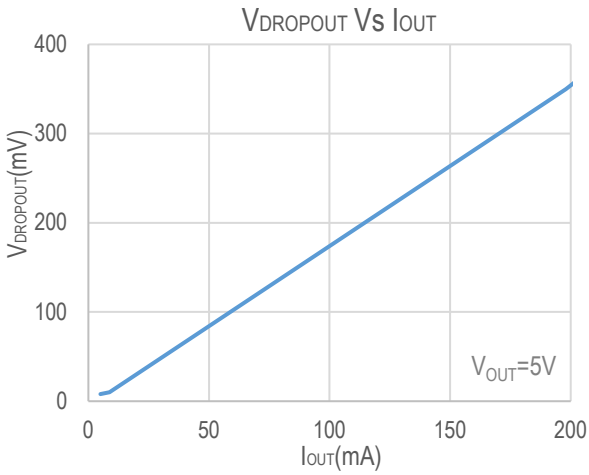


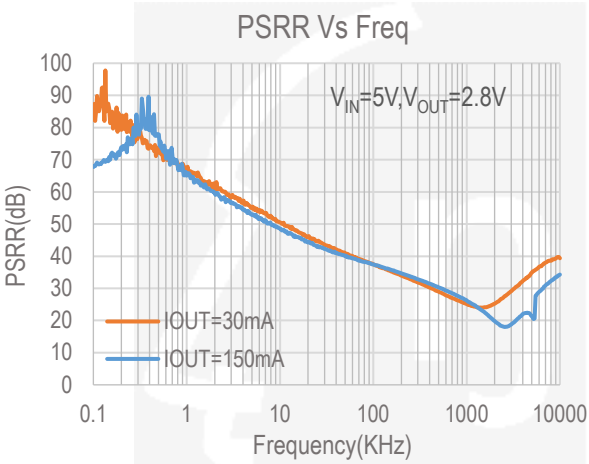


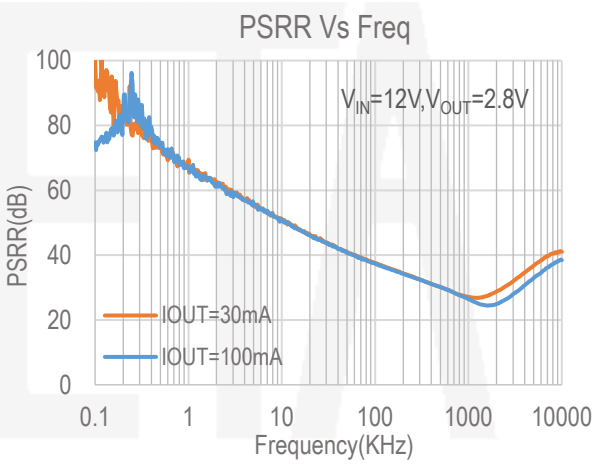


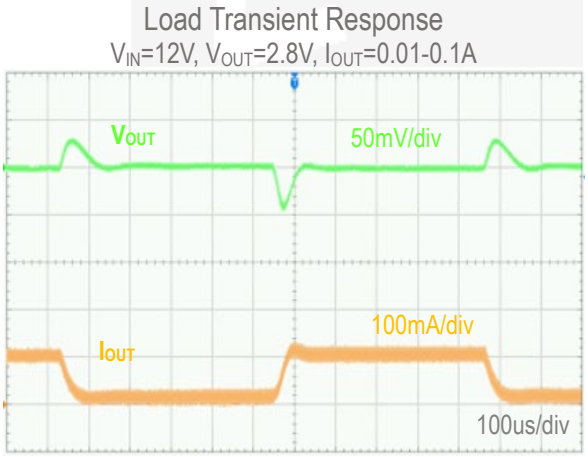
TYPICAL CHARACTERISTICS (cont')

