



MXD8680

SP8T Antenna Switch



This document contains information that is confidential and proprietary to Maxscend Microelectronics Company Limited (Maxscend) and may not be reproduced in any form without express written consent of Maxscend. No transfer or licensing of technology is implied by this document.

General Description

The MXD8680 is a low loss, high isolation SP8T switch with performance for antenna diversity receiving.

The MXD8680 is compatible with +1.0V control logic, which is a key requirement for most cellular transceivers. This part is packaged in a compact 2mm x 2mm x 0.53mm, 14-pin, QFN package which allows for a small solution size with no need for external DC blocking capacitors (when no external DC is applied to the device ports).

Features

- Excellent insertion loss
 - 0.60 dB Insertion Loss at 2.7GHz
- Broadband frequency range: 0.1 to 3.0 GHz
- No DC blocking capacitors required (unless external DC is applied to the RF ports)
- Compact 2mm x 2mm x 0.53mm in QFN-14 package, MSL1

Applications

- 2G/3G/4G antenna diversity
- Cellular modems and USB Devices

Functional Block Diagram and Pin Function

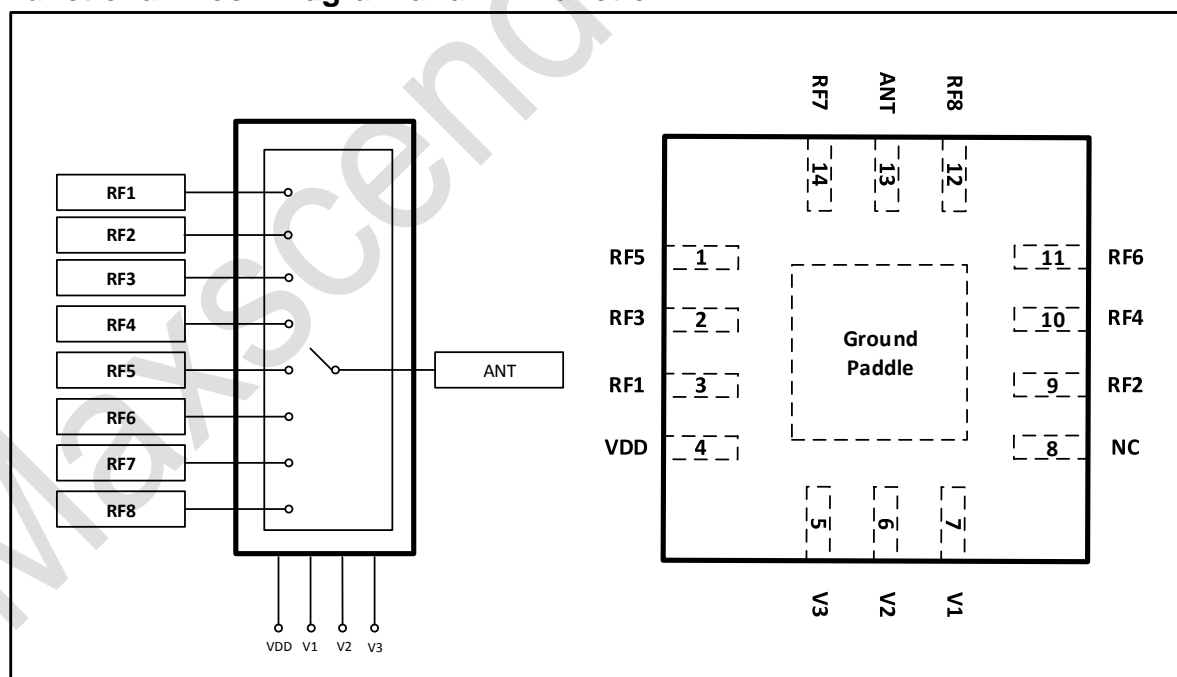


Figure 1. Functional Block Diagram and Pinout (Top View)

