

45V Input Voltage, 2.5uA Ultra-low Iq, High PSRR, 300mA LDO

DESCRIPTION

ETA5043 is a low-dropout (LDO) linear voltage regulator that features ultra-low standby current as low as 2.5uA. It can withstand input voltage up to 48V and deliver 300mA output current.

ETA5043 can provide fixed output voltages with wide input voltage range from 3V to 45V. The device also includes short circuit protection, UVLO and thermal shutdown.

Therefore, ETA5043 is an ideal power supply for low power applications such as IoT, portable and multi-cell battery-powered system, etc.

ETA5043 is housed in a tiny SOT23-5 package.

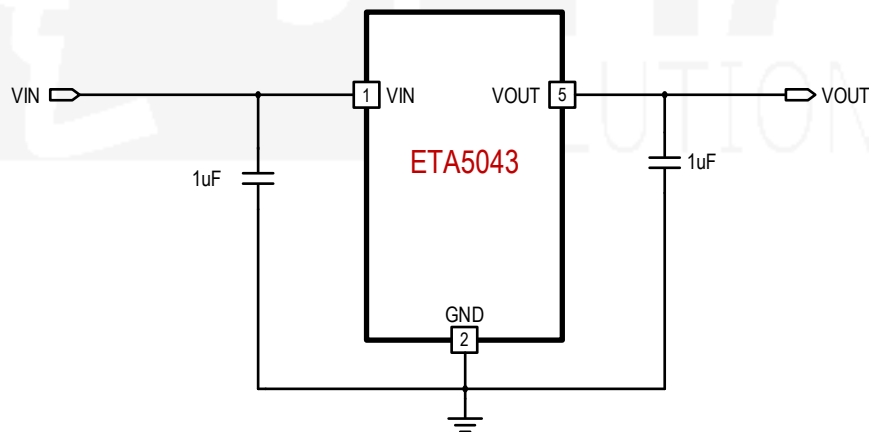
FEATURES

- ◆ Wide Input Voltage Range: from 3V to 45V
- ◆ Ultra-Low Quiescent Current: 2.5uA
- ◆ 300mA Output Current
- ◆ Stable with a Wide Range of Ceramic Capacitor, Larger than 1μF
- ◆ High PSRR, 70dB at 1KHz
- ◆ Integrated Thermal and Current Limit
- ◆ SOT23-5 package
- ◆ RoHS Compliant

APPLICATIONS

- ◆ Portable Equipment
- ◆ Multi-cell Battery-Powered System
- ◆ NB-IoT Module

TYPICAL APPLICATION

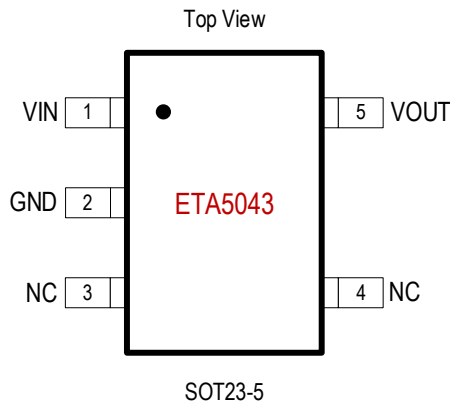


ORDERING

INFORMATION

PART No.	PACKAGE	TOP MARK	Pcs/Reel
ETA5043VXXXQS2F	SOT23-5	PPYW	3000
XXX: Voltage Code Q=N: no discharge;	e.g. <u>120</u> =1.2V, <u>Q</u> =adj Q=D: discharge	PP: product code YW: data code	

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.)

