

**DESCRIPTION: 1W 1KVDC and 3KVDC Isolated Miniature Single Output DC/DC Converters**

The TKE series are miniature, isolated 1W DC/DC converters in a SIP and DIP package. They offer the ideal solution in many space critical applications for board level power distribution. The internal SMD construction makes it possible to offer a product with high performance at low cost. The series offers smaller size, improved efficiency.

**FEATURES**

RoHS compliant	Sub-Miniature SIP & DIP styles	DIP: 3KVDC isolation, SIP: 1KVDC isolation
UL 94V-0 package material	Operating temperature: -40°C to 85°C	Power density 2.09W/cm <sup>3</sup>
Footprint at 0.69cm <sup>2</sup>	Industry standard pinout	Input voltage: 3.3V, 5V, 12V, 24V
Output voltage: 3.3V, 5V, 9V, 12V, 15V	Custom solutions available	CE certification

**SELECTION GUIDE**

Part Number	Nominal Input Voltage	Output Voltage	Output Current (Max./Min)	Efficiency	Package Style
	V	V	mA	%	
TKE0303D	3.3	3.3	303/30.3	71	DIP
TKE0305D	3.3	5	200/20	74	DIP
TKE0309D	3.3	9	111/11.1	75	DIP
TKE0303S	3.3	3.3	303/30.3	71	SIP
TKE0305S	3.3	5	200/20	75	SIP
TKE0309S	3.3	9	111/11.1	74	SIP
TKE0503D	5	3.3	303/30.3	74	DIP
TKE0505D	5	5	200/20	69	DIP
TKE0509D	5	9	111/11.1	74	DIP
TKE0512D	5	12	83/8.3	78	DIP
TKE0515D	5	15	67/6.7	78	DIP
TKE0503S	5	3.3	303/30.3	74	SIP
TKE0505S	5	5	200/20	69	SIP
TKE0509S	5	9	111/11.1	75	SIP
TKE0512S	5	12	83/8.3	78	SIP
TKE0515S	5	15	67/6.7	78	SIP
TKE1205D	12	5	200/20	72	DIP
TKE1209D	12	9	111/11.1	78	DIP
TKE1212D	12	12	83/8.3	80	DIP
TKE1215D	12	15	67/6.7	81	DIP
TKE1205S	12	5	200/20	72	SIP
TKE1209S	12	9	111/11.1	78	SIP
TKE1212S	12	12	83/8.3	80	SIP
TKE1215S	12	15	67/6.7	81	SIP
TKE2405D	24	5	200/20	69	DIP
TKE2412D	24	12	83/8.3	78	DIP
TKE2415D	24	15	67/6.7	79	DIP
TKE2405S	24	5	200/20	71	SIP

Add suffix "P" for continuous short circuit protection, for example TKE0505SP.

**INPUT CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	3.3V input	2.9	3.3	3.6	V
Voltage range	5V input	4.5	5.0	5.5	V
Voltage range	12V input	11	12.0	13.3	V
Voltage range	24V input	21.6	24	26.4	V

**ABSOLUTE MAXIMUM RATINGS**

Short-circuit protection	1 second
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	520mW
Input voltage Vin, TKE03	5.5V
Input voltage Vin, TKE05	7V
Input voltage Vin, TKE12	15V
Input voltage Vin, TKE24	28V

All specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified.

**ISOLATION CHARACTERISTICS**

Parameter	Conditions	Min.	Max.	Units
Rated Power	TA= -40°C to 85°C, see derating graphs		1.0	W
Voltage Set Point Accuracy	See tolerance envelope			
Line regulation	High Vin to low Vin		1.2	%/%
Load Regulation(10% load to rated load)	3.3V output types & 0309		15	%
Load Regulation(10% load to rated load)	5V output types		15	%
Load Regulation(10% load to rated load)	9V output types		10	%
Load Regulation(10% load to rated load)	12V output types		10	%
Load Regulation(10% load to rated load)	15V output types		9	%

