Rev: P00
The data contained in this preliminary are for reference only, Users should verify for a current and complete document before placing orders.

General Description

The EST5298B is low-cost USB Dedicated Charger Identification Circuit IC which is very smart to recognize most of the mainstream handheld devices. It allows devices to draw current as much as using as the original adapter. The EST5298B can support most of the USB Battery Charging Specification world-wide including BC 1.2, Apple® charging spec (for i-Pad & i-Phones) and specs for Samsung Galaxy Tab. Apple Inc. has upgraded its charger output capacity for tablets to 12W output (maximum 2.4A @ 5V). By setting the USB data pins (D+/D-) to the required voltage levels, the charging devices will recognize their required voltage levels, and starts to draw the suitable current to charge.

The EST5298B also supports USB high-voltage dedicated charging port (HVDCP) interface IC for the Qualcomm® Quick ChargeTM 2.0 (QC 2.0) specification. The EST5298B supports the full output voltage range of either Class A or Class B. Optionally 20V can be inhibited for protecting the battery charger from the accidental damage. The EST5298B automatically detects whether a connected Powered Device (PD) is Quick ChargeTM 2.0 capable before enabling output voltage adjustment. If a PD which is not compliant to Quick ChargeTM 2.0 is detected the EST5298B disable output voltage adjustment to ensure the safe operation with legacy 5 V only PDs.

The EST5298B has a selection pin to select Apple 2.1A or 2.4A mode and also builds in the FAULT# signal pin which is activated when the over voltage protection and internal discharge time is exceed 256ms.

The EST5298B is suitable for all charger products with USB interface. It provides enhanced ESD protection up to ±8kV on the DP and DM with the SOP-8 package. It requires minimum external circuits, which can reduce develop & production cost dramatically.

Application

- Car Charger
- Wall-Adapter / Power Plugs, Outlets
- USB Power Plugs (extensions)

Features

- Fully Supports Qualcomm® Quick Charge™ 2.0 Specification
- Class A: 5 V, 9 V, and 12 V Output Voltage
- Class B: 5 V, 9 V, 12 V, and 20 V Output Voltage, where 20V could be disabled.
- Support YD/T 1591-2009 Charging Spec.
- Qualcomm® Quick Charge™ 2.0 Delivers up to 75% Faster Charging
- Support 2.4A or 2.1A Apple® Devices Fast Charging and USB Battery Charging Specification (BC1.2) Compatible

-- Automatic USB DCP shorting D+ to D- line
-- Default 5V mode operation

- Very low power consumption
- Support Over Voltage Protection and Internal Discharge Function
- ±8kV High ESD Protection On DP/DM.
- Support Samsung Galaxy tab Devices Charging.
- SOP-8 Package
- Guarantee Operation Temperatures range from -40°C to 85°C*

General Information Ordering Information

Part Number	Package	Packaging	Note
EST5298B	SOP-8	Tape & Reel	-40 C to +85 C*

Note: *Design Guarantee: The device is guaranteed to meet the specifications from 0°C to 70°C. Specifications over the –40°C to 85°C operating temperature range are assured by design, characterization and correlation with the statistical process controls.

Pin connection and Marking (Top View)

Pin Assignments

Pin No.	Pin Name	Type	Description
1	ID1	OD	Voltage Adjustment Switch. Active for 9V, 12V, 20V output setting. See below output voltage lookup table for detail.
2	ID2	OD	Voltage Adjustment Switch. Active for 12V, 20V output setting. See below output voltage lookup table for detail.
3	ID3	OD	Voltage Adjustment Switch. Active for 20V output setting. See below output voltage lookup table for detail. Tie to CAP (pin 9) could disable 20V.
4	GND	P	Ground.
5	DM	AIO	USB negative data-channel to external USB device.
6	DP	AIO	USB positive data-channel to external USB device.
7	CAP	AO	Internal Power 5V, connect this pin with 0.1uF capacitor directly to GND.
8	VCC	P	Power Supply, 5V, 9V, 12V, 20V.

Note:
OD- Open-drain output pin
IN - Input pin
AIO - Analog Input/Output pin
P - Power

Output Voltage Lookup Table

D+	D-	Output	Internal Switch Setting		
			ID1	ID2	ID3
3.3V	3.3V	20V	0	0	0
0.6V	0.6V	12V	0	0	1
3.3V	0.6V	9V	0	1	1

0.6V	GND	5V (default)	1	1	1

Note:1 stands for the internal MOS (N1,N2,N3) are OFF; 0 stands for MOS are ON.