VIN to GND Voltage	-0.3V to 48V
VOUT to GND Voltage.....	-0.3V to 40V
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-55°C to 150°C
Thermal Resistance θ_{JA} θ_{JC}	
SOT23-5.....	220..... 110..... °C/W
Lead Temperature (Soldering 10sec)	260°C

ELECTRICAL CHARACTERISTICS

(VIN = VOUT+1V, unless otherwise specified. Typical values are at TA = 25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage Range ⁽¹⁾		3		45	V
Ground Current	No Load		2.5		µA
Shutdown Current			1		µA
Dropout Voltage	I _{OUT} =100mA, V _{OUT} =3.3V		540		mV
Output Current Limit	V _{OUT} =95%	300	400		mA
Output Foldback Current Limit	V _{OUT} =0V		200		mA
Line Regulation	V _{OUT} +1V ≤ V _{IN} ≤ 45V			0.12	%/V
Load Regulation	1mA ≤ I _{OUT} ≤ 100mA		20		mV
Output Voltage Range	Available in 100mV steps	1.2		20	V
Output Voltage Accuracy	I _{OUT} =30mA	-2		2	%
Power Supply Rejection Ratio	Freq = 100Hz, I _{OUT} = 10mA		88		dB
	Freq = 1KHz, I _{OUT} = 10mA		70		dB
Discharge Resistance ⁽²⁾			60		Ω
Thermal Shutdown	Hysteresis=30°C		160		°C

(1): Minimum VIN is 3V or VOUT + VDROPOUT, whichever is greater.

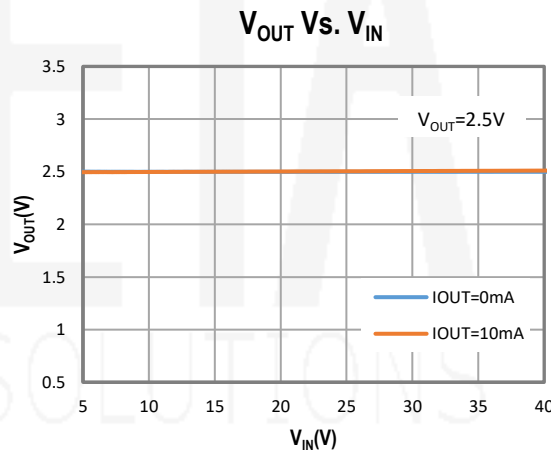
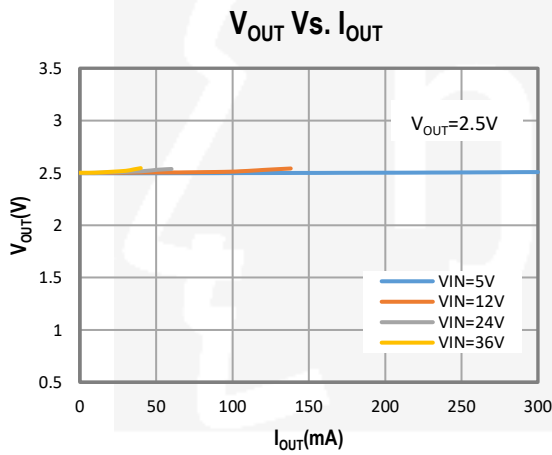
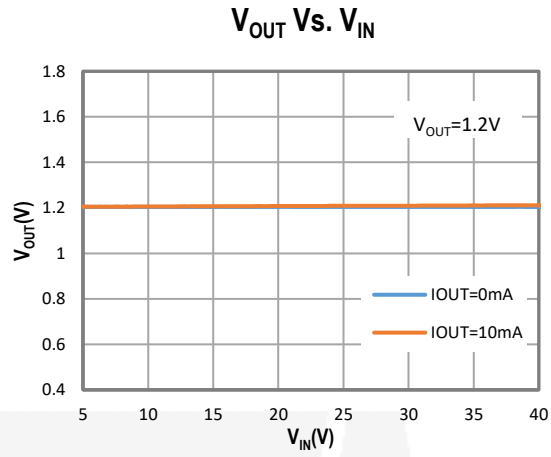
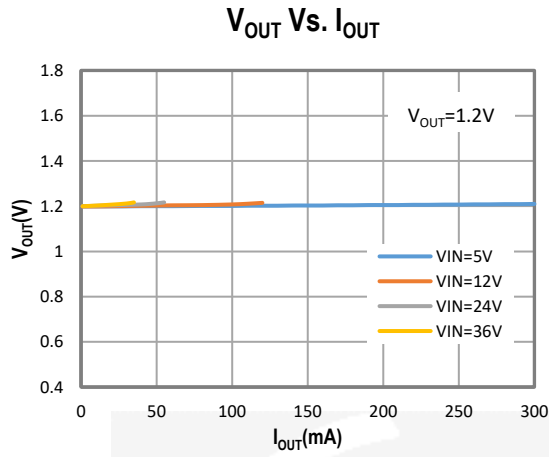
(2): This parameter is for output discharge version.