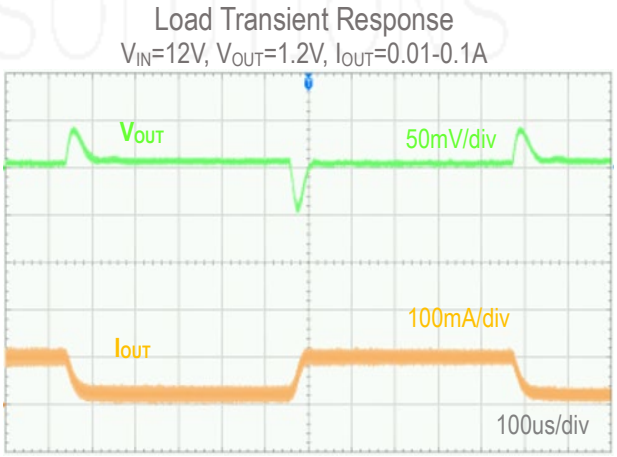




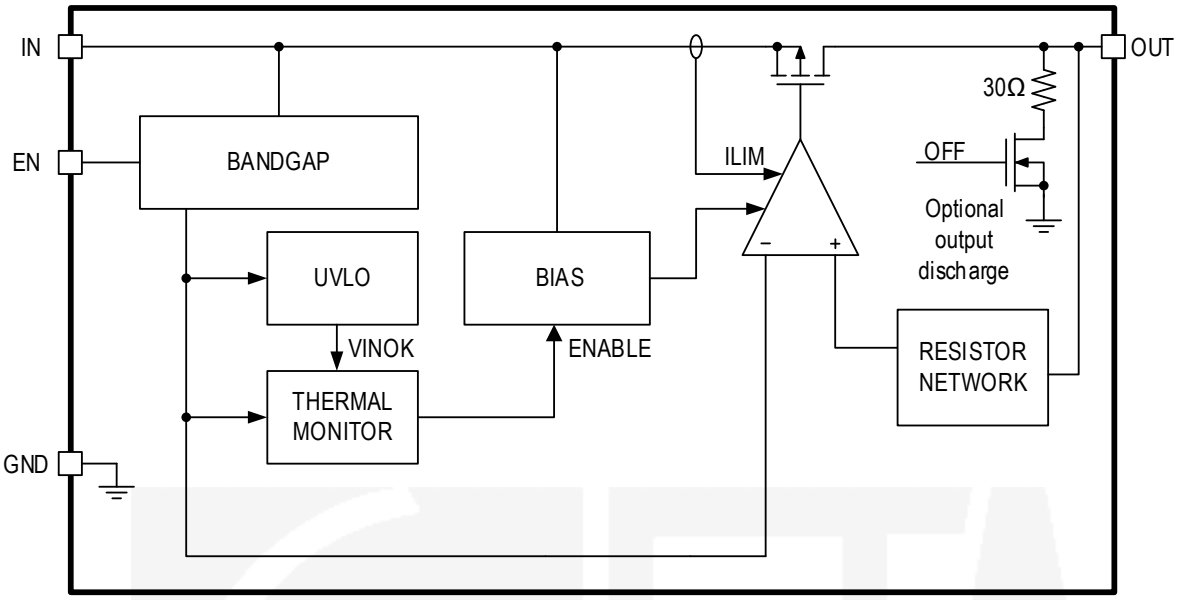








FUNCTIONAL BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The ETA5120 family of LDO regulators have been optimized for applications in low standby power equipment. The device features ultra-low quiescent current, and 20V maximum input voltage with 200mA output current capability.

Enable Sequence

ETA5120 is enabled when all below conditions happen. Otherwise, ETA5120 is in standby mode.

- EN pin voltage above logic High level
- Junction Temperature is not at Over-Temperature Protection level.

Once all above conditions happen, ETA5120 first enables BANDGAP and BIAS then enables LDO core.

ETA5120 is in shutdown mode when EN pin is pulled below logic low level threshold. The shutdown current is less than 1uA in at that time. Once ETA5120 is in shutdown conditions, Output is discharged by 30Ω resistor (optional).

Output Current Limit and Foldback Current Limit

ETA5120 family features an internal current limit that protects the regulator during transient high load current faults or shorting events. In a high load current fault, the ETA5120 is limited by output current limit, approximately 600mA and when current limiting engages, a foldback current limit activates while the output voltage approaches the ground.

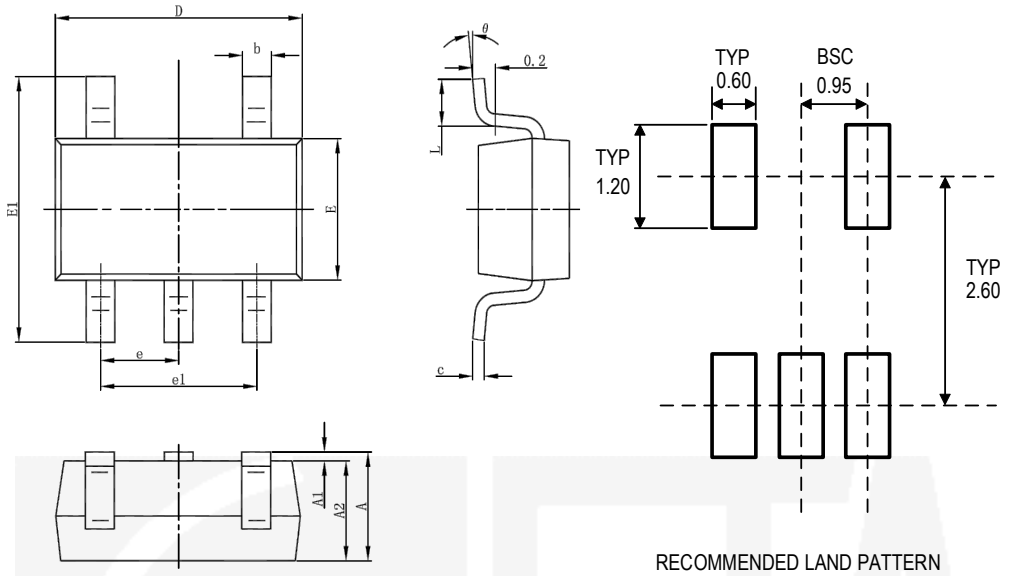
In case output is in hard short conditions, ETA5120 also provides an internal foldback limit that reduces the output current limit to a lower level, 130mA, then reduce power dissipation ratings of the package.