Absolute Maximum Ratings

PARAMETER	SYMBOL	RATINGS	UNIT
VCC Pin Voltage		-0.3 to 25	V
D+, D- , CAP, ID1, ID2, ID3, SEL, FAULT# Pins Voltage		-0.3 to 5.5	V
Maximum junction temperature (plastic package)	T_j	+150	°C
Maximum storage temperature	T_{STO}	-65 ~ +150	°C
Operating Temperature*		-40 to +85	°C
Maximum lead temperature (soldering 10s)		+260	°C

Note: If ICs are stressed beyond the limits listed in the “absolute maximum ratings”, they may be permanently destroyed. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

*Design Guarantee: The device is guaranteed to meet the specifications from 0°C to 70°C. Specifications over the –40°C to 85°C operating temperature range are assured by design, characterization and correlation with the statistical process controls.

DC Electrical Characteristics (VDD = 15V, TA = 25°C, unless otherwise specified.)

VDD SECTION

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating power supply	V_{OP}		4.75		22	V
Supply current	I_{CC}	VCC = 5V		350		uA
		VCC = 9-20V		450		

ANALOG SWITCH

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Leading edge blanking	V_{DP} V_{DM}		0		5	V

High Voltage Dedicated Charging Port (HVDCP)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
20V output inhibit threshold	V_{INH}		V_{CAP}-0.3		0.8	V
Data detect voltage	V_{DAT_REF}		0.25	0.325	0.4	V
Output voltage selection reference	V_{DAT_REF}	2.0V reference for selecting voltage	1.8	2	2.2	V
Data line leakage	V_{DAT_REF}			530		KΩ
D- pull down resistance	V_{DAT_REF}			20		KΩ
D+ to D- resistance during DCP mode	V_{DAT_REF}			20		Ω
Switch N1 on-resistance	$R_{DS\_ON\_N1}$	I_{N1} = 200μ A			300	Ω
Switch N2 on-resistance	$R_{DS\_ON\_N2}$	I_{N2} = 200μ A			300	Ω
Switch N3 on-resistance	$R_{DS\_ON\_N3}$	I_{N3} = 200μ A			300	Ω
D- low glitch filter time	$R_{D-\_L\_GLITCH}$		1			ms
D+ high glitch filter time	$T_{GLITCH\_BC\_DONE}$		1000	1250	1500	ms
Output Voltage Glitch Filter Time	T_{V_CHANGE}		20	40	60	ms

Block Diagram

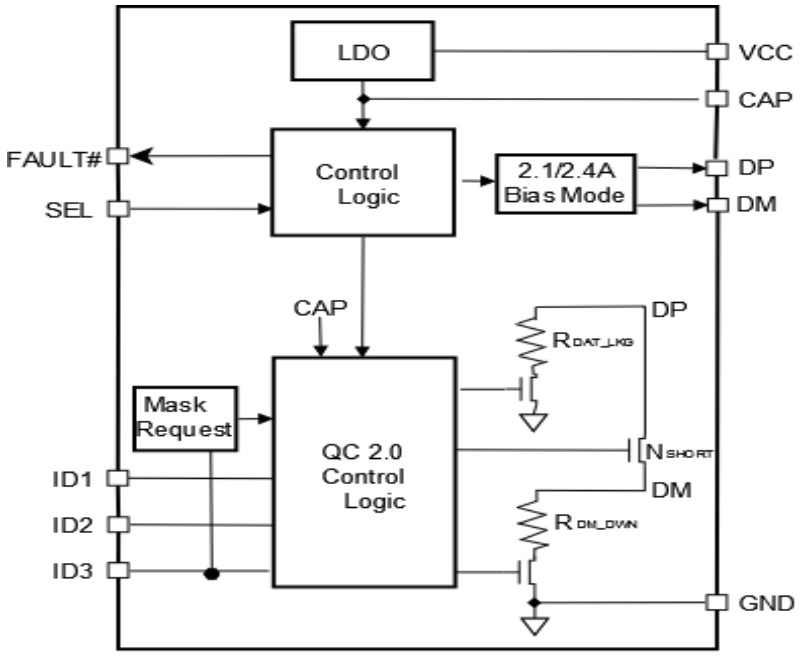
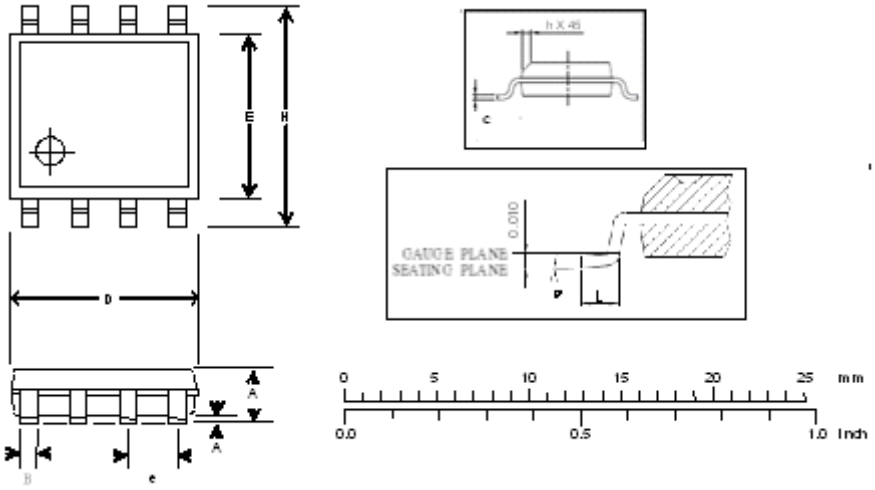


