Trans-inductor Voltage Regulator – *SMF090610 (Z) Series*

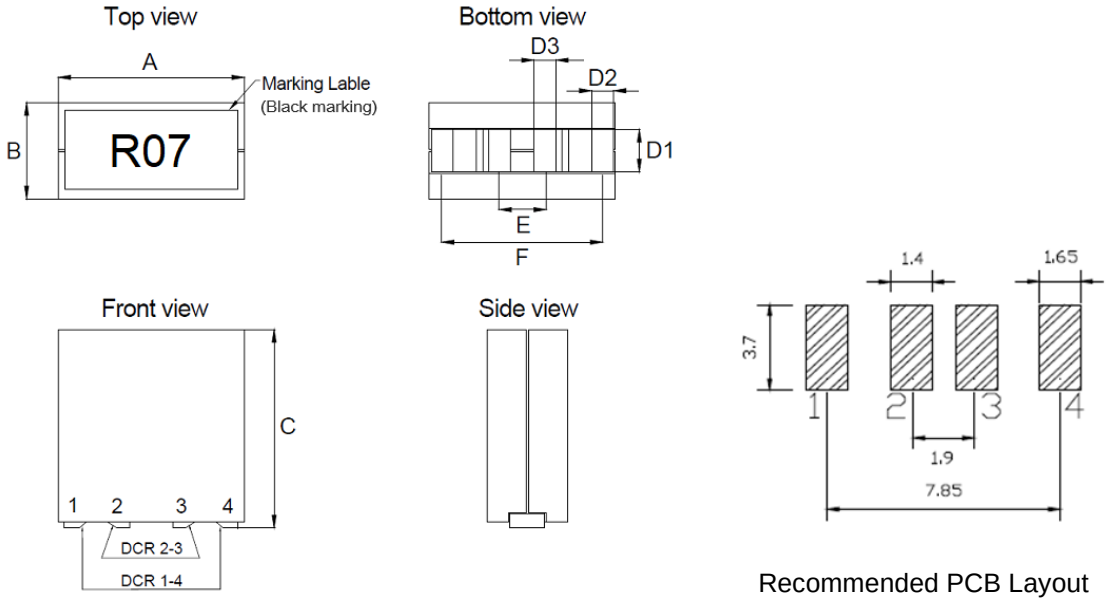
1. Part No. Expression

S M F 0 9 0 6 1 0 R 0 7 L Z F

(a) (b) (c) (d) (e) (f)

(a)	Series Code	(d)	Tolerance Code
(b)	Dimension Code	(e)	Special Code
(c)	Inductance Code	(f)	Packaging Code

2. Configuration & Dimensions (Unit: mm)



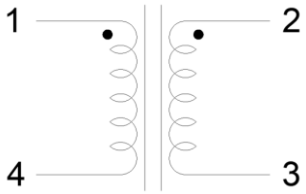
Recommended PCB Layout

Note:
1. The above PCB layout reference only.
2. Marking: Inductance Code (Please refer to Electrical Characteristics table)
3. PAD surface flatness 0.1 mm max.
4. Recommended: modules should be surface- mounted on the second time (last time) of customer's double-sided PCB to prevent shift of parts.
5. Before soldering, be sure to preheat components. The recommended preheating condition is 150°C for 3 minutes.

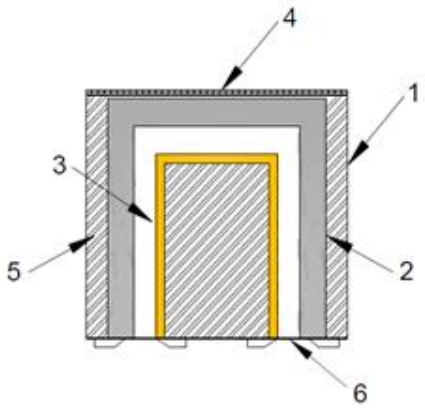
A	B	C	D1	D2	D3	E	F
9.30±0.30	6.10±0.30	10.20±0.3	3.20±0.30	1.15±0.30	0.60±0.30	2.20±0.30	7.85±0.30

NOTE: Specifications subject to change without notice. Please check our website for latest information.

