

## Features

- High isolation 3750 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 40 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1

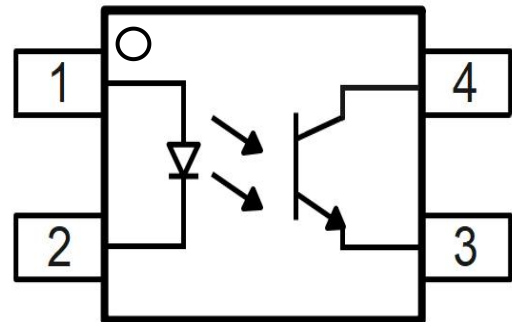
## Applications

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment


## Description

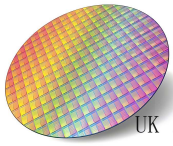
The IS181D series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package.

With the robust coplanar double mold structure, IS181 series provide the most stable isolation feature.



## ORDERING INFORMATION

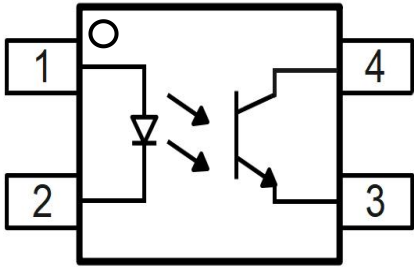
Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity
	IS181D	SOP4	FPT1 /YWW X	Reel	13 "	3000



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### PIN CONFIGURATION AND FUNCTIONS

	Pin	Name
	1	Anode
	2	Cathode
	3	Emitter
	4	Collector

### ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit	Note
INPUT				
Forward Current	$I_F$	60	mA	
Peak Forward Current	$I_{FP}$	1	A	1
Reverse Voltage	$V_R$	6	V	
Input Power Dissipation	$P_I$	100	mW	
OUTPUT				
Collector - Emitter Voltage	$V_{CEO}$	80	V	
Emitter - Collector Voltage	$V_{ECO}$	7	V	
Collector Current	$I_C$	50	mA	
Output Power Dissipation	$P_O$	150	mW	
COMMON				
Total Power Dissipation	$P_{tot}$	200	mW	
Isolation Voltage	$V_{iso}$	3750	Vrms	2
Operating Temperature	$T_{opr}$	-40~110	°C	
Storage Temperature	$T_{stg}$	-55~125	°C	
Soldering Temperature	$T_{sol}$	260	°C	

Note 1. 100µs pulse, 100Hz frequency

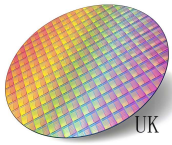
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

**ELECTRICAL OPTICAL CHARACTERISTICS(T<sub>a</sub> = 25°C)**

Parameter	Symbol	Min	Typ.	Max.	Unit	Test Condition	Note
INPUT							
Forward Voltage	V <sub>F</sub>	-	1.24	1.4	V	I <sub>F</sub> =10mA	
Reverse Current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> =6V	
Input Capacitance	C <sub>in</sub>	-	10	-	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> =20V, I <sub>F</sub> =0	
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0	
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> =0.1mA, I <sub>F</sub> =0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	CTR	300	-	600	%	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V	
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.06	0.2	V	I <sub>F</sub> =20mA, I <sub>C</sub> =1mA	
Isolation Resistance	R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C <sub>IO</sub>	-	0.4	1	pF	V=0, f=1MHz	
Response Time (Rise)	t <sub>r</sub>	-	3	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA	3
Response Time (Fall)	t <sub>f</sub>	-	4	18	μs	R <sub>L</sub> =100Ω	3
Cut-off Frequency	f <sub>c</sub>	-	80	-	kHz	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω,-3dB	4