Application Circuit

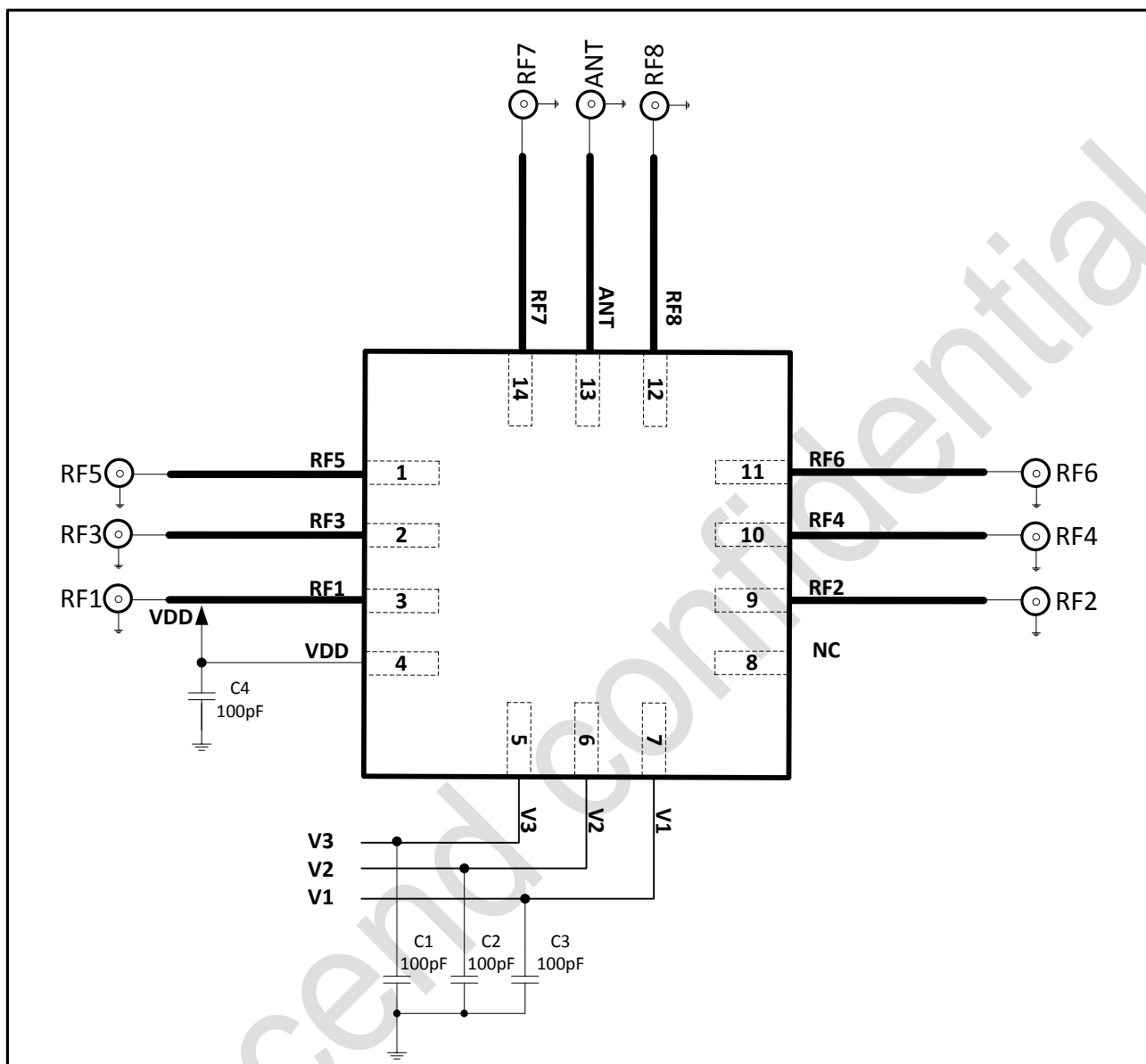


Figure 2. MXD8680 Evaluation Board Schematic

Table 1. Pin Description

Pin No.	Name	Description	Pin No.	Name	Description
1	RF5	RF port5	8	NC	No connection
2	RF3	RF port3	9	RF2	RF port2
3	RF1	RF port1	10	RF4	RF port4
4	V _{DD}	Power supply	11	RF6	RF port6
5	V3	Control logic 3#	12	RF8	RF port8
6	V2	Control logic 2#	13	ANT	Antenna port
7	V1	Control logic 1#	14	RF7	RF port7
Ground Paddle	GND	Ground			

Note: Bottom ground paddles must be connected to ground.