Fig 3.

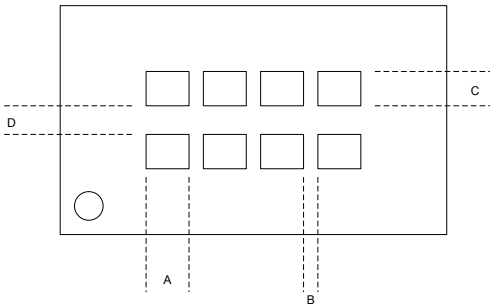
Package Information

SOP-8

Symbol	Dimension in mm		Dimension in inch	
A	1.350	1.75	0.053	0.0688
A1	0.100	0.25	0.004	0.01
B	0.330	0.51	0.013	0.02
C	0.190	0.25	0.008	0.0098
e	1.270	(TYP)	0.050	(TYP)
D	4.800	5.00	0.189	0.197
H	5.800	6.20	0.228	0.224
E	3.800	4.00	0.150	0.1574
L	0.400	1.27	0.016	0.05
h	0.250	0.50	0.009	0.0196
θ °	0° ~ 8°		0° ~ 8°	



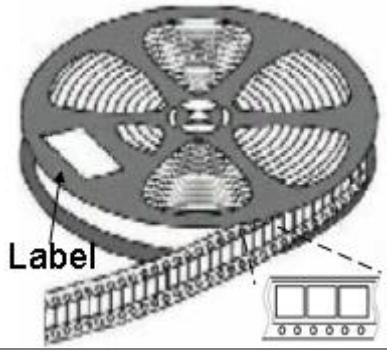
Body Marking



Package Type	A	B	C	D
SOP-8	0.3 mm	0.1 mm	0.35 mm	0.2 mm

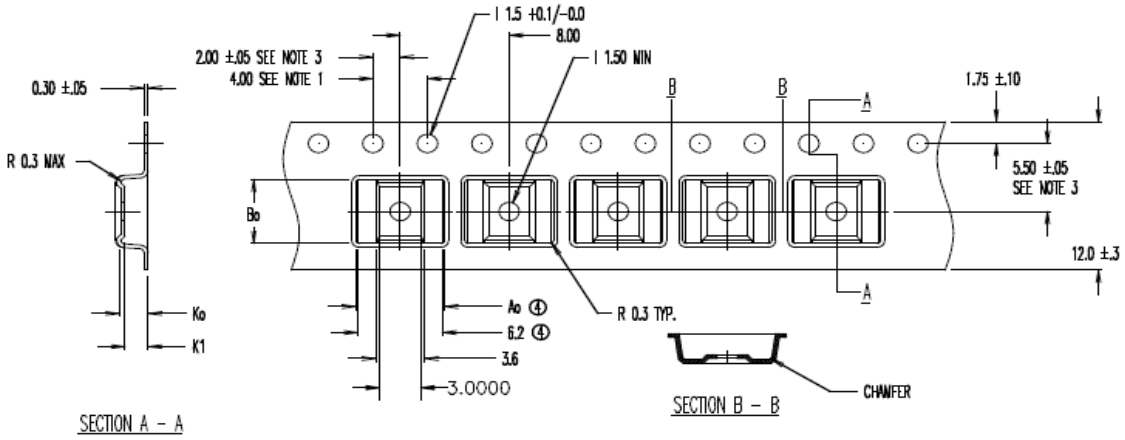
Line #	Mark Number	Contents
Line 1 :	1 thru 4	Name : S202
Line 2 :	1 thru 4	Date code : 1020