Note 3. Fig.12&13

Note 4. Fig.14



CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

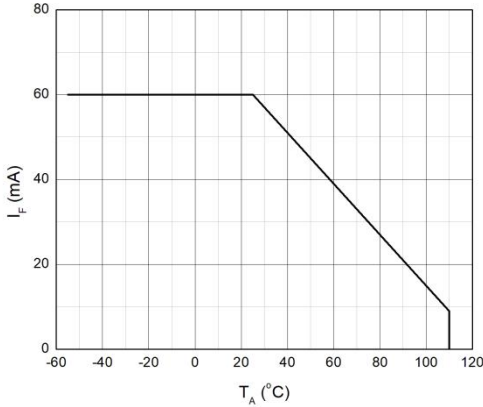


Fig.2 Collector Power Dissipation vs. Ambient Temperature

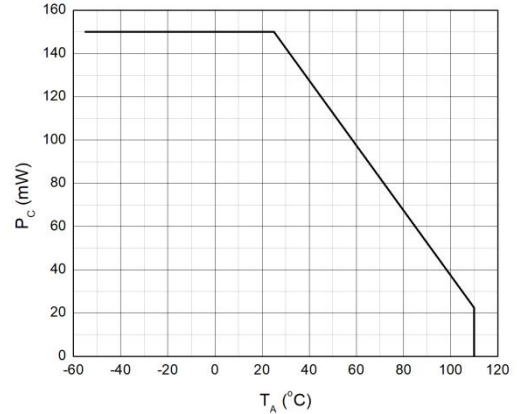


Fig.3 Forward Current vs. Forward Voltage

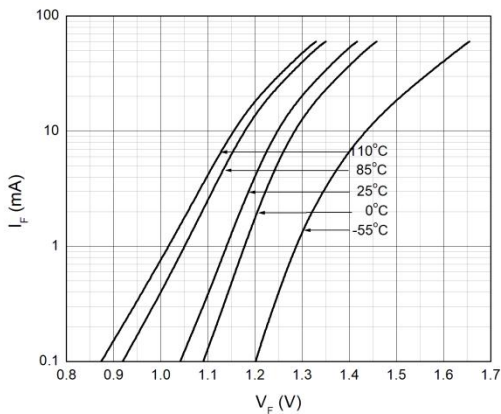


Fig.4 Collector Dark Current vs. Ambient Temperature

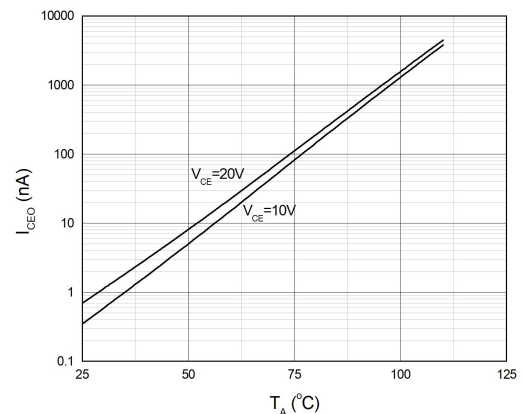


Fig.5 Collector Current vs. Collector-emitter Voltage

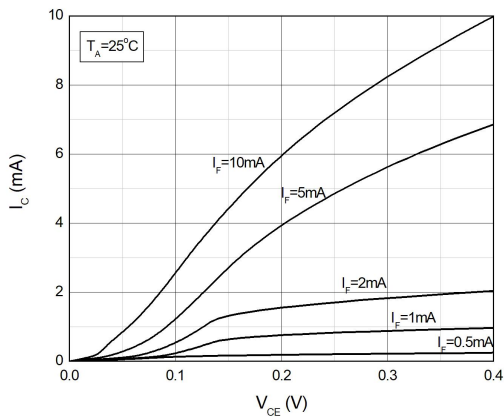
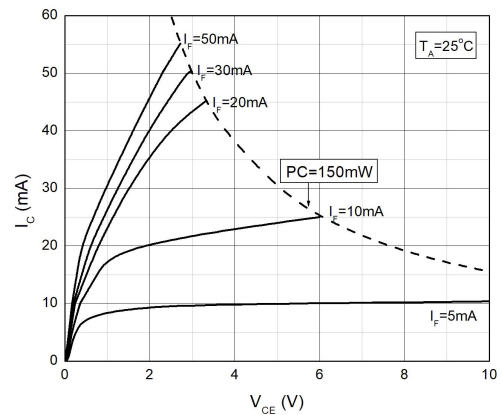
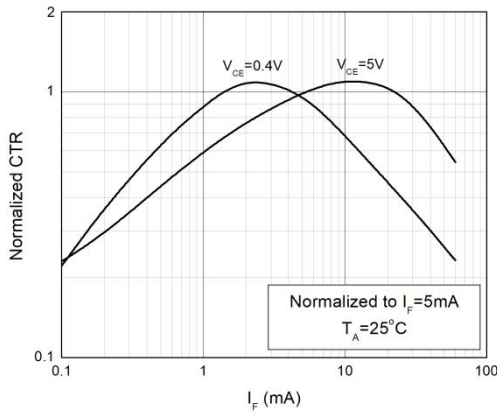