3. Schematic



4. Material List



(1) Core
(2) Clip
(3) Wire
(4) Tape
(5) Glue
(6) Coating

5. General Specifications

(a) Operating Temp.: -40°C to +125°C (including self-temperature rise)
(b) Storage Temp.: -40°C to +125°C (on board)
(c) All test data referenced to 25°C ambient.
(d) Heat Rated Current (Irms) will cause the coil temperature rise approximately ΔT of 40°C.
(e) Saturation Current (Isat1) will cause inductance L0 to drop approximately 20% at +25°C.
Saturation Current (Isat2) will cause inductance L0 to drop approximately 20% at +100°C.
Saturation Current (Isat3) will cause inductance L0 to drop approximately 20% at +125°C.
(f) Rated DC Current: The lower value of Irms and Isat.
(g) Maximum Operating Voltage: 80V
(h) Storage Condition (Component in its packaging)
i) Temperature: Less than 40°C
ii) Humidity: Less than 60% RH

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6. Electrical Characteristics

Part Number	L(nH) @0A 1-4/2-3 ±15%	Li (nH) Min	DCR (mΩ) ±10%		Irms (A)		Isat 1 (A)	Isat 2 (A)	Isat 3 (A)	Kps Typ	Lk (nH) Typ	Marking
			1-4	2-3	1-4	2-3	@25°C	@100°C	@125°C			
SMF090610R07LZF	70	47.6	0.125	0.330	75	40	140	116	109	0.92	8	70N
SMF090610R10LZF	100	64	0.125	0.330	75	40	112	83	78	0.94	8	R10
SMF090610R12LZF	120	77	0.125	0.330	75	40	93	67	63	0.95	8	R12
SMF090610R15LZF	150	96	0.125	0.330	75	40	67	53	49	0.94	8	R15
SMF090610R17LZF	170	107	0.125	0.330	75	40	56	48	45	0.96	8	R17
SMF090610R18LZF	180	115	0.125	0.330	75	40	54	46	43	0.97	8	R18
SMF090610R20LZF	200	128	0.125	0.330	75	40	52	42	39	0.97	8	R20
SMF090610R22LZF	220	140	0.125	0.330	75	40	50	38	35	0.97	8	R22

Test Frequency: 1.0V/100kHz
Kps: Coupling Coefficient
Lk: Leakage inductance

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7. Soldering Specification

Mildly activated rosin fluxes are preferred. Our terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

7-1. IR Soldering Reflow

Recommended temperature profiles for lead free re-flow soldering in Figure 1, Table 1.1 & 1.2 (J-STD-020E).

7-2. Iron Reflow

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended (Figure 2).

Note:

(a) Preheat circuit and products to 150°C.

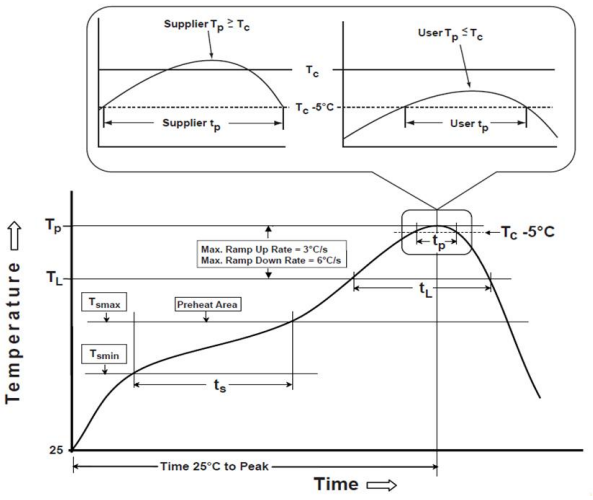
(b) 355°C tip temperature (Max.)

(c) Never contact the ceramic with the iron tip

(d) 1.0mm tip diameter (Max.)

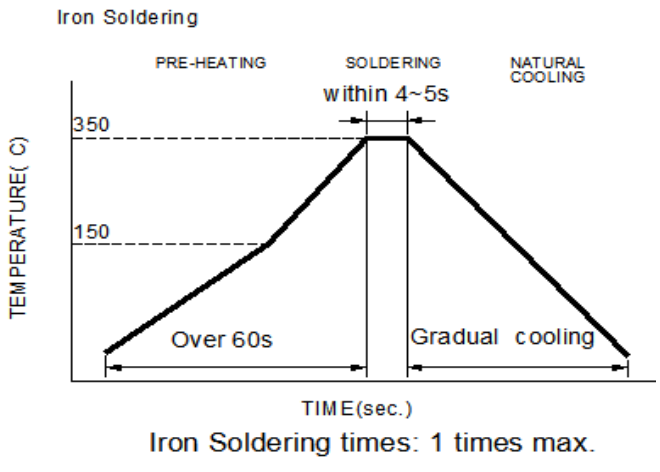
(e) Use a 20 watt soldering iron with tip diameter of 1.0mm

(f) Limit soldering time to 4~5 sec.



Reflow times: 3 times Max

Figure 1: IR Soldering Reflow



Soldering iron method: 350±5°C Max

Figure 2: Iron soldering temperature profiles

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Table (1.1) Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (t_s) from (T_{smin} to T_{smax})	 150°C 200°C 60-120seconds
Ramp-up rate ($T_L$to T_p)	3°C /second max.
Liquids temperature (T_L) Time (t_L) maintained above T_L	217°C 60-150 seconds
Classification temperature (T_c)	See Table (1.2)
Time (t_p) at Tc- 5°C (Tp should be equal to or less than Tc.)	*< 30 seconds
Ramp-down rate (T_p to T_L)	6°C /second max.
Time 25°C to peak temperature	8 minutes max.

