

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

DESCRIPTION

ETA5122 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, ETA5122 is an ideal power supply for low power applications such as IoT, wearables and multi-cell battery powered system, and etc.

ETA5122 is available in SOT89-5.

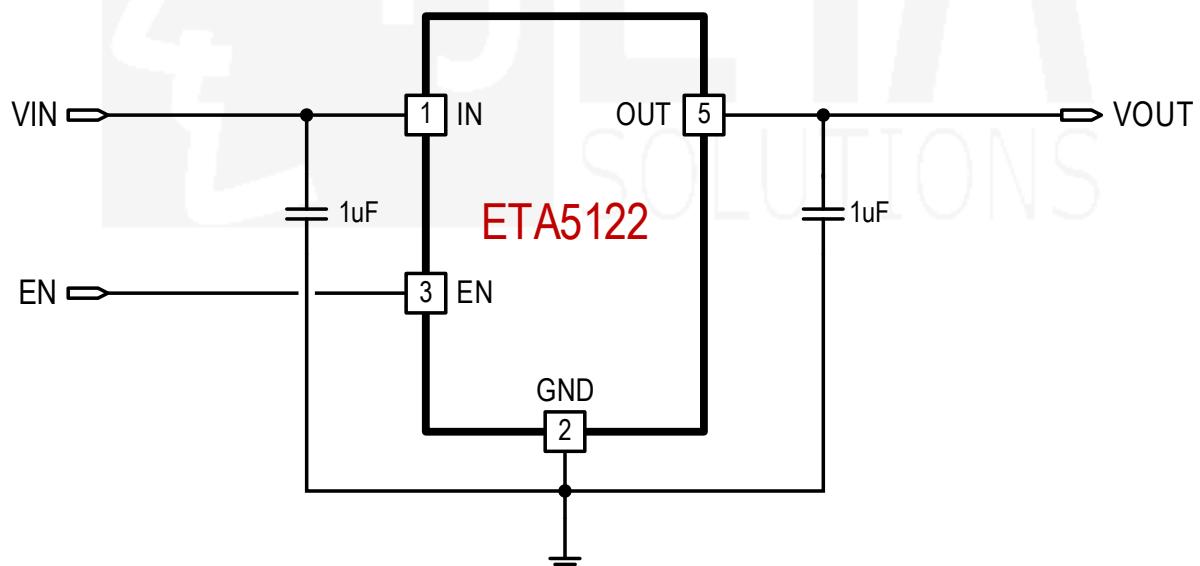
FEATURES

- ◆ 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

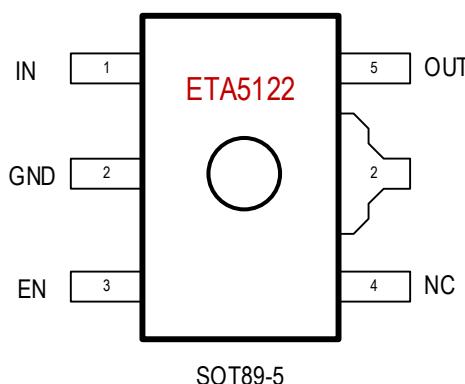
APPLICATIONS

- ◆ NB-IoT module
- ◆ Wearables
- ◆ multi-cell battery powered system

TYPICAL APPLICATION



PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

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

V _{IN} , EN, V _{OUT} 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}	
SOT89-5.....47.....77.... °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

