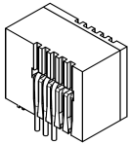


電流センサ CURRENT SENSOR

フラックスゲート型 / 電圧出力型 Fluxgate type / Voltage-output type

F01P SERIES

F01P006S05, F01P015S05, F01P025S05, F01P050S05

RoHS指令
適合品

■絶対最大定格 ABSOLUTE MAXIMUM RATINGS

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value	備考 Comment
電源電圧 Supply voltage	V _{CC}	V	7	
一次側導体温度 Primary conductor temperature	—	°C	110	
非繰り返し一次電流 (20 μs) Non repetitive primary current pulse (20 μs), in powered or unpowered state.	I _p	A	20 × I _f	
静電耐圧 (HBM:人体モデル) ESD (HBM: Human Body Model)	—	kV	4	C=100pF, R=1.5k Ω

■絶縁性能 ISOLATION CHARACTERISTICS

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value	備考 Comment
絶縁耐圧 Insulation voltage	V _d	—	AC4200V, 1分間 (感応電流0.5mA) AC4200V, for 1minute (Sensing current 0.5mA)	一次 ⇄ 二次間 Primary ⇄ Secondary
絶縁抵抗 Insulation Resistance	R _{is}	—	≥ 500M Ω (at DC500V)	一次 ⇄ 二次間 Primary ⇄ Secondary
絶縁距離 Clearance distance	d _{ci}	—	7.7mm	一次 ⇄ 二次間 Primary ⇄ Secondary
沿面距離 Creepage distance	d _{cp}	—	7.7mm	一次 ⇄ 二次間 Primary ⇄ Secondary
ケース材料 Case material	—	—	UL94 V-0	
比較トラッキング指数 (CTI) Comparative Tracking Index; (CTI)	CTI	V	600	
適用例 Application example	—	—	300V, CAT III, PD2	強化絶縁,不均一電界 EN50178, EN61010による Reinforced isolation, non uniform field according to EN50178, EN61010
	—	—	600V, CAT III, PD2	基礎絶縁,不均一電界 EN50178, EN61010による Simple isolation, non uniform field according to EN50178, EN61010

■環境及び機械的性能 ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value			備考 Comment
			MIN	TYP	MAX	
動作温度範囲 Ambient operating temperature	T _a	°C	−40		+105	
保存温度範囲 Ambient storage temperature	T _s	°C	−40		+105	
製品重量 Mass	m	g		12		

■仕様 SPECIFICATIONS

Ta=+25°C, RL=10k Ω , Vcc=+5V

仕様項目 Parameters		記号 Symbol	単位 Unit	規格値 Value			備考 Comment
				MIN	TYP	MAX	
定格電流 Rated Current	F01P006S05	If	A		6		
	F01P015S05				15		
	F01P025S05				25		
	F01P050S05				50		
最大電流 (at Vcc=+5V, Ta=+105°C) Maximum current (at Vcc=+5V, Ta=+105°C)	F01P006S05	Ipmax	A	−20		20	
	F01P015S05			−51		51	
	F01P025S05			−85		85	
	F01P050S05			−150		150	
供給電圧 Supply Voltage		Vcc	V	4.75	5.00	5.25	
一次側ターン数 Number of primary turns		Np	T	1, 2, 3			
二次側ターン数 Number of secondary turns	F01P006S05	Ns	T		1816		
	F01P015S05				1737		
	F01P025S05				1764		
	F01P050S05				1600		
定格消費電流 Consumption current	F01P006S05	Icc	mA		25		
	F01P015S05				30		
	F01P025S05				35		
	F01P050S05				55		
出力電圧 Output voltage		Vo	V	0.375		4.625	
出力電圧 (at Ip=0A) Output voltage (at Ip=0A)		Vo	V		2.5		
電氣的オフセット電圧 *1 Electrical offset voltage	F01P006S05	Voe	mV	−10.40		10.40	
	F01P015S05			−7.10		7.10	
	F01P025S05			−6.25		6.25	
	F01P050S05			−5.80		5.80	
一次側電氣的オフセット電流 Electrical offset current referred to primary	F01P006S05	Ioe	A	−0.10		0.10	
	F01P015S05			−0.17		0.17	
	F01P025S05			−0.25		0.25	
	F01P050S05			−0.46		0.46	
出力電圧温度係数 (at Ip=0A) Temperature coefficient of Output voltage (at Ip=0A)	F01P006S05	TCVo	ppm/K		±10.0	±80.0	ppm/K of 2.5V (−40°C ~ +105°C)
	F01P015S05				±7.5	±70.0	
	F01P025S05				±6.5	±60.0	
	F01P050S05				±6.0	±60.0	
感度 (理論値) Sensitivity (Theoretical value)	F01P006S05	Gth	mV/A		104.2		625mV/If
	F01P015S05				41.67		
	F01P025S05				25		
	F01P050S05				12.5		
感度誤差 Sensitivity error		ε_G	%	−0.7		0.7	
感度温度係数 (at Ta=−40°C ~ +105°C) Temperature coefficient of Sensitivity (at Ta=−40°C ~ +105°C)		TCG	ppm/K			±40	
出力直線性 Output Linearity		ε_L	%	−0.1		0.1	
一次側磁氣的オフセット電流 (at 10×If) Magnetic offset current referred to primary (at 10×If)		I _{OM}	A	−0.1		0.1	
一次側入力換算ノイズ電流 (at 100Hz ~ 100kHz) Output current noise referred to primary (at 100Hz ~ 100kHz)	F01P006S05	Ino	$\mu A/(Hz)^{1/2}$		36		RL=1k Ω
	F01P015S05				90		
	F01P025S05				150		
	F01P050S05				300		

