THIS SERIES IS NOT recommended for new design-ins and this series is discontinued

Recommended alternative: 1T8A2_1.5UP series

Please click here for the datasheet.

1T8A1_1.5UP series

1W - Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated

DC-DC Converter 1 Watt

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating ambient temp. range: -40°C to +105°C
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage: 1.5kVDC isolation
- Industry standard pin-out
- RoHS compliance
- IEC62368, UL62368, EN62368 approved

UL-62368-1 (E347551)

The 1T8A1_1.5UP series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Common specifications

Short circuit protection	Continuous, self-recovery
Operation temperature	-40°C ~ +105°C (Derating when operating temperature≥100°C,(see Fig. 2))
Storage temperature	-55°C ~ +125°C
Case temperature rise	3.3VDC output 25°C (Ta=25°C) Other outputs 15°C (Ta=25°C)
Storage Humidity	95%RH (Non-condensing)
Reflow Soldering Temperature*	Peak temp.≤245°C, maximum duration time≤60s over 217°C
MTBF	>3,500,000 hours (MIL-HDBK-217F@25°C)
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1 Level 1
Casing material	Black flame-retardant, heat-resistant plastic [UL94-V0]
Dimensions:	13.20 x 11.40 x 7.25 mm
Weight:	1.4g (Typ)
Cooling	Free air convection

*For actual application, please refer to IPC/JEDEC J-STD-020D.1.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no load)	3VDC input				
	• 3.3VDC output		405/8	427/-	mA
	• 5/9/12/15/24VDC output		379/8	399/-	mA
	5VDC input				
	• 3.3VDC/5VDC output		270/5	286/10	mA
	• 9VDC/12VDC output		241/12	254/20	mA
	• 15VDC/24VDC output		241/18	254/30	mA
	12VDC input				
	• 5VDC output		102/8	107/-	mA
	• 9/12/15VDC output		101/8	106/-	mA
	• 24VDC output		99/8	103/-	mA
	15VDC input				
	• 5VDC output		82/8	86/-	mA
	• 15VDC output		81/8	85/-	mA
	24VDC input				
	• 5/9/12/15VDC output		51/8	55/-	mA
	• 24VDC output		50/8	53/-	mA
Reflected ripple current*	• 5VDC input		15		mA
	• Other input		30		mA
Surge voltage (1 sec. max.)	• 3VDC input	-0.7		5	VDC
	• 5VDC input	-0.7		9	VDC
	• 12VDC input	-0.7		18	VDC
	• 15VDC input	-0.7		21	VDC
	• 24VDC input	-0.7		30	VDC
Input filter	Capacitance filter				
Hot plug	Unavailable				

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Example:
1T8A1_0505S1.5UP
1 = 1Watt; T8 = SMT8; A1 = Pinning; 05 = 5Vin; 05 = 5Vout; S = Single output; 1.5 = 1.5kVDC; U = Unregulated output; P = Short circuit protection

Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage accuracy	See output regulation curves				
Line regulation (Input voltage change: ±1%)	3VDC input				
	• 3.3VDC output			1.5	%
	Others Input			1.2	%
Load regulation (10% to 100% load)	3VDC input				
	• 3.3VDC output			25	%
	• 5VDC output			15	%
	• 9VDC output			15	%
	• 12VDC output			15	%
	• 15VDC output			15	%
	• 24VDC output			15	%
	5VDC input				
	• 3.3VDC output		15	20	%
	• 5VDC output		10	15	%
	• 9VDC output		8	10	%
	• 12VDC output		7	10	%
	• 15VDC output		6	10	%
	• 24VDC output		5	10	%
	Others input				
	• 5VDC output		10	15	%
	• 9VDC output		8	10	%
	• 12VDC output		7	10	%
	• 15VDC output		6	10	%
	• 24VDC output		5	10	%
Ripple & Noise* (20MHz Bandwidth)	3VDC input		75	100	mVp-p
	Others Input				
	• 5/9/12/15VDC output		30	75	mVp-p
	• 24VDC output		50	100	mVp-p
Temperature coefficient	full load		±0.02		%/°C
Switching frequency (full-load,nominal input)	• 3VDC input		220		KHz
	• Other input		260		KHz

The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1min and 1mA Max.	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output 100KHz/0.1V		20		pF

EMC specifications

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
Emissions	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV , Contact ±4kV perf. Criteria B

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the data-sheet;
2. The max. capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see „Features" and „EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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Products Selection Guide

Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA, Max/min]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_0303S1.5UP	3.3	3.3	303/30	2400	71/75	UL
1T8A1_0305S1.5UP	3.3	5	200/20	2400	76/80	UL
1T8A1_0309S1.5UP	3.3	9	111/11	1000	76/80	UL
1T8A1_0312S1.5UP	3.3	12	83/8	560	76/80	UL
1T8A1_0315S1.5UP	3.3	15	67/7	560	76/80	UL
1T8A1_0324S1.5UP	3.3	24	42/4	220	76/80	UL

Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA, Max/min]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_0503S1.5UP	5	3.3	303/30	2400	70/74	UL
1T8A1_0505S1.5UP	5	5	200/20	2400	78/82	UL
1T8A1_0509S1.5UP	5	9	111/12	1000	79/83	UL
1T8A1_0512S1.5UP	5	12	84/9	560	79/83	UL
1T8A1_0515S1.5UP	5	15	67/7	560	79/83	UL
1T8A1_0524S1.5UP	5	24	42/4	220	81/85	UL

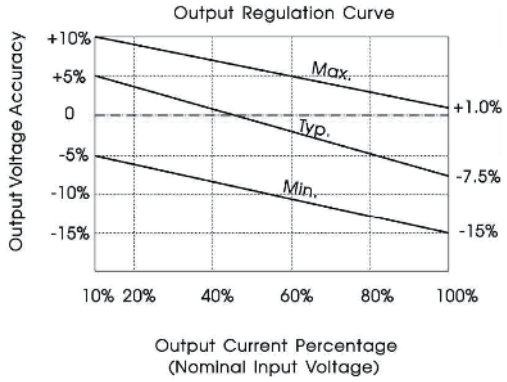
Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_1205S1.5UP	12	5	200	2400	78/82	UL
1T8A1_1209S1.5UP	12	9	111	1000	79/83	UL
1T8A1_1212S1.5UP	12	12	84	560	79/83	UL
1T8A1_1215S1.5UP	12	15	67	560	79/83	UL
1T8A1_1224S1.5UP	12	24	42	220	81/85	UL

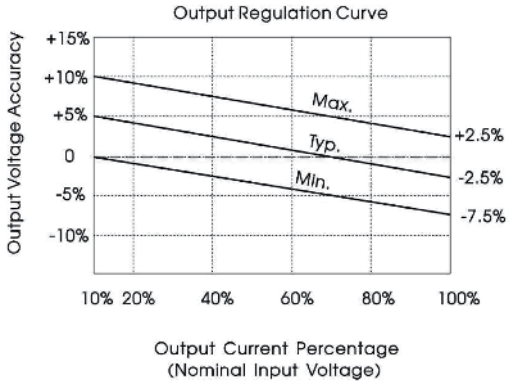
Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_1505S1.5UP	15	5	200	2400	78/82	UL
1T8A1_1515S1.5UP	15	15	67	560	79/83	UL

Part Number	Input Voltage [V, nom]	Output Voltage [VDC]	Output Current [mA]	Capacitive load [µF, Max.]	Efficiency [%, min/typ]	Certification
1T8A1_2405S1.5UP	24	5	200	2400	76/82	UL
1T8A1_2409S1.5UP	24	9	111	1000	77/83	UL
1T8A1_2412S1.5UP	24	12	111	560	77/83	UL
1T8A1_2415S1.5UP	24	15	67	560	77/83	UL
1T8A1_2424S1.5UP	24	24	42	220	79/85	UL