PIN DESCRIPTION

PIN #	NAME	DESCRIPTION
1	VIN	Supply voltage pin. Bypass with a 1µF ceramic capacitor to GND
2	GND	Ground
3	NC	Not Connect
4	NC	Not Connect
5	VOUT	Output voltage pin. Bypass with a 1µF ceramic capacitor to GND

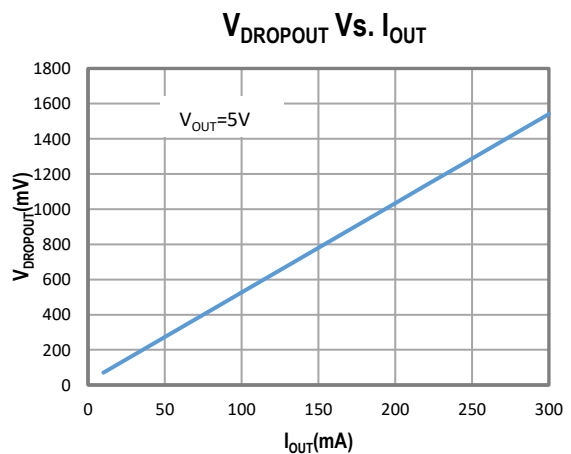
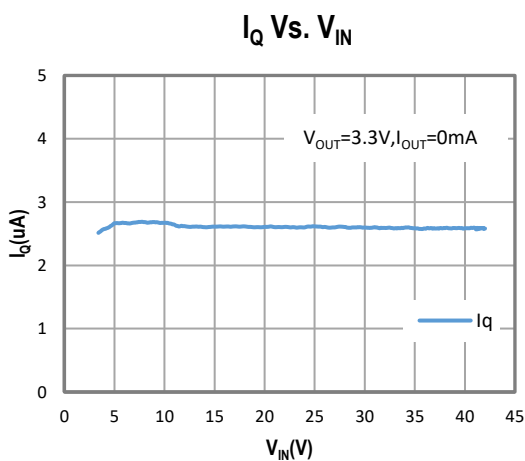
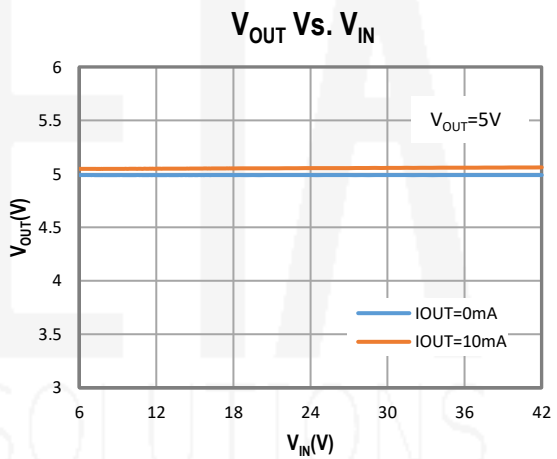
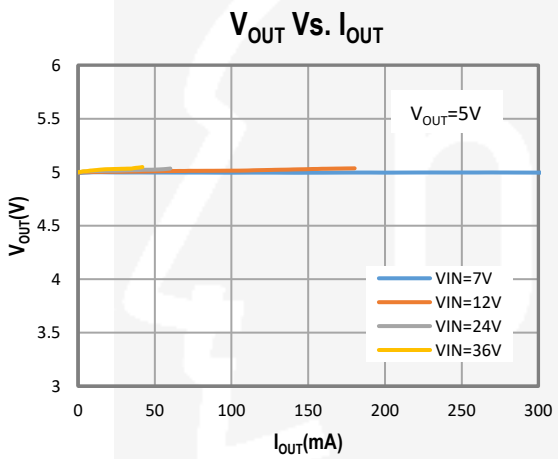
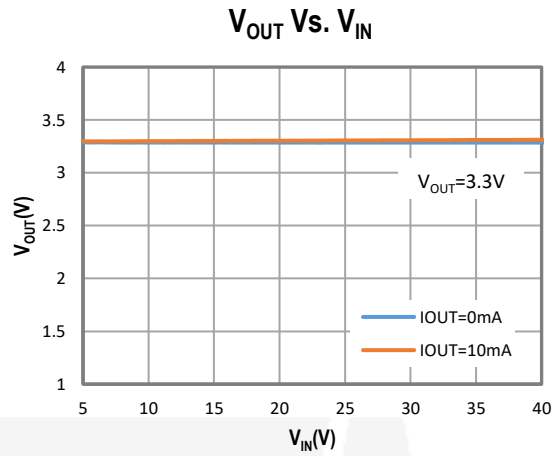
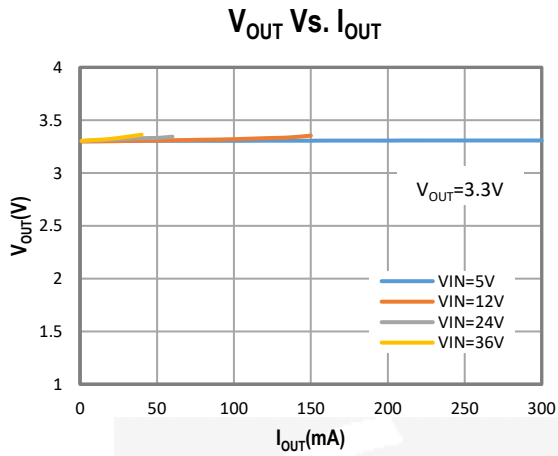
TYPICAL CHARACTERISTICS