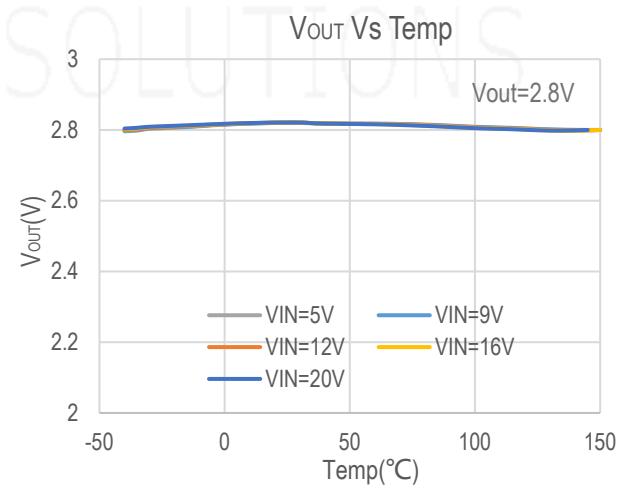
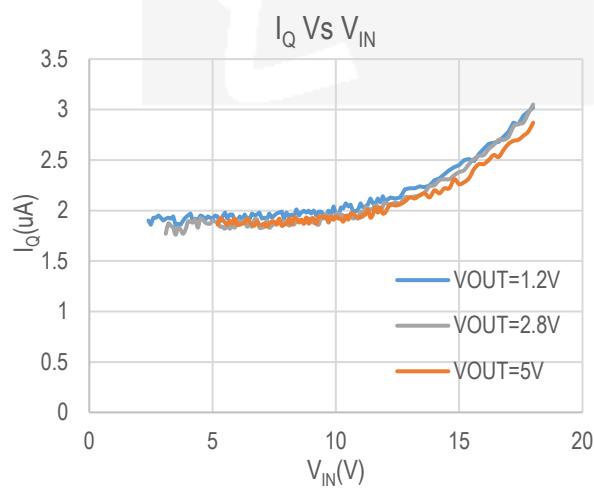
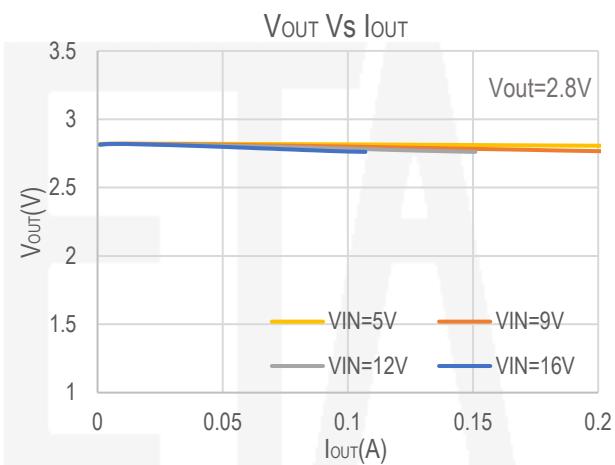
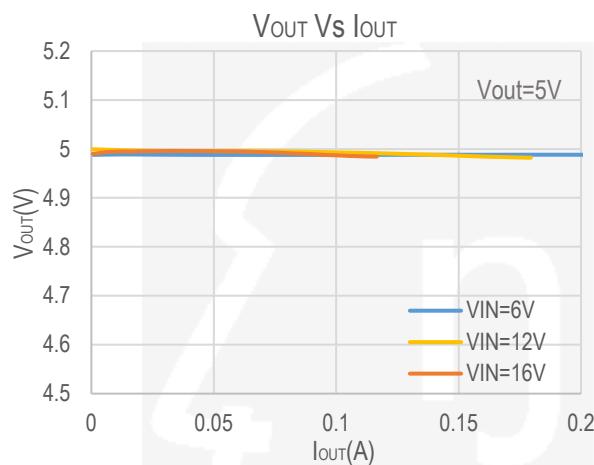
(1): Minimum V_{IN} is V_{OUT} + V_{DROPOUT}, whichever is greater.