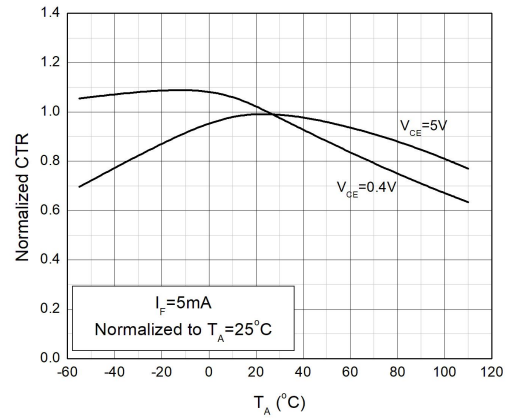
Fig.6 Collector Current vs. Collector-emitter Voltage



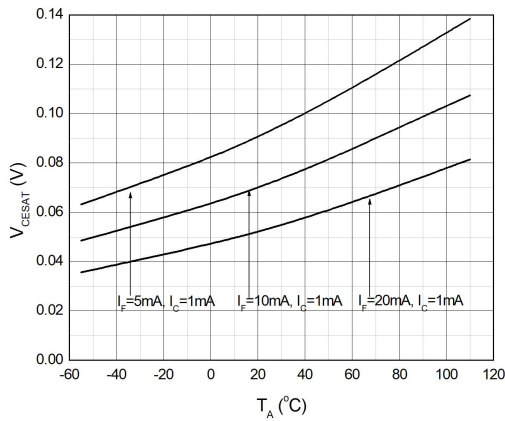
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



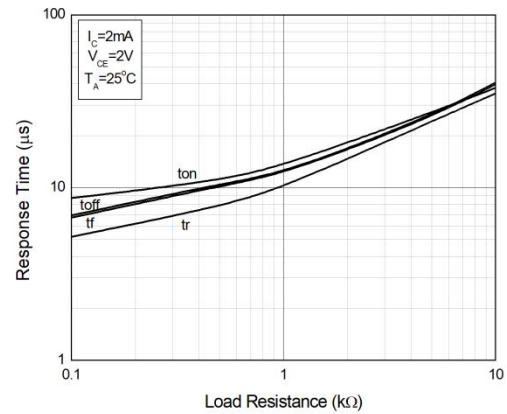
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



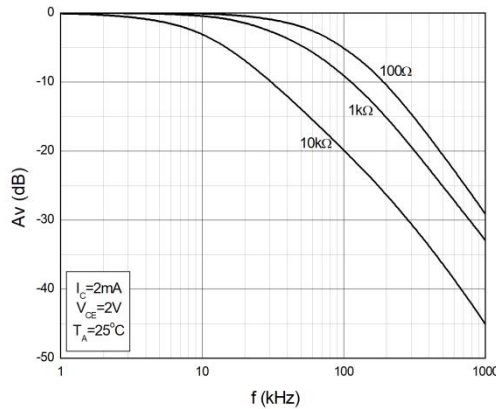
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**