Tp: maximum peak package body temperature, **Tc**: the classification temperature.

For user (customer) **Tp** should be equal to or less than **Tc.**

*Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.

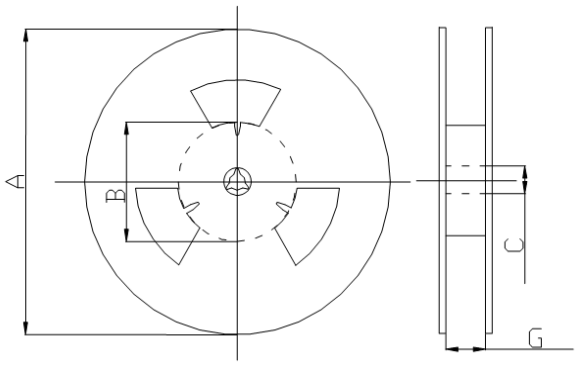
Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

	Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
PB-Free Assembly	<1.6mm	260°C	260°C	260°C
	1.6-2.5mm	260°C	250°C	245°C
	≥2.5mm	250°C	245°C	245°C

Reflow is referred to standard IPC/JEDEC J-STD-020E.

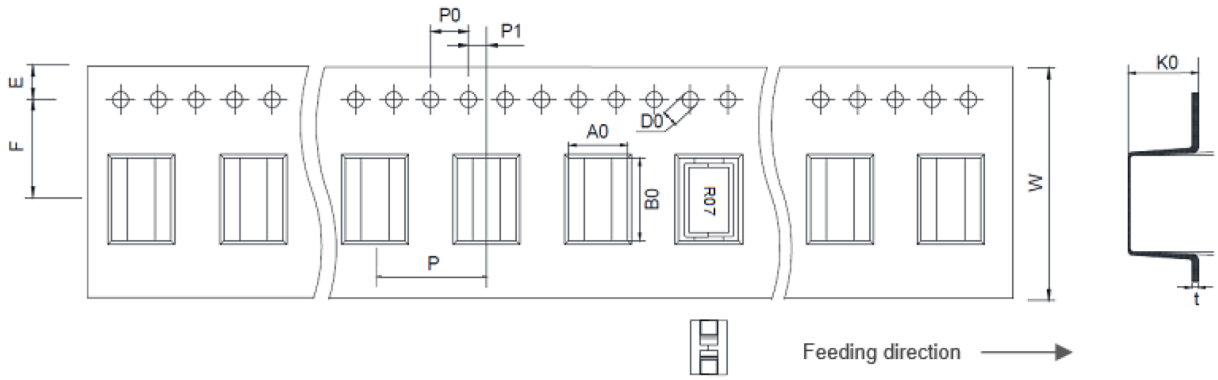
8. Packaging Information

8-1. Reel Dimension (Unit: mm)



Type	A	B	C	G
13”x24mm	330.0	100.0	13.5	24.5

8-2. Tape Dimension (Unit: mm)



B0	A0	K0	P	P0	P1
9.80±0.30	6.60±0.30	10.70±0.30	12.00±0.10	4.00±0.10	2.00±0.10
W	F	E	D0	t	-
24.00±0.30	11.50±0.10	1.75±0.10	1.50±0.10	0.50±0.05	-

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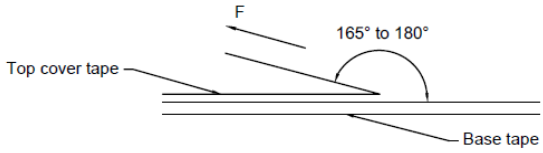
8-3. Packaging Quantity (Unit: Pcs)

Chip/ Reel	500
Carton	4,000

Carton size: 352*352*358mm

8-4. Tearing Off Force



The force for tearing off cover tape is according to the follow table, in the arrow direction under the following conditions.

(Referenced ANSI/EIA-481-D-2008 of 4.11 standard)

Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed (mm/min)
5~35	45~85	860~1060	300±10

Tape Size	8 mm	12 to 56 mm	72 mm or Wider
Tearing Off Force (grams)	10~100	10~130	10~150

Application Notice

1. Storage Conditions

To maintain the solderability of terminal electrodes:

(a) Recommended products should be used within 12 months from the time of delivery.

(b) The packaging material should be kept where no chlorine or sulfur exists in the air.

2. Transportation

(a) Products should be handled with care to avoid damage or contamination from perspiration and skin oils.

(b) Vacuum pick up is strongly recommended for individual components.

(c) Bulk handling should ensure that abrasion and mechanical shock are minimized.