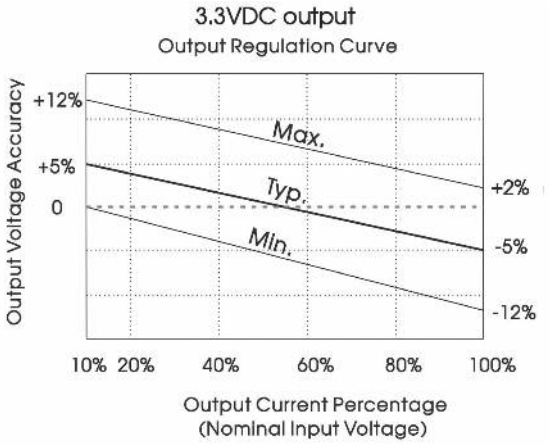
Typical characteristics

3VDC Input





5VDC Inputs



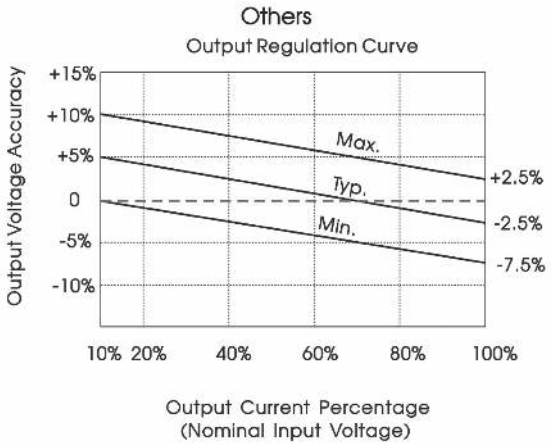


Fig. 1

Other Inputs

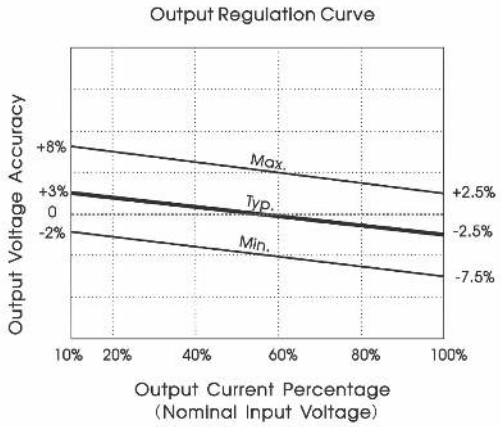


Fig. 1

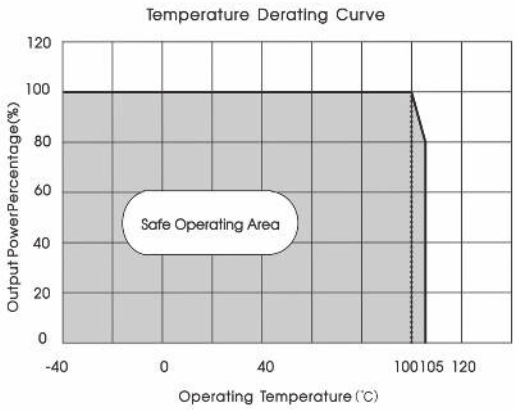
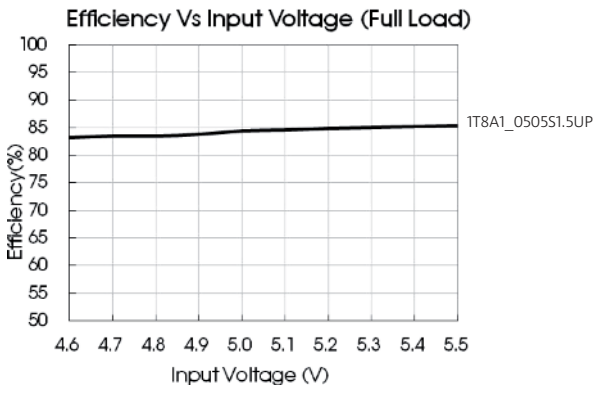
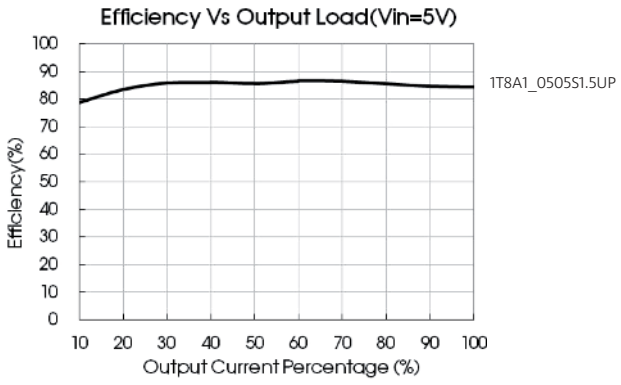
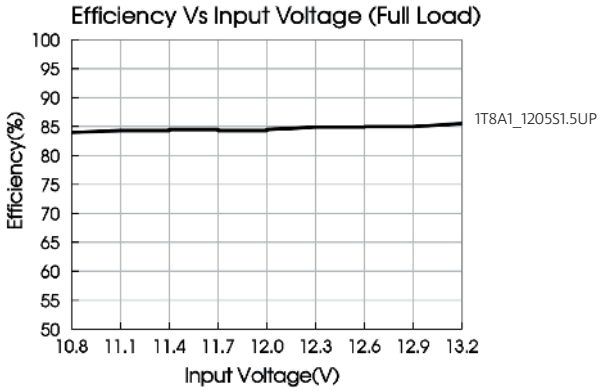
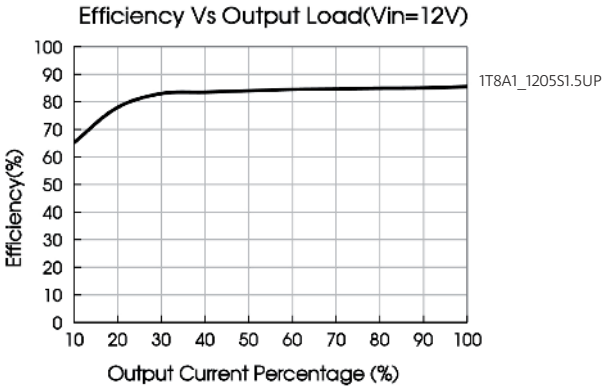