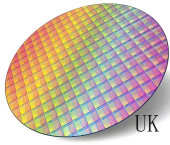


**Fig.10 Switching Time vs. Load Resistance**



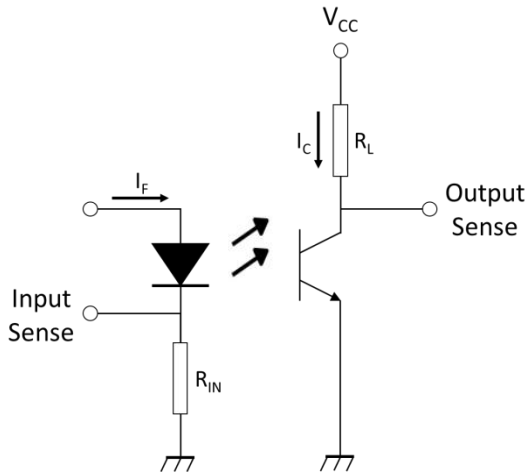
**Fig.11 Frequency Response**



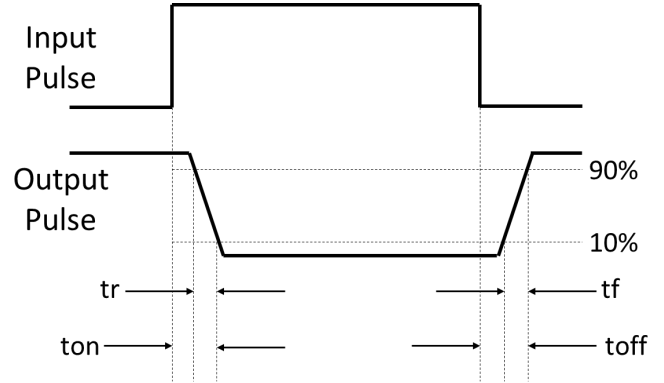


### TEST CIRCUITS

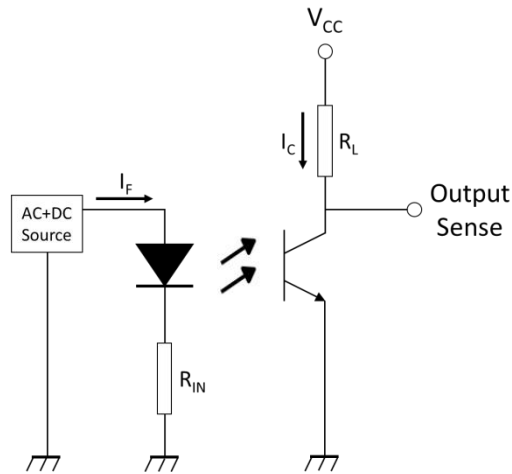
**Fig.12 Test Circuits of Response Time**

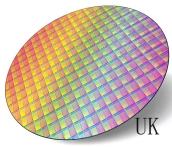


**Fig.13 Curves of Response Time**



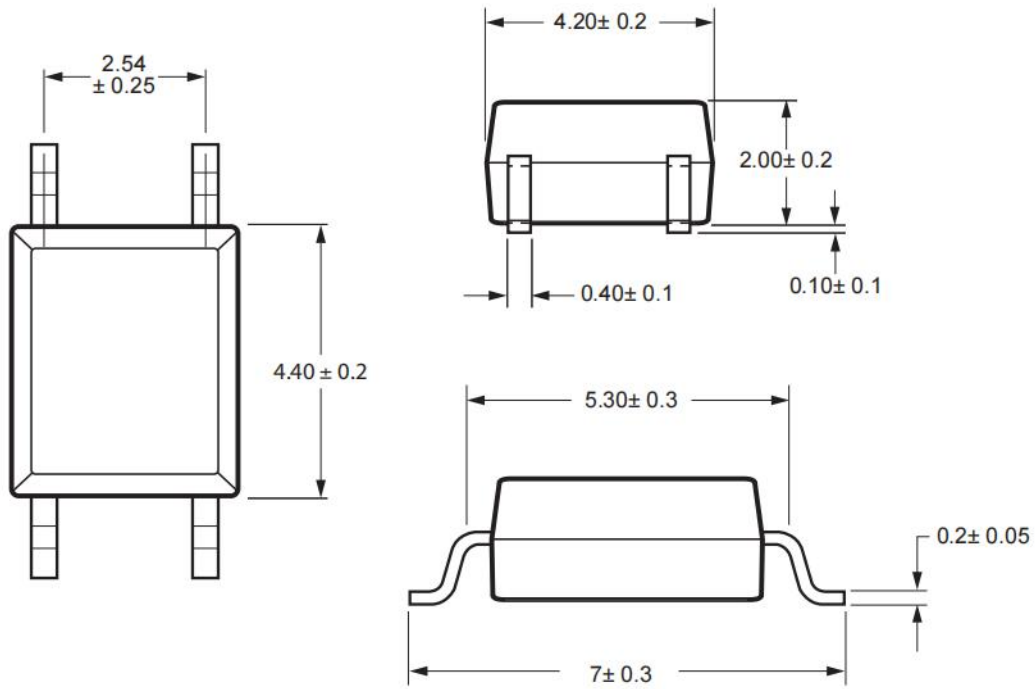
**Fig.14 Test Circuits of Frequency Response**