PIN DESCRIPTION

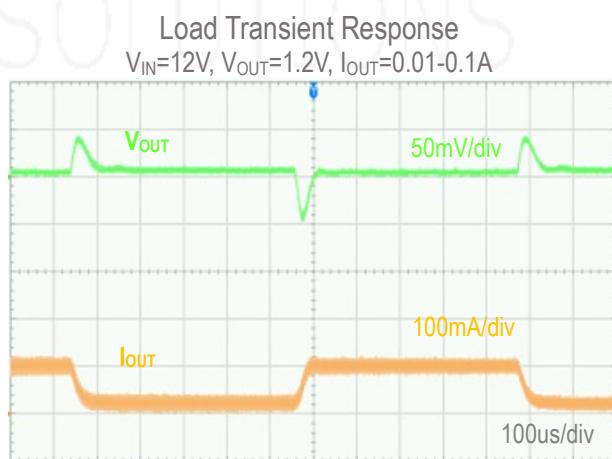
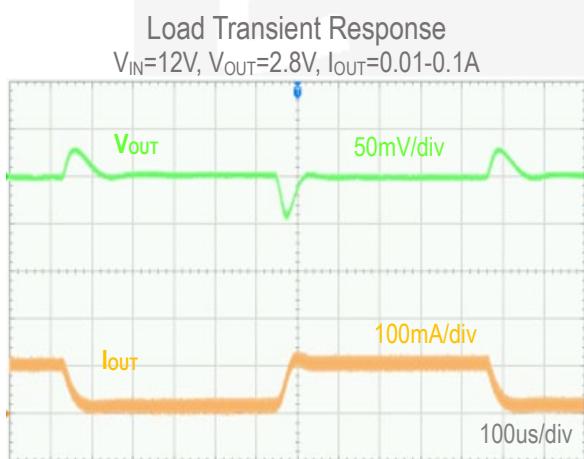
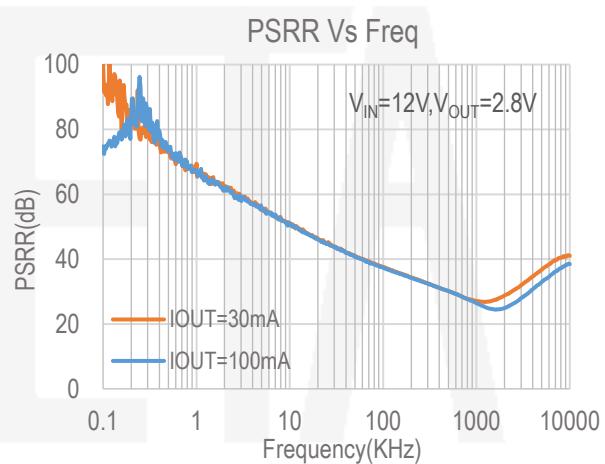
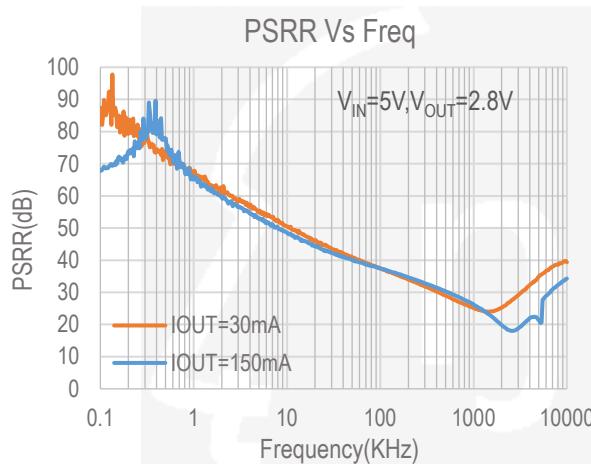
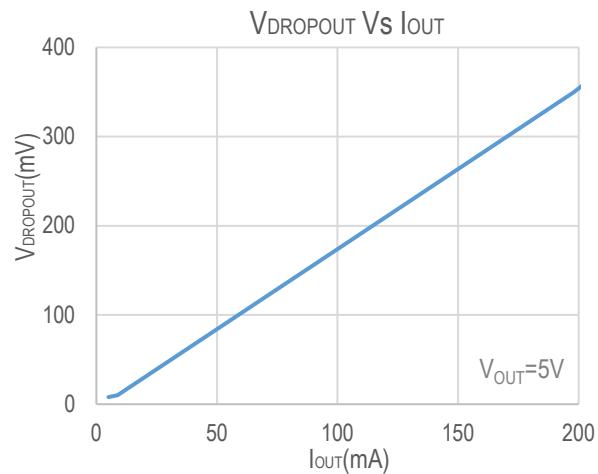
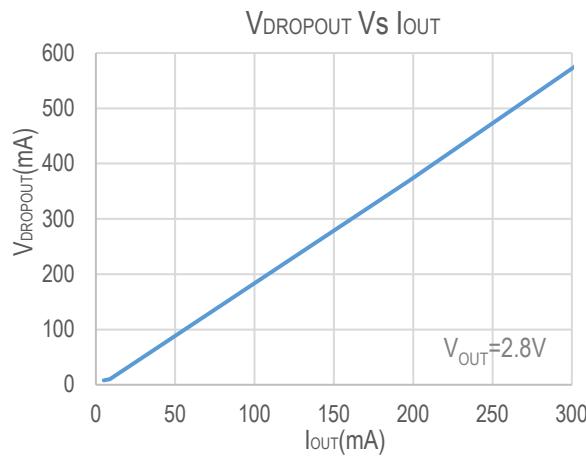
SOT89-5 PIN#	NAME	DESCRIPTION
1	IN	Input Supply Pin
2	GND	Ground Pin
3	EN	Enable Pin. Drive it high to enable IC, drive it low to disable. EN can be connected to IN if not used.
4	NC	Not Connected
5	OUT	Output Pin of the regulator