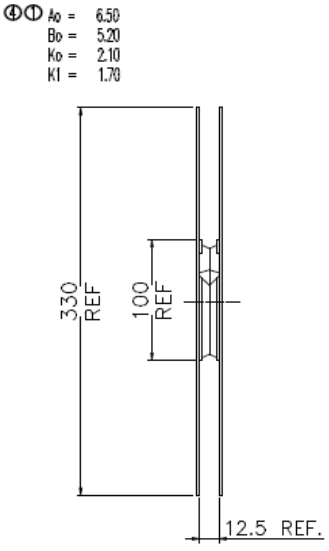
SOP 8 Shipping Packing

Package Type (Device)	SOP
Orientation in Carrier	
Termination 1 Orientation by Quadrant	1 2 3 4
Reel绕卷Type及Label 位置	
Q’ ty (Reel)	2500

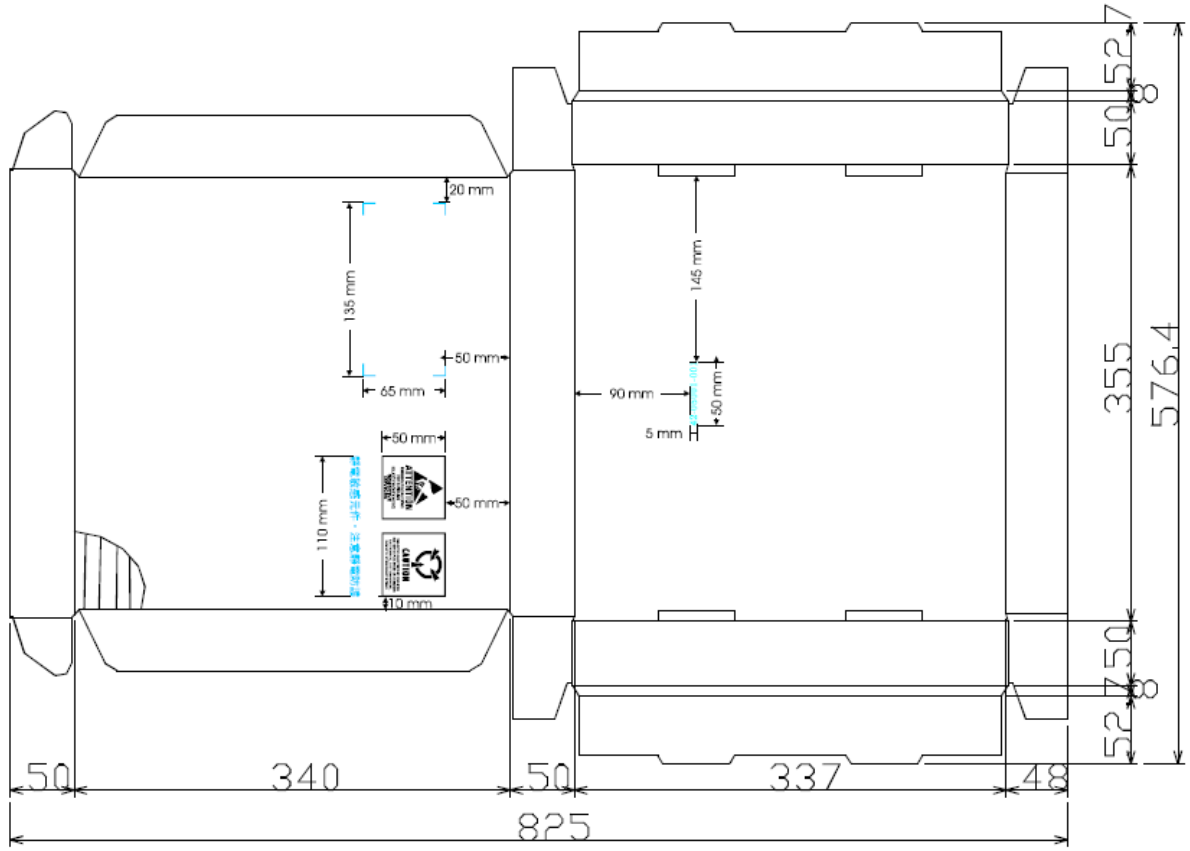
SOP 8 Tape Reel Data

(Size: mm)