**ISOLATION CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage DIP package	tested for 1 second	3000			VDC
Isolation test voltage SIP package	tested for 1 second	1000			VDC
Resistance	Viso= 1000VDC	1			GΩ

**GENERAL CHARACTERISTICS**

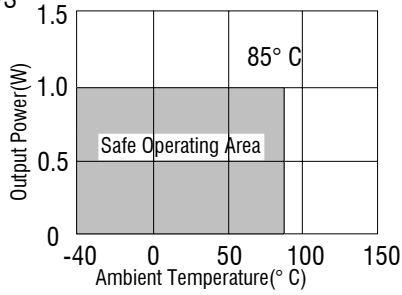
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	All output types		120		kHz

**TEMPERATURE CHARACTERISTICS**

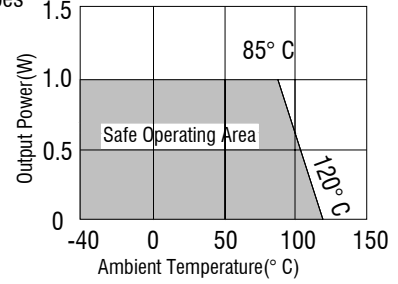
Specification	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	-40		85	°C
Storage		-50		130	°C
Case temperature rise above ambient	0505D/S, 1205D/S			35	°C
Case temperature rise above ambient	All other output types				
Cooling	Free air convection				