Truth Table

Table 2.

Control pins			Switched RF Outputs							
V1	V2	V3	RF1	RF2	RF3	RF4	RF5	RF6	RF7	RF8
0	0	0	Insertion Loss	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation
0	0	1	Isolation	Insertion Loss	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation
0	1	0	Isolation	Isolation	Insertion Loss	Isolation	Isolation	Isolation	Isolation	Isolation
0	1	1	Isolation	Isolation	Isolation	Insertion Loss	Isolation	Isolation	Isolation	Isolation
1	0	0	Isolation	Isolation	Isolation	Isolation	Insertion Loss	Isolation	Isolation	Isolation
1	0	1	Isolation	Isolation	Isolation	Isolation	Isolation	Insertion Loss	Isolation	Isolation
1	1	0	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	Insertion Loss	Isolation
1	1	1	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	Insertion Loss

Note: “1” = 1.6 V to 3.0 V. “0” = 0 V to 0.3 V.

Recommended Operation Range

Table 3. Recommended Operation Condition

Parameters	Symbol	Min	Typ	Max	Units
Operation Frequency	f1	0.1	-	3.0	GHz
Power supply	V _{DD}	2.5	2.8	3.0	V
Switch Control Voltage High	V _H	1.6	1.8	3.0	V
Switch Control Voltage Low	V _L	0	0	0.3	V

Specifications

Table 4. Electrical Specifications

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
DC Specifications						
Supply voltage	V _{DD}		2.5	2.8	3.0	V
Supply current	I _{DD}			25	60	uA
Control voltage	V _{CTL_H} V _{CTL_L}		1.6 0	1.8 0	3.0 0.3	V V
Control current	I _{CTL}	V _{CTL} = 1.8 V		1.0	2.0	uA
Switching Speed, on RF to another		10% to 90% RF		1	2	uS
Turn-on time	ton	Time from V _{DD} =0V to part ON and RF at 90%		5	10	uS
RF Specifications						
Insertion loss (ANT pin to all RF ports)	IL	0.1 to 1.0 GHz 1.0 to 2.0 GHz 2.0 to 2.7 GHz		0.35 0.45 0.60	0.45 0.55 0.75	dB dB dB
Isolation (ANT pin to all RF ports)	Iso	0.1 to 1.0 GHz 1.0 to 2.0 GHz 2.0 to 2.7 GHz	35 25 20	40 30 24		dB dB dB
RF to RF Isolation (Active port to the other RF ports)	Iso	0.1 to 1.0 GHz 1.0 to 2.0 GHz 2.0 to 2.7 GHz	27 22 19	38 30 25		dB dB dB
Input return loss (ANT pin to all RF ports)	RL	0.1 to 1.0 GHz 1.0 to 2.0 GHz 2.0 to 2.7 GHz	20 15 12	25 20 15		dB dB dB

0.1 dB Compression Point (ANT pin to all RF ports)	P0.1dB	0.1 GHz to 3.0 GHz	+28	+29		dBm
--	--------	--------------------	-----	-----	--	-----

Absolute Maximum Ratings

Table 5. Maximum ratings

Parameters	Symbol	Minimum	Maximum	Units
Supply voltage	V_{DD}	+2.5	+3.3	V
Control voltage (V1, V2, and V3)	V_{CTL}	0	+3.0	V
RF input power ^{Note1}	P_{IN}		+29	dBm
Operating temperature	T_{OP}	−45	+90	°C
Storage temperature	T_{STG}	−65	+150	°C
Humidity Grade		MSL1		
Storage Cycle(package)		2		years
Electrostatic Discharge Human body model (HBM), Class 1C	ESD_HBM		1000	V
Machine Model (MM), Class A	ESD_MM		100	V
Charged device model (CDM), Class III	ESD_CDM		500	V