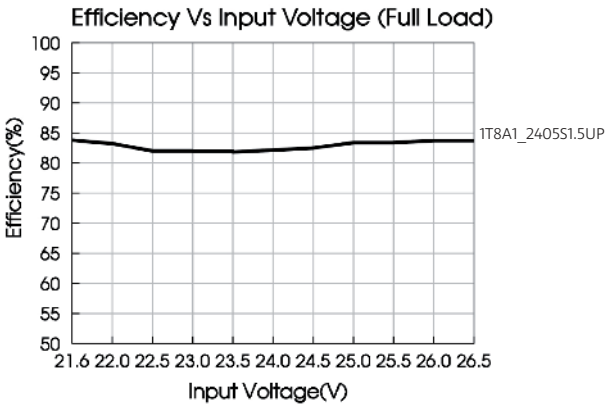
Fig. 2

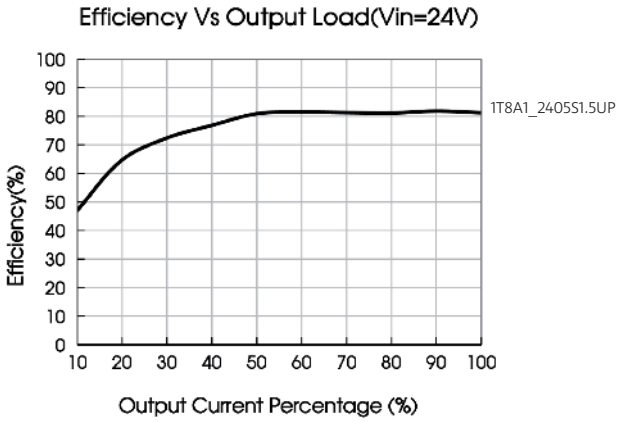












Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3 Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

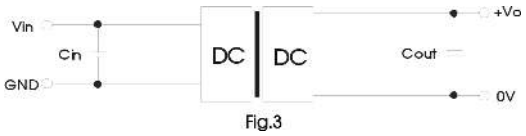


Fig.3

5VDC Input

Vin (VDC)	Cin (µF)	Vout (VDC)	Cout (µF)
5VDC	4.7	3.3/5VDC	10
		9VDC	4.7
		12VDC	2.2
		15VDC	1
		24VDC	0.47

Other Inputs

Vin (VDC)	Cin (µF)	Vout (VDC)	Cout (µF)
12VDC	2.2µF/50V	5VDC	10µF/16V
15VDC	2.2µF/50V	9VDC	2.2µF/16V
24VDC	1µF/50V	12VDC	2.2µF/25V
		15VDC	1µF/25V
		24VDC	1µF/50V