*1 オフセット電圧はコアヒステリシス除去後の値とする。Offset voltage value is after removal of core hysteresis.

■仕様 SPECIFICATIONS

Ta=+25°C, RL=10k Ω , Vcc=+5V

仕様項目 Parameters		記号 Symbol	単位 Unit	規格値 Value			備考 Comment
				MIN	TYP	MAX	
発振周波数における最大出力リップル (f typ=450kHz) Peak to peak output ripple at oscillator frequency (f typ=450kHz)	F01P006S05	—	mV		40	160	RL=1k Ω
	F01P015S05				15	60	
	F01P025S05				10	40	
	F01P050S05				5	20	
遅延時間 (at 10% of If) Reaction time (at 10% of If)	F01P006S05	tra	μ s			0.3	RL=1k Ω , di/dt=18A/ μ s
	F01P015S05					0.3	RL=1k Ω , di/dt=44A/ μ s
	F01P025S05					0.3	RL=1k Ω , di/dt=68A/ μ s
	F01P050S05					0.3	RL=1k Ω , di/dt=100A/ μ s
応答時間 1 (at 90% of If) Response time 1 (at 90% of If)	F01P006S05	tr	μ s			0.3	RL=1k Ω , di/dt=18A/ μ s
	F01P015S05					0.3	RL=1k Ω , di/dt=44A/ μ s
	F01P025S05					0.3	RL=1k Ω , di/dt=68A/ μ s
	F01P050S05					0.3	RL=1k Ω , di/dt=100A/ μ s
応答時間 2 (at 10% of If to 90% of Vo) Response time 2 (at 10% of If to 90% of Vo)		tr	μ s			0.6	RL=1k Ω , di/dt=1f/ μ s
周波数帯域幅(±1dB) Frequency bandwidth(±1dB)		BW	kHz	200			RL=1k Ω
周波数帯域幅(±3dB) Frequency bandwidth(±3dB)		BW	kHz	300			RL=1k Ω
出力電圧精度(総合) Output Voltage Accuracy(Overall)	F01P006S05	X _G	%			2.5	
	F01P015S05					1.9	
	F01P025S05					1.8	
	F01P050S05					1.7	

■適用規格 STANDARDS

EN50178 認定 Recognized
 EN61010-1 認定 Recognized
 EN60950-1 認定 Recognized
 UL508 認定 Recognized (file №E243511)
 ・UL508適合について According to UL508

Ratings – Electrical :

Model	Primary (Feed-through)	Secondary(Sensing)	
		Input	Output
F01P006S05	6 A, 600 Vrms	5 Vdc, 25 mA	2.5 $\pm$ 2.2 Vdc, $\pm$ 0.5 mA
F01P015S05	15 A, 600 Vrms	5 Vdc, 30 mA	
F01P025S05	25 A, 600 Vrms	5 Vdc, 35 mA	
F01P050S05	50 A, 600 Vrms	5 Vdc, 55 mA	

Ratings – Environmental :

Model	Maximum Surrounding Air Temperature Rating	Pollution Degree
F01P006S05	105°C	2
F01P015S05		
F01P025S05		
F01P050S05		

Caution : The maximum temperature at top of Case shall not be higher than 110°C
 and primary conductor shall not be higher than 108°C in the end-use product.

■特性曲線(TYP) Characteristic curve(TYP)