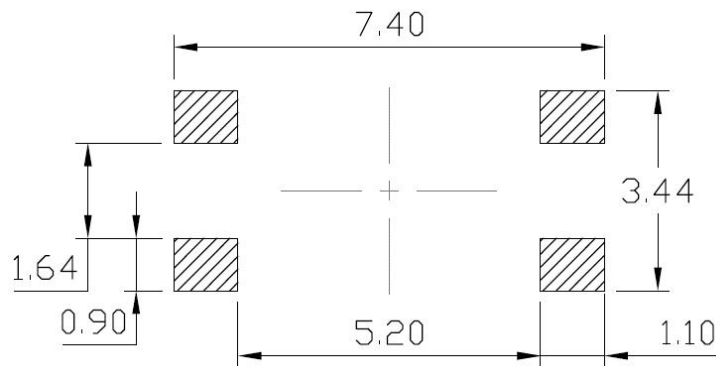


### PACKAGE DIMENSIONS

#### Surface Mount (Low Profile) - (SOP4)

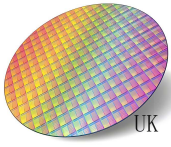


#### Recommended Solder Mask



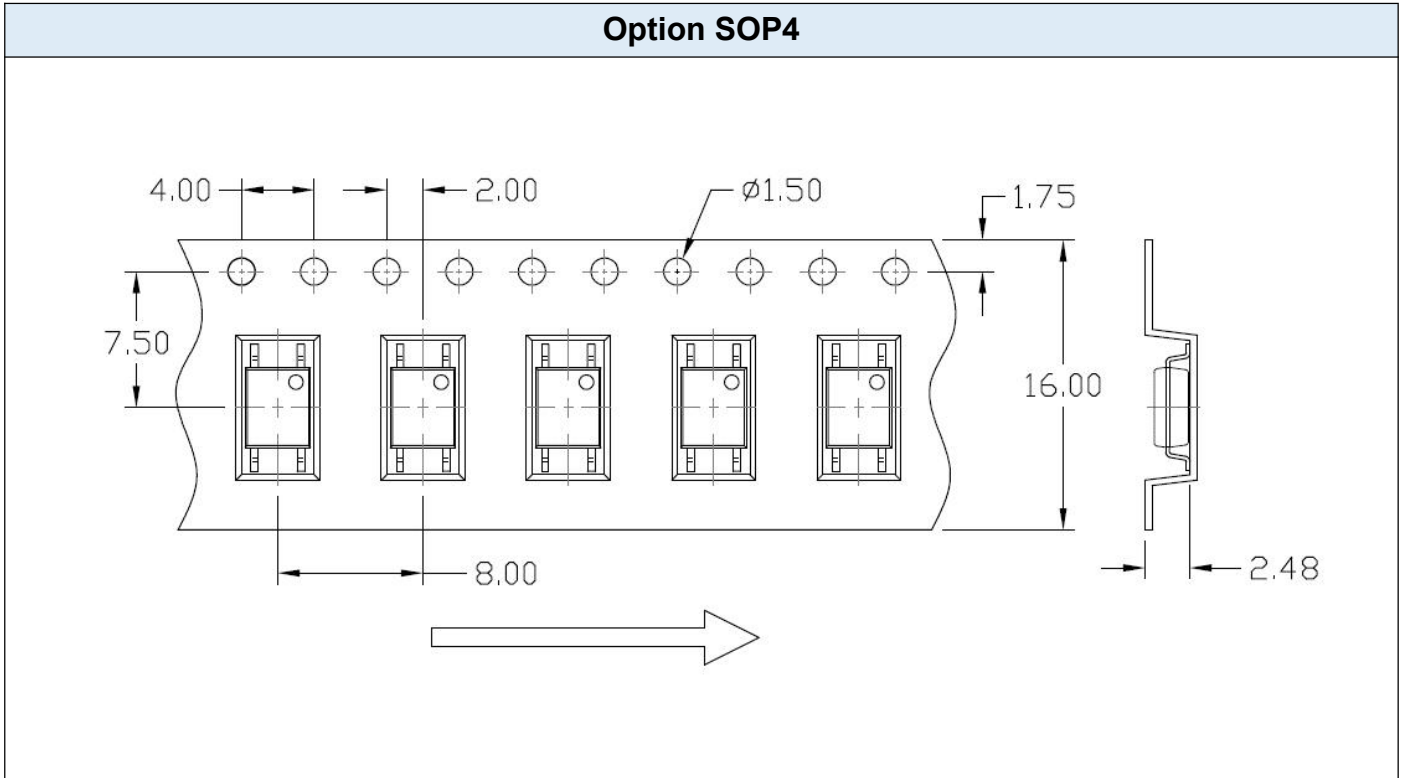
- Dimensions in mm unless otherwise stated