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device

Note1: Continuous wave for 5000hrs, 50°C

Package Outline Dimension

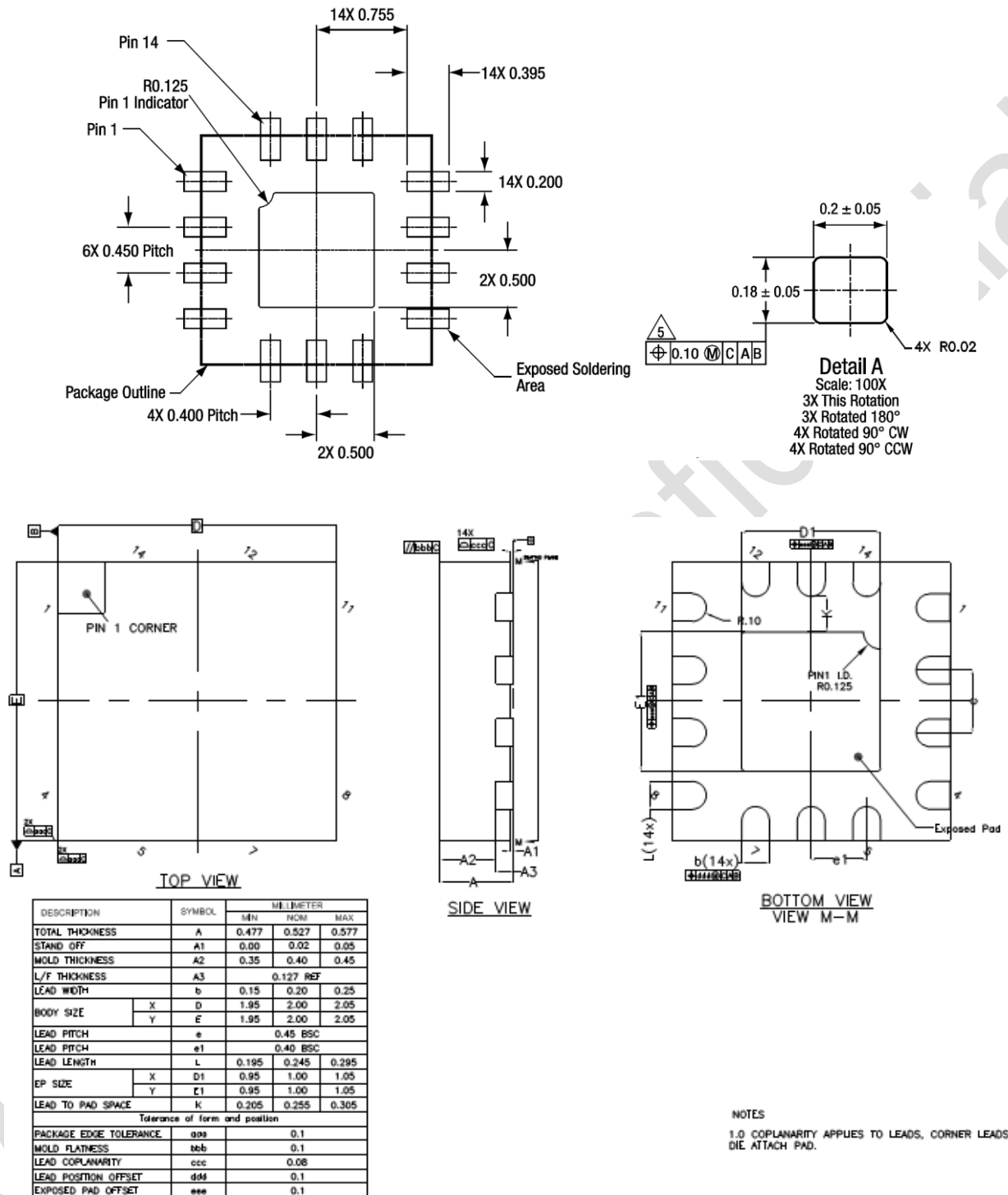


Figure 3. package outline dimension

Marking Specification

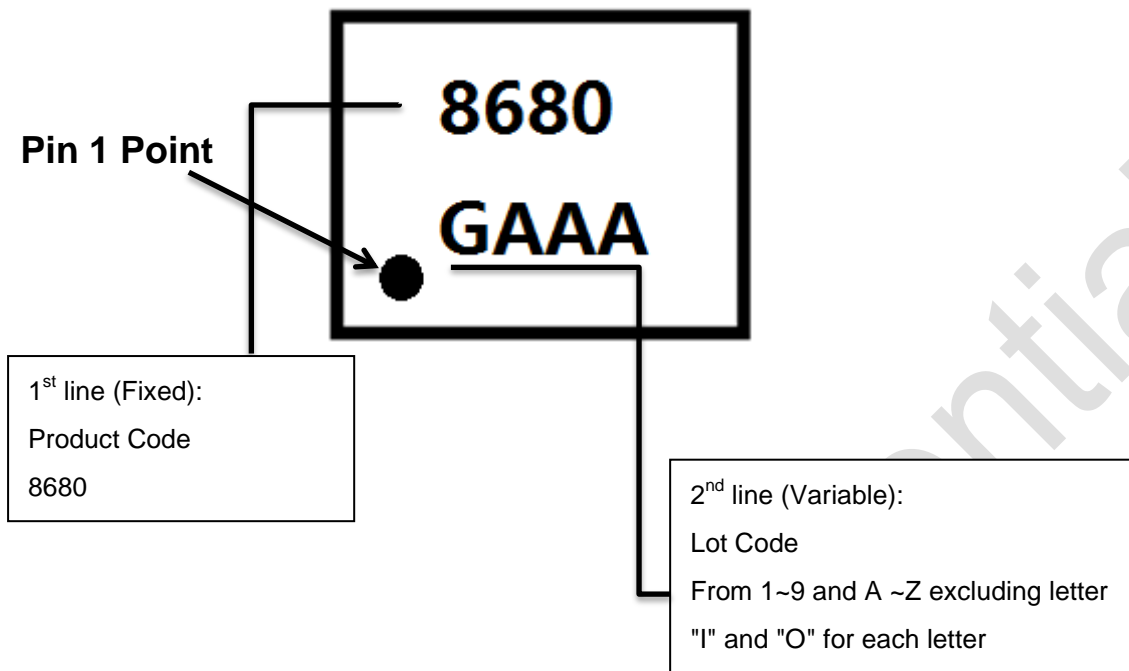


Figure 4. Marking specification (Top View)