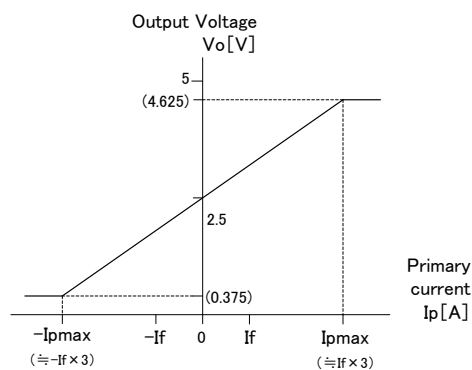


Figure 1: Linearity curve

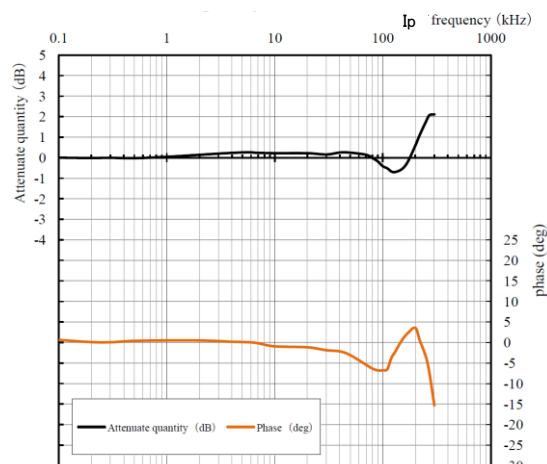


Figure 2: Frequency response curve

ex) F01P025S05

Measurement condition Ta=+25°C, RL=1k Ω , Ip=3A, Vcc=+5V

■補足資料 SUPPORT DOCUMENTATION

最大繰り返し一次電流 Maximum continuous DC primary current

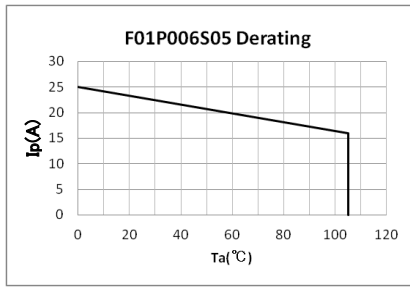


Figure 3: Ip vs Ta for F01P006S05

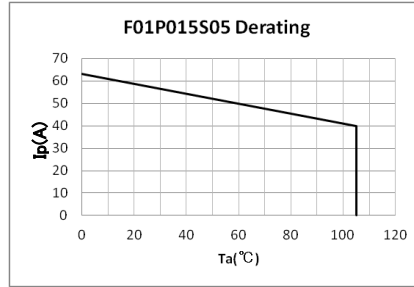


Figure 4: Ip vs Ta for F01P015S05

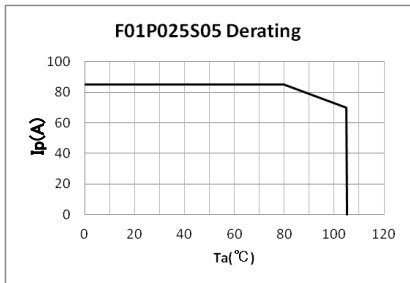


Figure 5: Ip vs Ta for F01P025S05

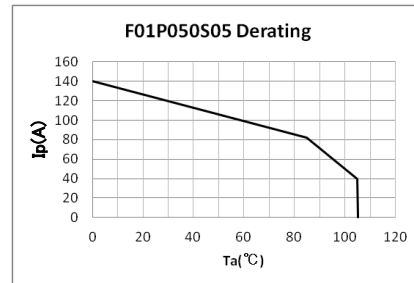


Figure 6: Ip vs Ta for F01P050S05

最大繰り返し一次電流は、次のすべての条件を満たします。

条件は以下となります。

According to which the following conditions are true the maximum continuous DC primary current plot shows the boundary of the area.
Conditions is following.

- ① $I_p < I_{pmax}$
- ② ジャンクション温度 Junction temperature $T_j < 125^\circ\text{C}$
- ③ 一次側導体温度 Primary conductor temperature $< 110^\circ\text{C}$
- ④ 内部抵抗消費電力 Resistor power dissipation $< 0.5 \times \text{rated power}$

周波数によるディレーティング Frequency derating

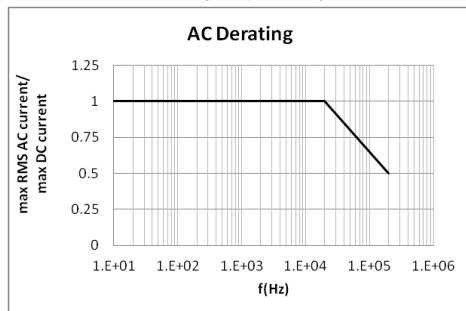
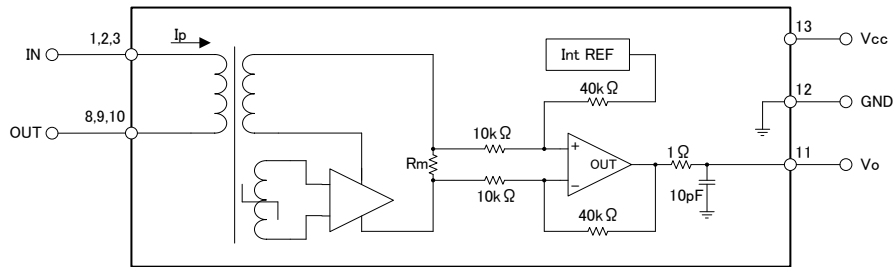


Figure 7: Maximum RMS AC primary current/maximum DC primary current vs frequency

■接続図 CONNECTION



If/3	
If/2	
If	

■外形図 DIMENSIONS(mm)