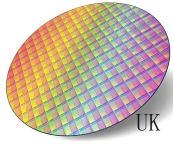


### CARRIER TAPE SPECIFICATIONS

#### Option SOP4

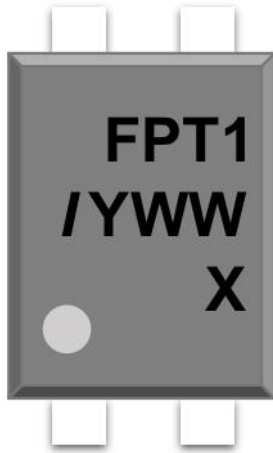


- Dimensions in mm unless otherwise stated



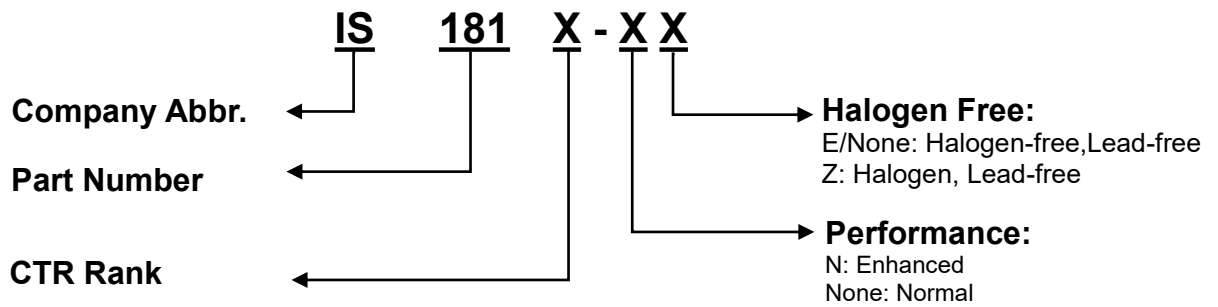
**ORDERING AND MARKING INFORMATION**

**Marking Information**



FPT1 : Part Number  
 / : Company Abbr.  
 Y : Fiscal Year (M:2022,N:2023...)  
 WW : Work Week  
 X : CTR Rank