Tape and Reel Dimensions

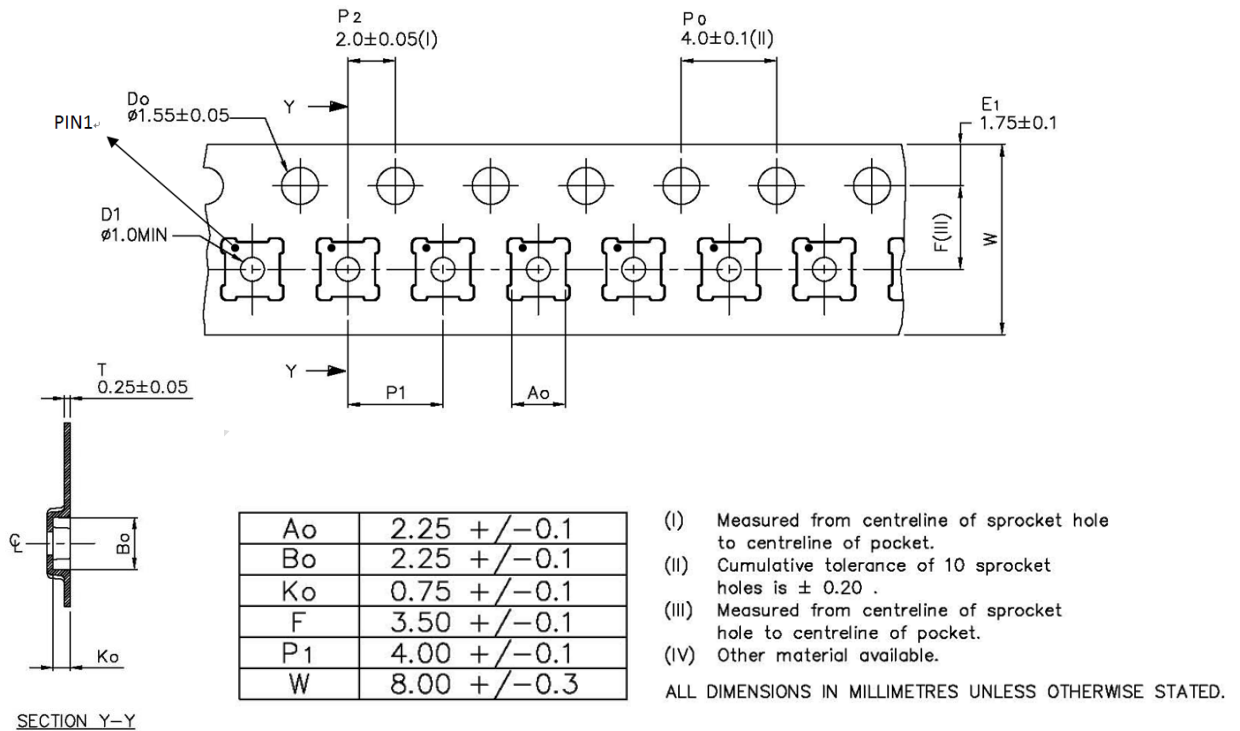


Figure 5. Tape and reel dimensions

Reflow Chart

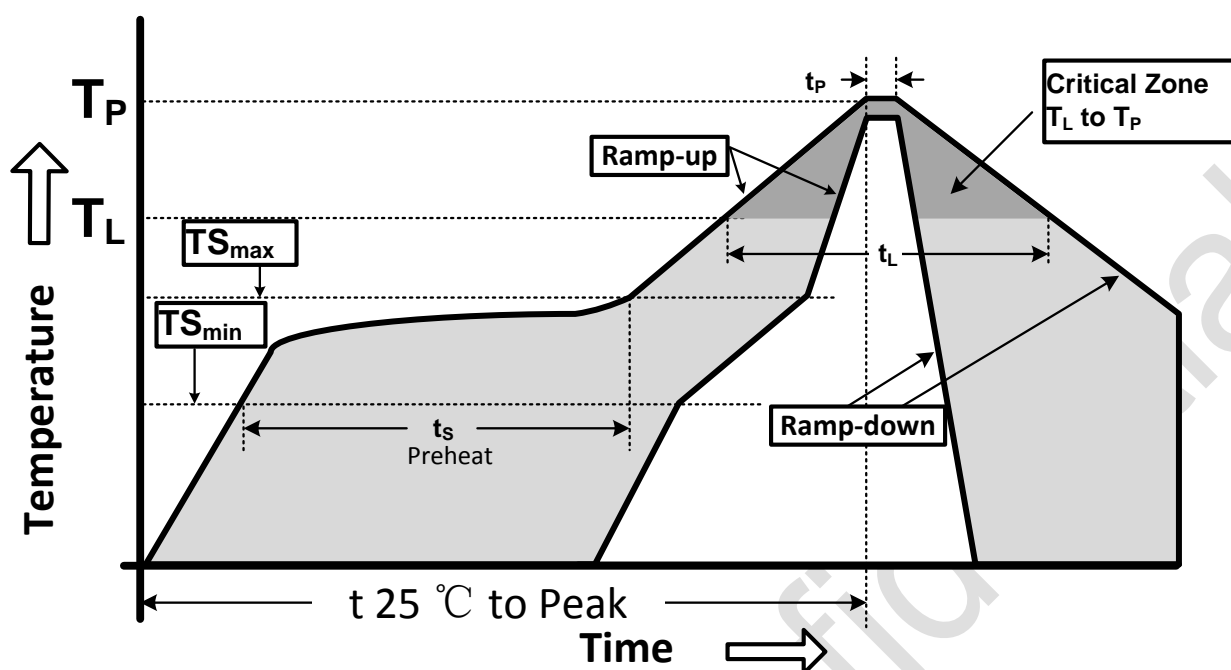


Figure 6. Recommended Lead-Free Reflow Profile

Table 6. Reflow condition

Profile Parameter	Lead-Free Assembly, Convection, IR/Convection
Ramp-up rate (TS_{max} to T_P)	3°C/second max.
Preheat temperature (TS_{min} to TS_{max})	150°C to 200°C
Preheat time (t_s)	60 - 180 seconds
Time above T_L , 217°C (t_L)	60 - 150 seconds
Peak temperature (T_P)	260°C
Time within 5°C of peak temperature(t_P)	20 - 40 seconds
Ramp-down rate	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

ESD Sensitivity

Integrated circuits are ESD sensitive and can be damaged by static electric charge. Proper ESD protection techniques should be used when handling these devices.

RoHS Compliant

This product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), and are considered RoHS compliant.