Over-Temperature Protection

Thermal protection disables the output when the junction temperature rises to approximately 150°C, allowing the device to cool down. When the junction temperature cools to approximately 90°C, the output circuitry is again enabled. Depending on power dissipation, thermal resistance, and ambient temperature, the thermal protection circuit may cycle on and off. This cycling limits regulator dissipation, protecting the device from damage as a result of overheating.

PACKAGE OUTLINE

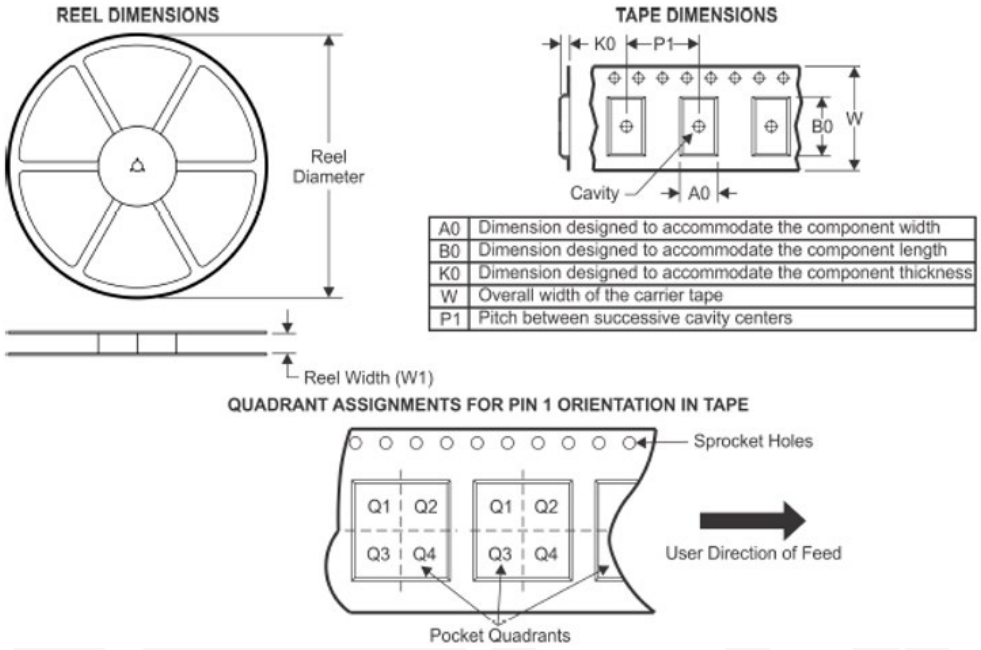
Package: SOT23-5



RECOMMENDED LAND PATTERN

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

TAPE AND REEL INFORMATION



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

Device	Package Type	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
ETA5120VXXXXNS2F	SOT23-5	5	3000	180	9.5	3.17	3.23	1.37	4	8	Q3
ETA5120VXXXXDS2F	SOT23-5	5	3000	180	9.5	3.17	3.23	1.37	4	8	Q3

ORDERING INFORMATION

		PART No.	PACKAGE	TOP MARK	Pcs/Reel
		ETA5120VXXXNS2F	SOT23-5	PP	3000
		XXX : voltage code =1.2V	*e.g. 120*	*PP: product code*	
		O=N: no discharge;	*0=D: discharge*	*YW: date code*	
SOT 23-5	1.2V No discharge	ETA5120V120NS2F	SOT23-5	wA1	3000
SOT 23-5	1.8V No discharge	ETA5120V180NS2F	SOT23-5	wA2	3000
SOT 23-5	2.5V No discharge	ETA5120V250NS2F	SOT23-5	wA3	3000
SOT 23-5	2.8V No discharge	ETA5120V280NS2F	SOT23-5	wA4	3000
SOT 23-5	3V No discharge	ETA5120V300NS2F	SOT23-5	wA5	3000
SOT 23-5	3.3V No discharge	ETA5120V330NS2F	SOT23-5	wA6	3000
SOT 23-5	5V No discharge	ETA5120V500NS2F	SOT23-5	wA7	3000
SOT 23-5	1.2V Discharge	ETA5120V120DS2F	SOT23-5	WA1	3000
SOT 23-5	1.8V Discharge	ETA5120V180DS2F	SOT23-5	WA2	3000
SOT 23-5	2.5V Discharge	ETA5120V250DS2F	SOT23-5	WA3	3000
SOT 23-5	2.8V Discharge	ETA5120V280DS2F	SOT23-5	WA4	3000
SOT 23-5	3V Discharge	ETA5120V300DS2F	SOT23-5	WA5	3000
SOT 23-5	3.3V Discharge	ETA5120V330DS2F	SOT23-5	WA6	3000
SOT 23-5	5V Discharge	ETA5120V500DS2F	SOT23-5	WA7	3000