EMC recommended circuit

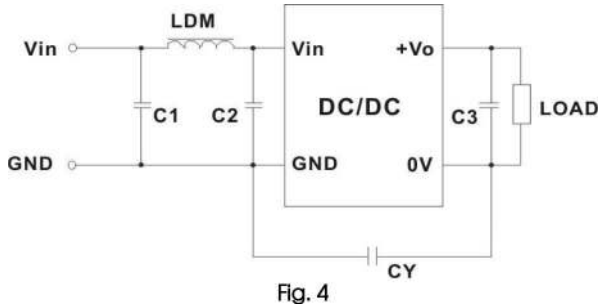


Fig. 4

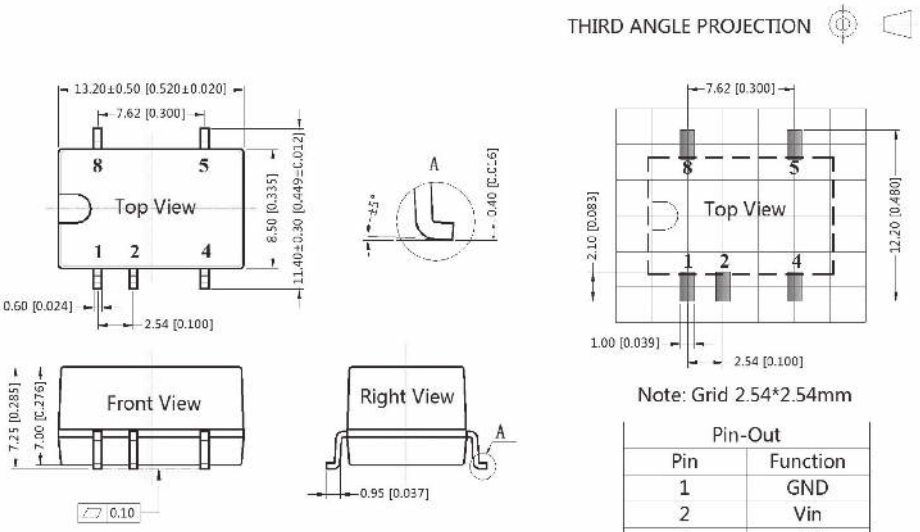
Input voltage		05VDC	
Output voltage(VDC)		3.3/5/9	12/15/24
Emissions	C1/C2	4.7µF /25V	22µF /16V
Emissions	CY	-	1nF/2KVDC
Emissions	C3	Refer to the Cout in table 1	
Emissions	LDM	6.8µH	6.8µH

Input voltage		3.3/12/15/24 VDC
Emissions	C1	4.7µF /50V
Emissions	C2	4.7µF /50V
Emissions	CY	270pF /2kV
Emissions	C3	Refer to the Cout in table 1
Emissions	C1/C2	6.8µH

Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 1% of the rated output load. If the total required output power is below 1%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 1% minimum.

Mechanical dimensions



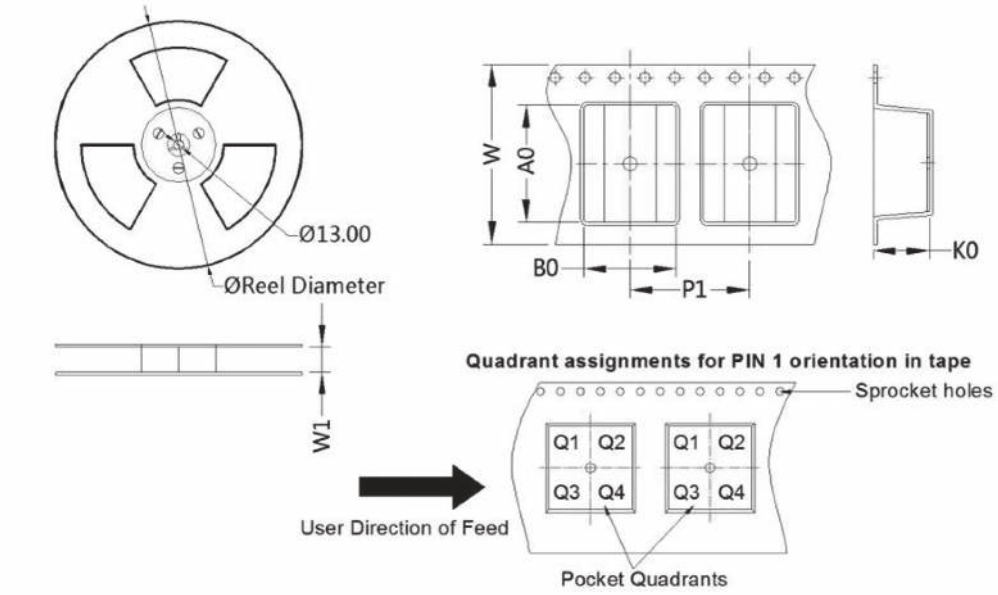
Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Vin
4	0V
5	+Vo
8	NC

NC: Pin to be isolated from circuitry

Tape and Reel Info



Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1