**Order Code**

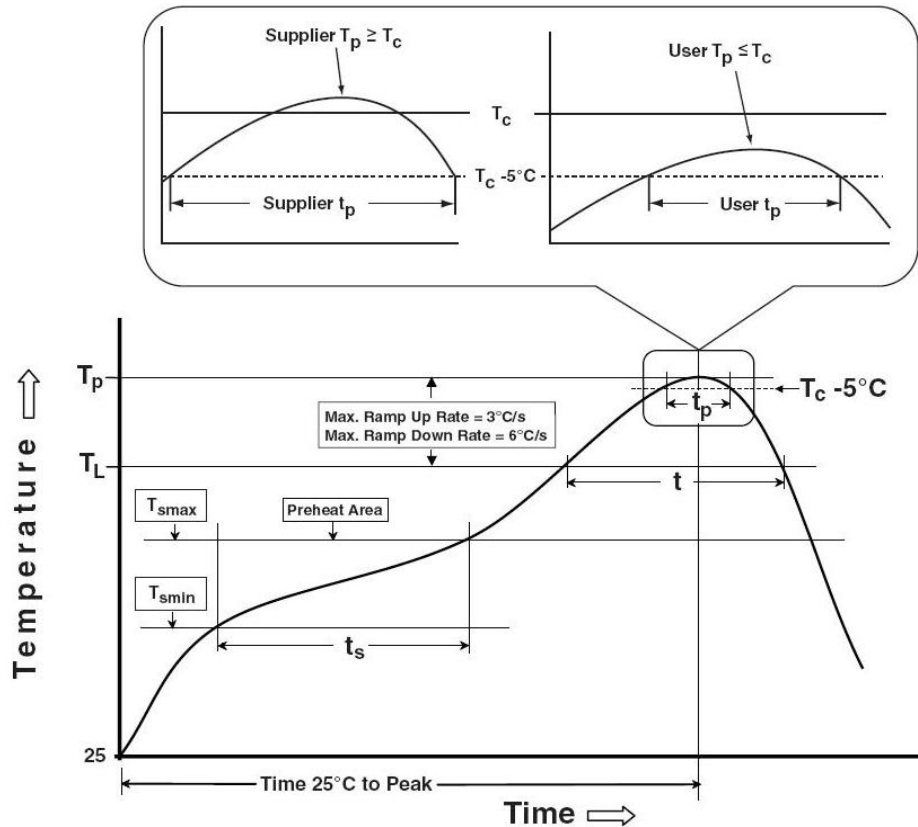


**Packing Quantity**

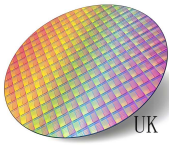
Option	Quantity	Quantity – Inner box	Quantity – Outer box
SOP4	3000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 30k Units

## REFLOW INFORMATION

### Reflow Profile

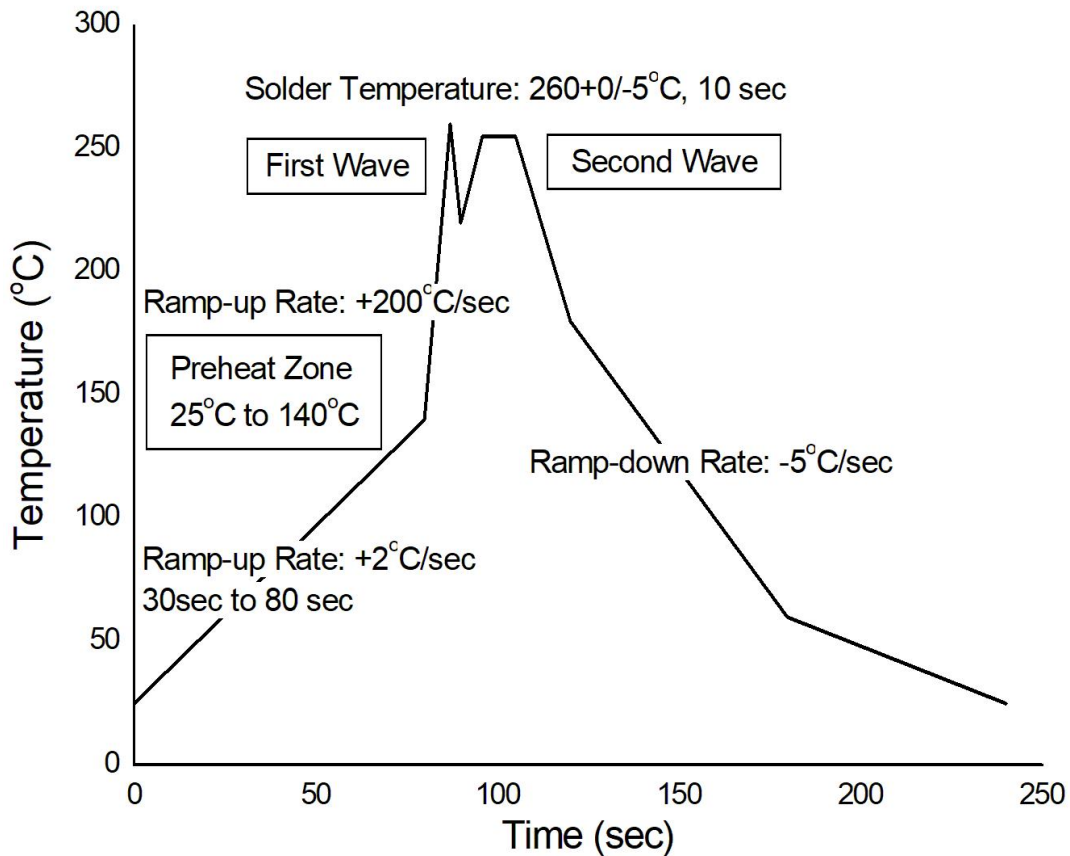


Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



### TEMPERATURE PROFILE OF SOLDERING

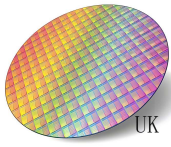
#### Wave Soldering (JESD22-A111 Compliant)



#### Hand Soldering By Soldering Iron

Soldering Temperature	380+0/-5°C
Soldering Time	3 sec max.

- One time soldering is recommended for all soldering method.
- Do not solder more than three times for IR reflow soldering.



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- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.