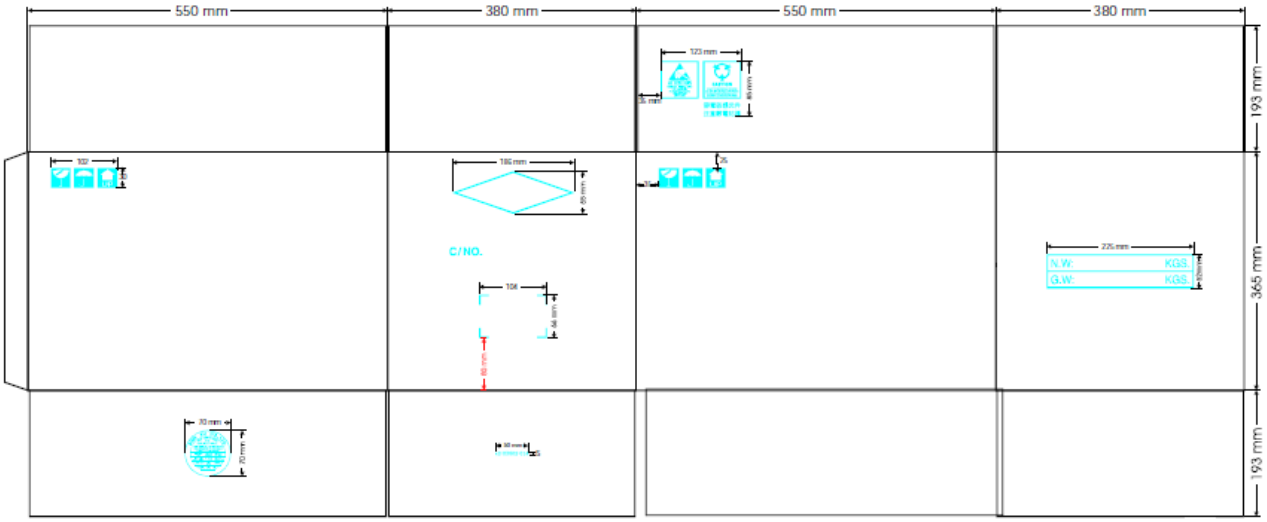


Tape Reel Inner Box



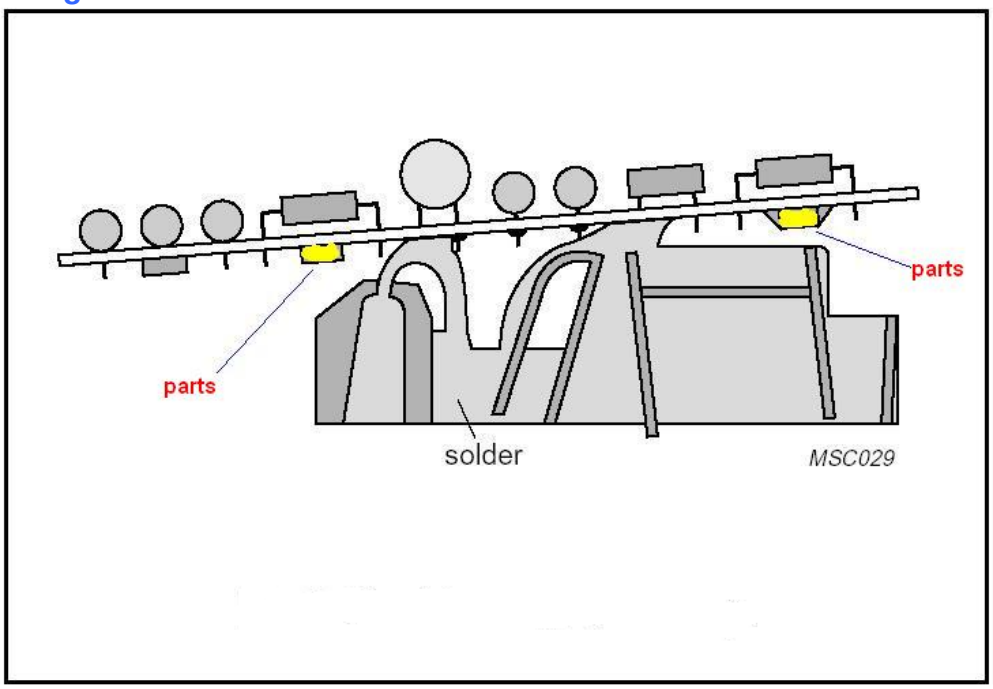
NOTE
1.紙箱尺寸：L355 X W340 X H50 mm
2.尺寸公差：± 3 mm
3.紙箱材質：面紙白紙　200
　　蕊紙 B 浪　130
　　底紙　200
4.破裂強度：200LBS ± 10LBS
5.印刷顏色：黑色、藍色