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



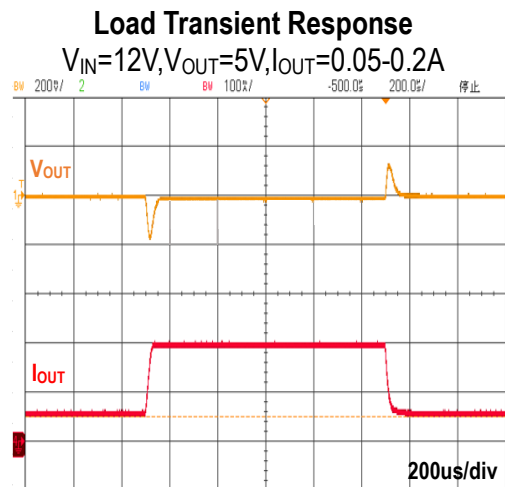
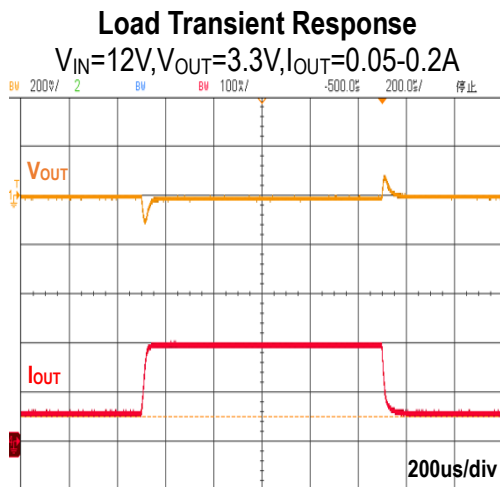
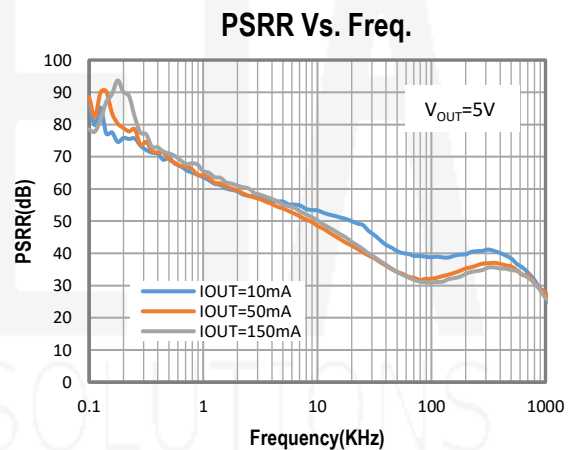
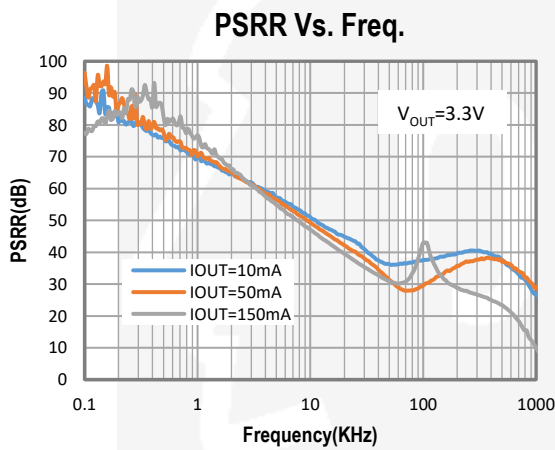
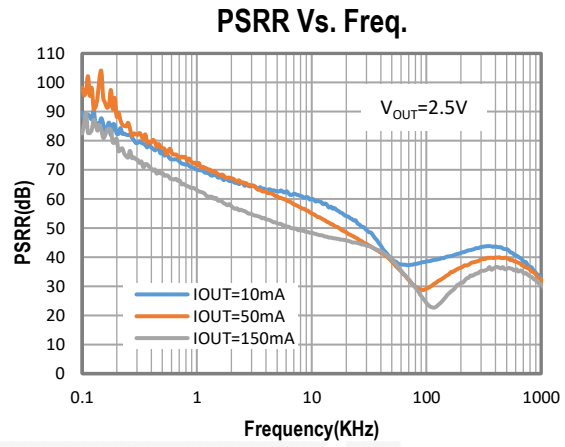
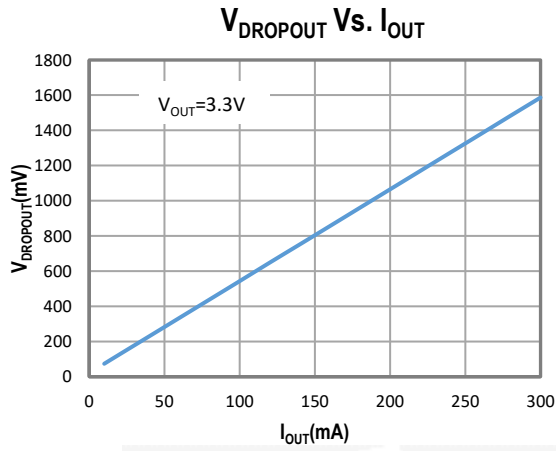
TYPICAL CHARACTERISTICS (cont')