**TEMPERATURE DERATING GRAPHS**

TKE0303D/S,0305D/S  
0309D/S,0503D/S  
types only

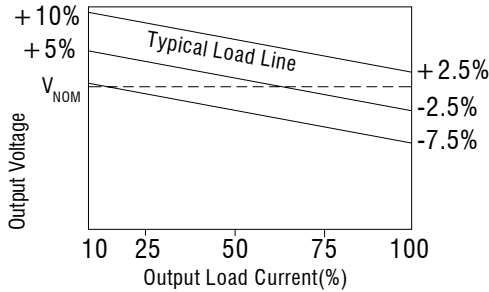


All other types

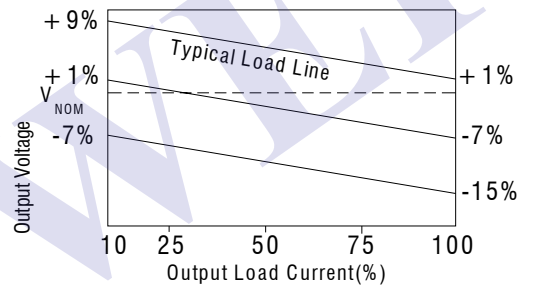


**TOLERANCE ENVELOPES**

All other types

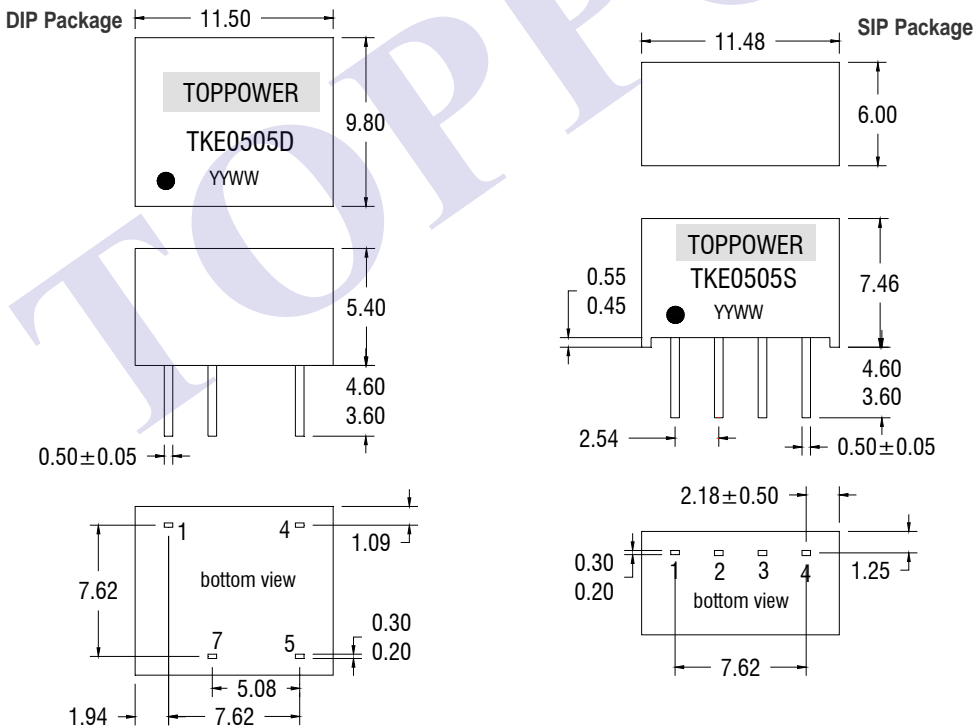


3.3V output types



**MECHANICAL DIMENSIONS**

**PIN CONNECTIONS**



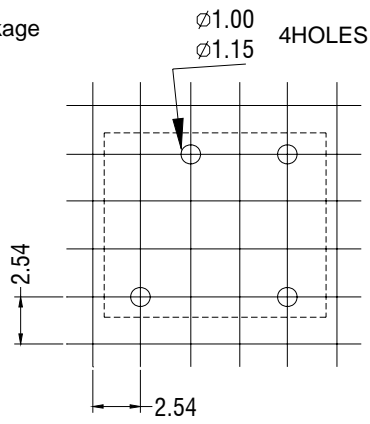
8 PIN DIP	
Pin	Function
1	-Vin
4	+Vin
5	+Vout
7	-Vout

4 PIN SIP	
Pin	Function
1	-Vin
2	+Vin
3	-Vout
4	+Vout

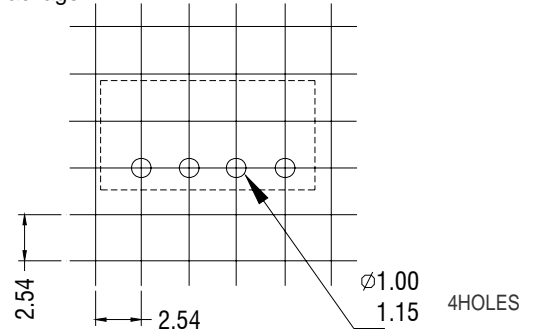
All dimensions in mm  $\pm 0.25$ mm. All pins on a 2.54mm pitch and within  $\pm 0.25$ mm of true position.  
Weight: 1.09g(SIP) 1.25g(DIP)

**RECOMMENDED FOOTPRINT DETAILS**

8 Pin DIP Package

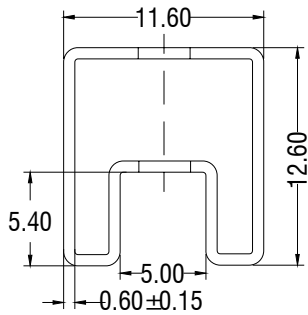


4 Pin SIP Package

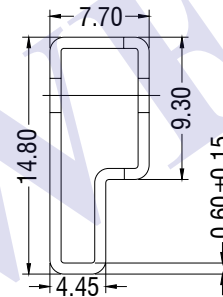


**TUBE OUTLINE DIMENSIONS**

8 Pin DIP Tube



4 Pin SIP Tube



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm

Tube length(8 Pin DIP):520mm  $\pm 2$ mm

Tube length(4 Pin SIP):525mm  $\pm 2$ mm

Tube Quantity:40PCS

**SOLDERING INFORMATION**

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300° C for 10 seconds. Both SIP and DIP types in this series are backward compatible with Sn/Pb soldering systems.