Tape Reel Carton Data



NOTE
1.紙箱尺寸：L550 X W380 X H365 mm
2.尺寸公差：± 5 mm
3.紙箱材質：面紙白紙 240
蕊紙 B 浪 100
中紙 175
蕊紙 A 浪 180
底紙 A 級 200
4.破裂強度：250LBS ± 10LBS
5.印刷顏色：天空藍
6.備　　註：紙箱打釘

Wave Soldering Process



Wave Soldering Profile

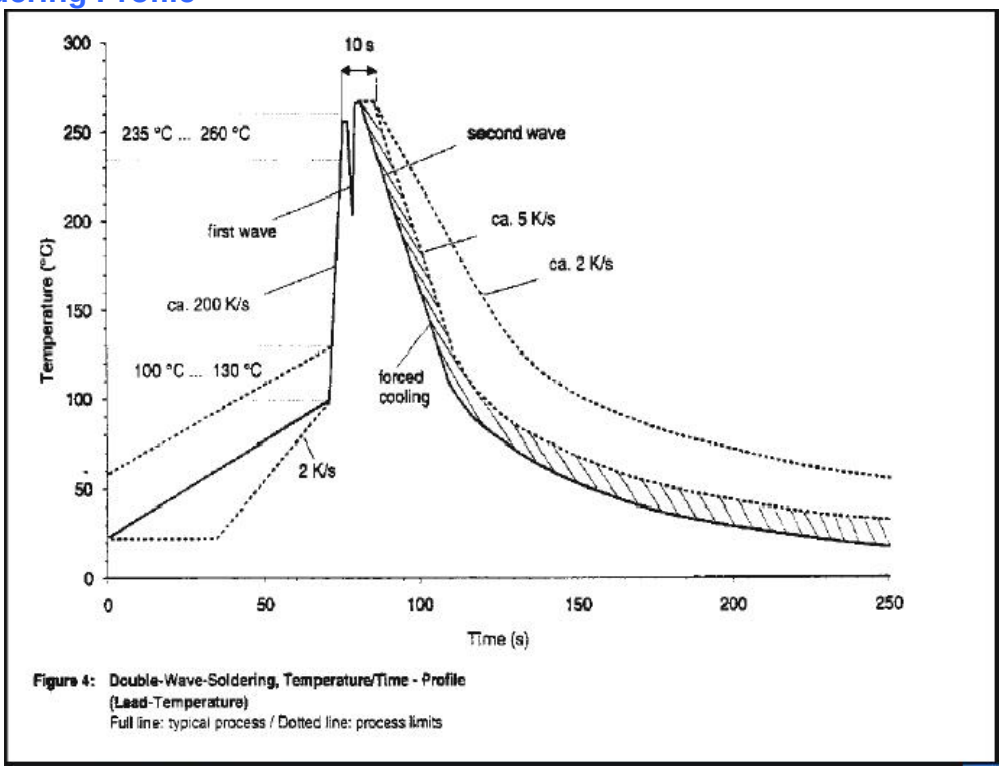


Figure 4: Double-Wave-Soldering, Temperature/Time - Profile (Lead-Temperature)
Full line: typical process / Dotted line: process limits

Revision History

REVISION	DESCRIPTION	PAGE	DATE
1.0	First release		2015/11/01