TYPICAL CHARACTERISTICS

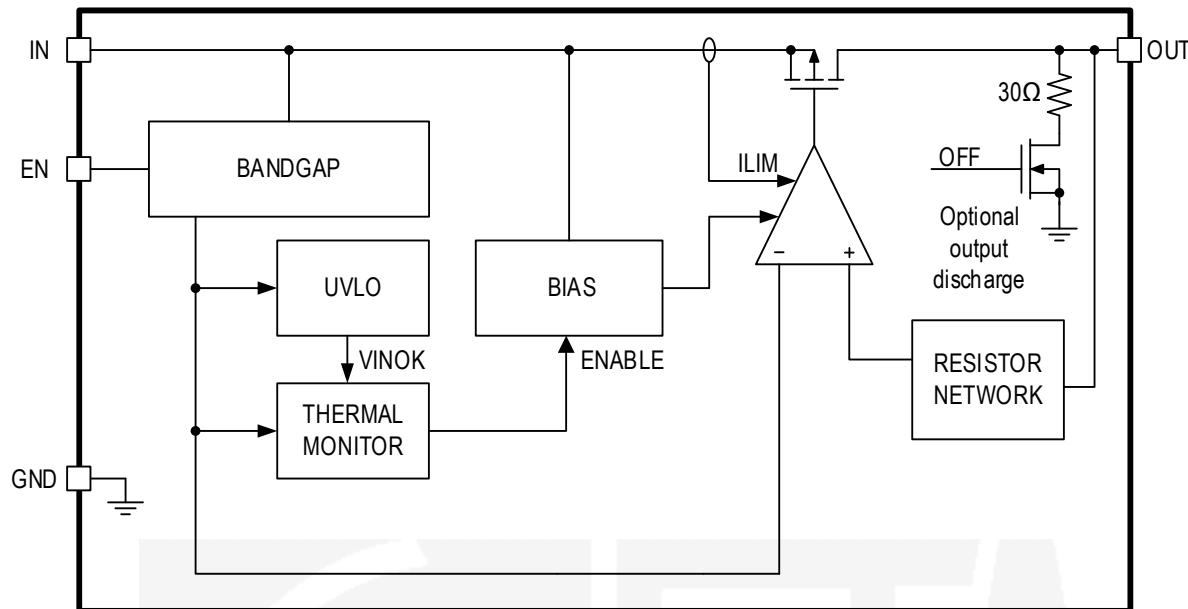
(Typical values are at $T_A = 25^\circ\text{C}$ unless otherwise specified.)



TYPICAL CHARACTERISTICS (cont')



FUNCTIONAL BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The ETA5122 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

ETA5122 is enabled when all below conditions happen. Otherwise, ETA5122 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, ETA5122 first enables BANDGAP and BIAS then enables LDO core.

ETA5122 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 ETA5122 is in shutdown conditions, Output is discharged by 30Ω resistor (optional).

Output Current Limit and Foldback Current Limit

ETA5122 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 ETA5122 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 voltage.

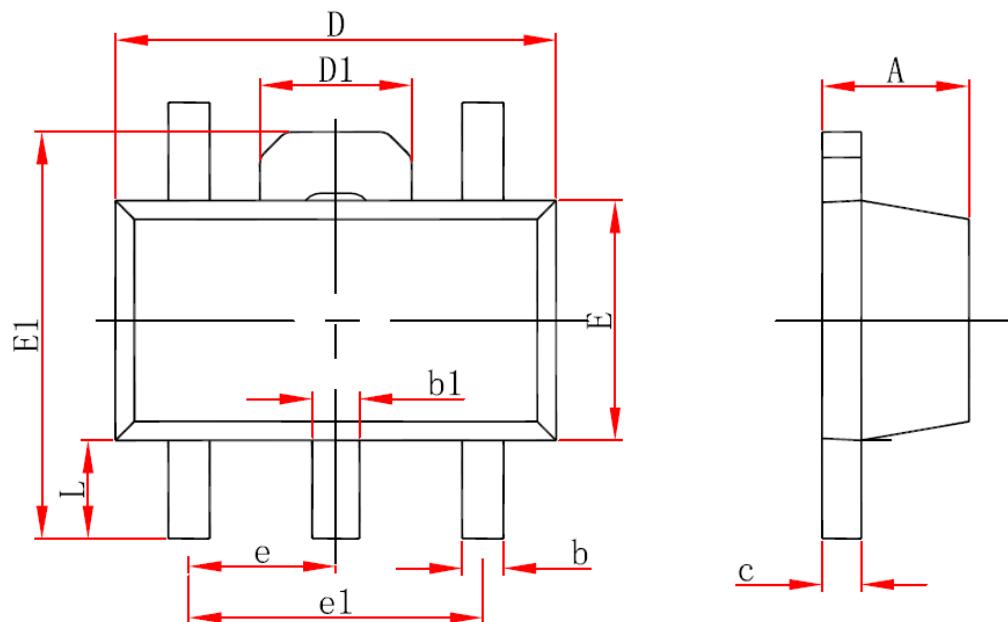
In case output is in hard short conditions, ETA5122 also provides an internal foldback limit that reduces the output current limit to a lower level, 130mA, then reduce power dissipation ratings of the package.