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

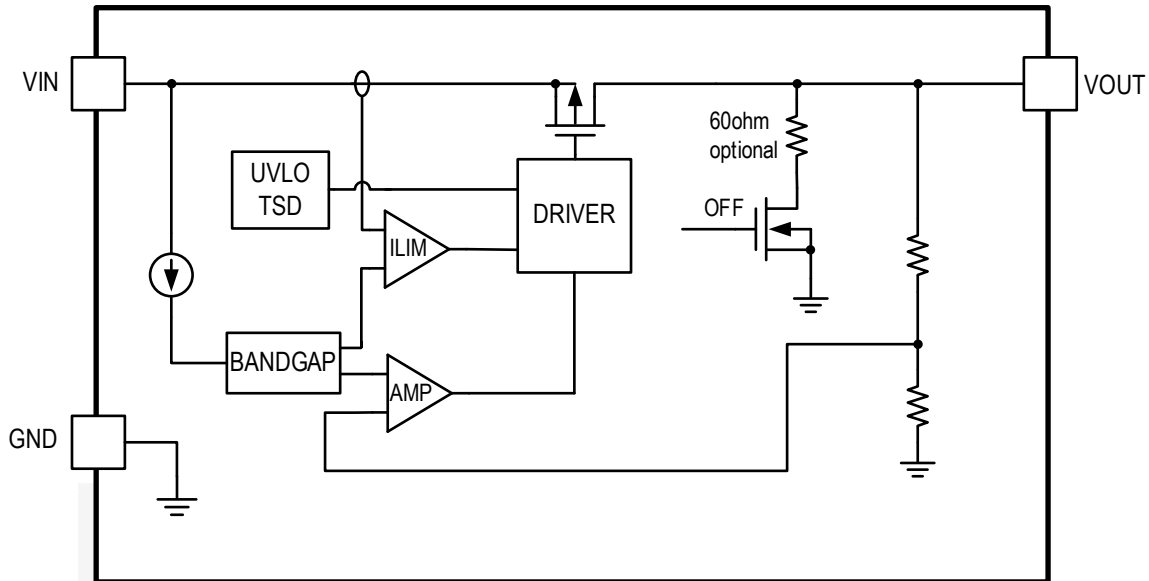


TYPICAL CHARACTERISTICS (cont')

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



FUNCTIONAL BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The ETA5043 family of LDO regulators has been optimized for application in low standby power equipments. The device features 2.5uA ultra-low quiescent current, 45V input voltage and 300mA output current capability.

Enable Sequence

ETA5043 is enabled when all below conditions happen. Otherwise, ETA5043 is in standby mode.

- ◆ VIN is higher than Under-Voltage-Lock-Out level.
- ◆ Junction Temperature is not at Over-Temperature Protection level.

Once all above conditions happen, ETA5043 first enables BANDGAP and BIAS. When internal bias is ready, ETA5043 enables LDO core.

Once ETA5043 is in shutdown conditions, Output is discharged by 60Ω resistor (optional).

Output Current Limit and Foldback Current Limit

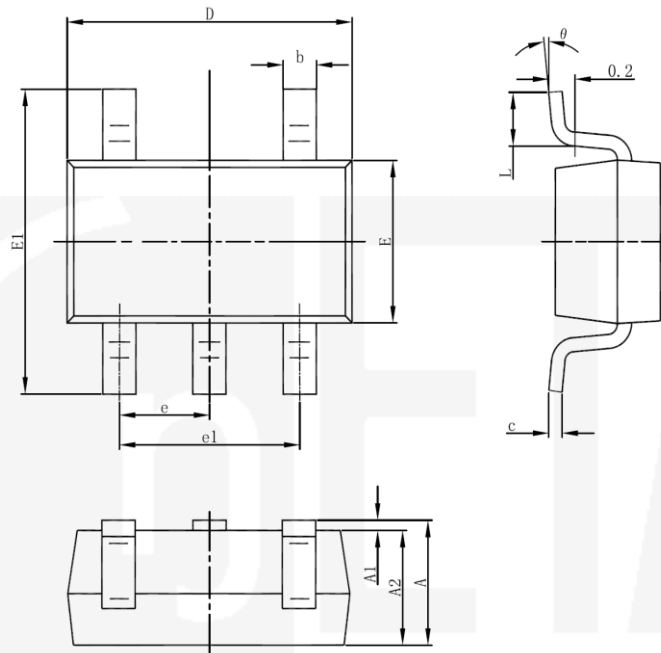
ETA5043 family features an internal current limit. In normal operation, the ETA5043 limits output current to approximately 400mA. When current limiting engages, the output voltage scales back linearly until the over current condition ends.

In case output is in hard short conditions, ETA5043 also features an internal foldback limit that reduces the output current limit to a lower level, 200mA, then reduce power dissipation ratings of the package.

Over-Temperature Protection

Thermal protection disables the output when the junction temperature rises to approximately 160°C, allowing the device to cool down. When the junction temperature cools to approximately 130°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

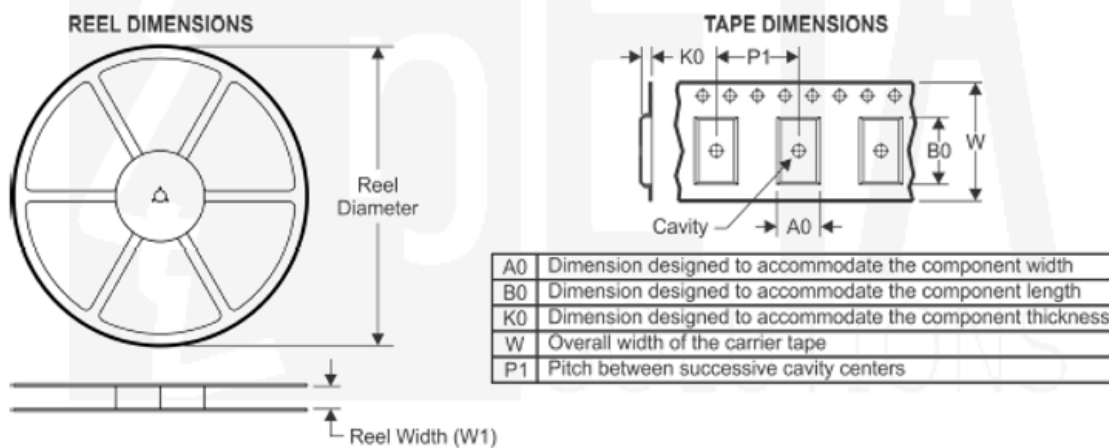


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

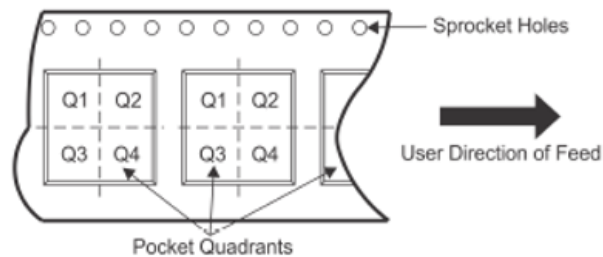
AVAILABLE PART NUMBER

Part Description	Part Number	Package	Mark	Pcs/Reel
VOUT Adjustable No Discharge SOT23-5	ETA5043V0NS2F	SOT23-5	fiYW	3000
VOUT Adjustable with Discharge SOT23-5	ETA5043V0DS2F	SOT23-5	fpYW	3000
1.2V No Discharge SOT23-5	ETA5043V120NS2F	SOT23-5	fjYW	3000
1.2V with Discharge SOT23-5	ETA5043V120DS2F	SOT23-5	fqYW	3000
2.5V No Discharge SOT23-5	ETA5043V250NS2F	SOT23-5	fkYW	3000
2.5V with Discharge SOT23-5	ETA5043V250DS2F	SOT23-5	frYW	3000
3.3V No Discharge SOT23-5	ETA5043V330NS2F	SOT23-5	fgYW	3000
3.3V with Discharge SOT23-5	ETA5043V330DS2F	SOT23-5	fsYW	3000
5V No Discharge SOT23-5	ETA5043V500NS2F	SOT23-5	fhYW	3000
5V with Discharge SOT23-5	ETA5043V500DS2F	SOT23-5	fiYW	3000

TAPE AND REEL INFORMATION



QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Device	Package Type	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
ETA5043VXXXOS2F	SOT23-5	5	3000	180	9.5	3.17	3.23	1.37	4	8	Q3