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.

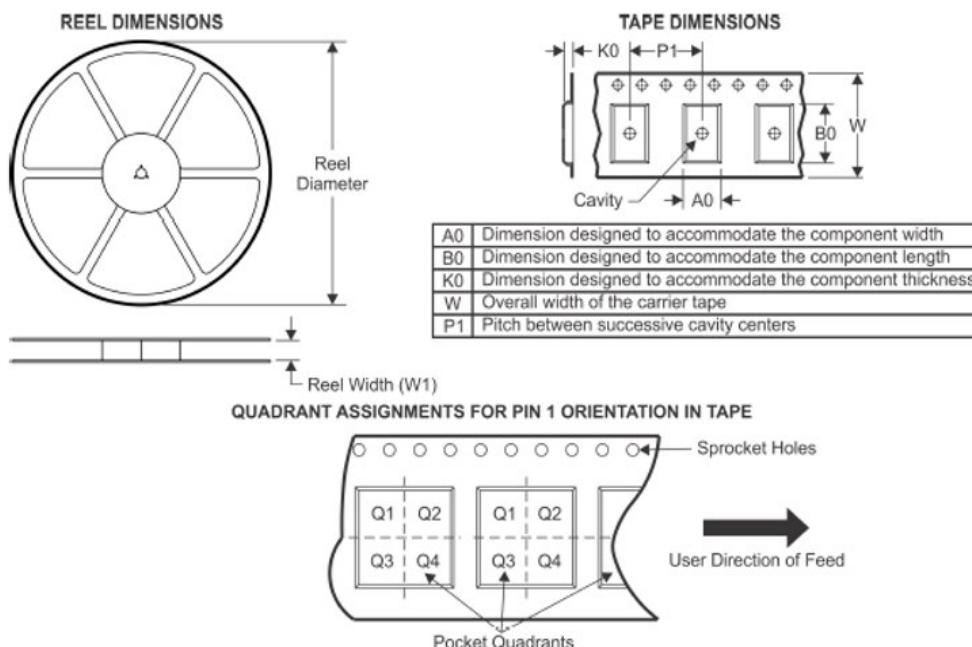
PACKAGE OUTLINE

Package: SOT89-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.380	0.580	0.015	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

TAPE AND REEL INFORMATION



Device	Package Type	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
ETA5122VXXXNS8F	SOT89-5	5	1000	178	9.5	4.75	4.75	1.8	8	8	Q3
ETA5122VXXXDS8F	SOT89-5	5	1000	178	9.5	4.75	4.75	1.8	8	8	Q3

ORDERING		PART No.	PACKAGE	TOP MARK	Pcs/Reel
INFORMATION		ETA5122V <u>XXX</u> NS8F	SOT89-5	<u>PP</u>	3000
		<u>XXX</u> : voltage code =1.2V	e.g. <u>120</u>	<u>PP</u> : product code	
		<u>O=N</u> : no discharge; <u>O=D</u> : discharge		<u>YW</u> : date code	
SOT89-5	1.2V No discharge	ETA5122V120NS8F	SOT89-5	wK1	3000
SOT89-5	1.8V No discharge	ETA5122V180NS8F	SOT89-5	wK2	3000
SOT89-5	2.5V No discharge	ETA5122V250NS8F	SOT89-5	wK3	3000
SOT89-5	2.8V No discharge	ETA5122V280NS8F	SOT89-5	wK4	3000
SOT89-5	3V No discharge	ETA5122V300NS8F	SOT89-5	wK5	3000
SOT89-5	3.3V No discharge	ETA5122V330NS8F	SOT89-5	wK6	3000
SOT89-5	5V No discharge	ETA5122V500NS8F	SOT89-5	wK7	3000
SOT89-5	1.2V Discharge	ETA5122V120DS8F	SOT89-5	WK1	3000
SOT89-5	1.8V Discharge	ETA5122V180DS8F	SOT89-5	WK2	3000
SOT89-5	2.5V Discharge	ETA5122V250DS8F	SOT89-5	WK3	3000
SOT89-5	2.8V Discharge	ETA5122V280DS8F	SOT89-5	WK4	3000
SOT89-5	3V Discharge	ETA5122V300DS8F	SOT89-5	WK5	3000
SOT89-5	3.3V Discharge	ETA5122V330DS8F	SOT89-5	WK6	3000
SOT89-5	5V Discharge	ETA5122V500DS8F	SOT89-5	WK7	3000