



MXDLN02G

FM Low Noise Amplifier



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General Description

MXDLN02G low current, high gain, low noise amplifier (LNA) is dedicated to FM receive. This product achieved excellent noise figure of 0.9dB and 20dB gain.

MXDLN02G works under a 1.6V to 3.3V single power supply while consumes 10 mA current, in power down (PD) mode, the power consumption will be reduced to less than 0.1uA.

MXDLN02G uses a small 1.0mmx1.5mmx0.75mm DFN 6-pin package.

Applications

Cell Phone with FM
Portable audio device

Features

- Low noise figure: 0.9 dB
- High gain: 20dB
- PD current less than 0.1uA
- Single supply voltage range 1.6V to 3.3V
- Small package 1.0mmx1.5mmx0.75mm
- Low cost BOM
- Lead-Free and RoHS-Compliant

Pin Configuration and function block diagram (Top view)

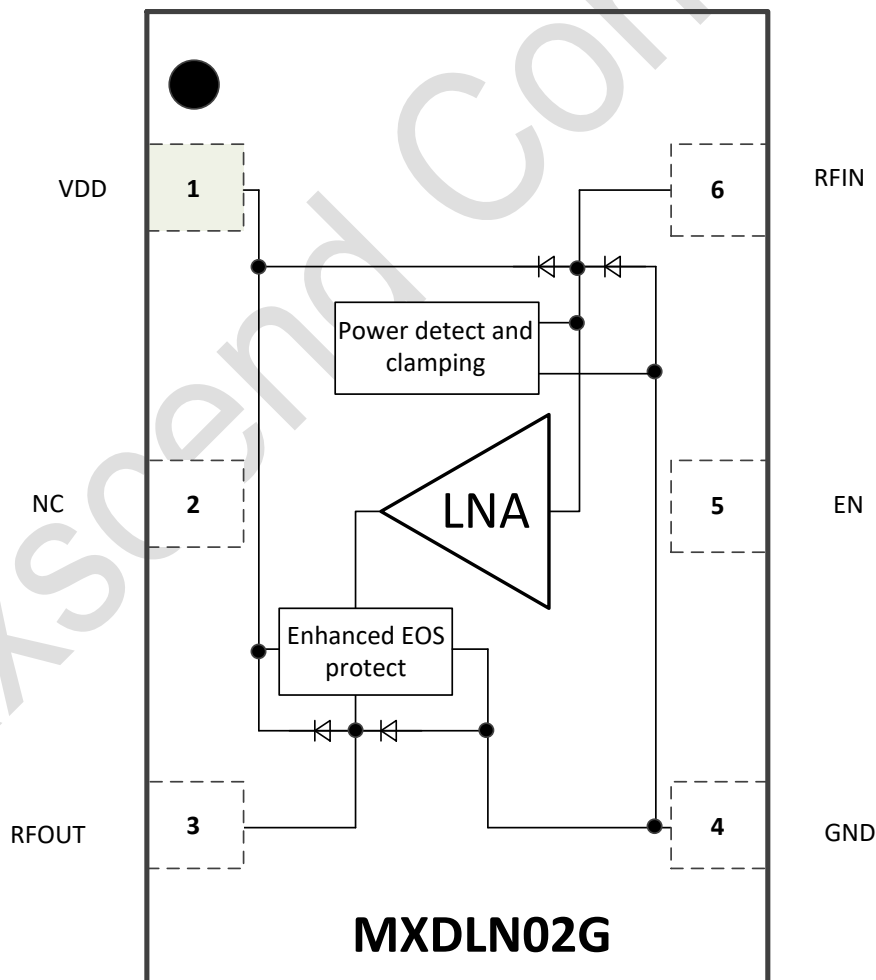


Figure 1 MXDLN02G pin configuration and function block diagram

Application circuit

Application A: Internal antenna;

Application B: Separated antenna, matching to 50 Ohm.

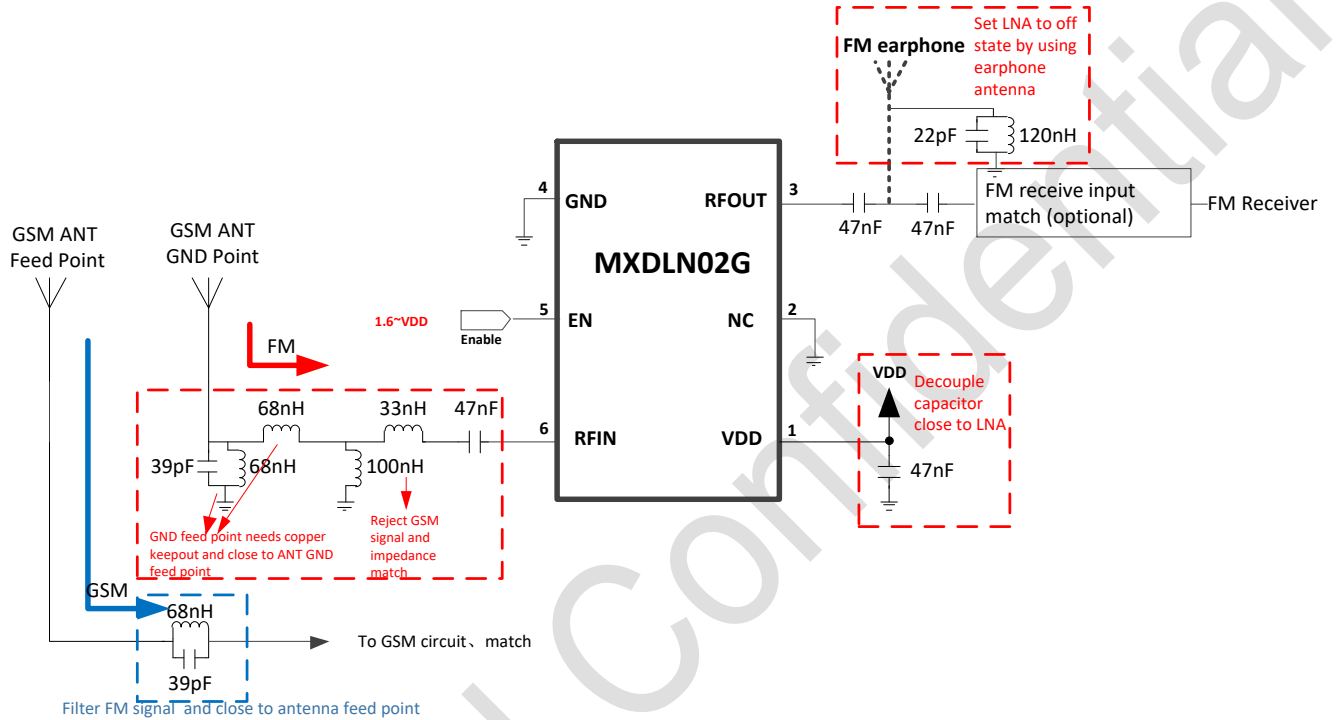


Figure 2 Application A: Internal antenna sharing with GSM

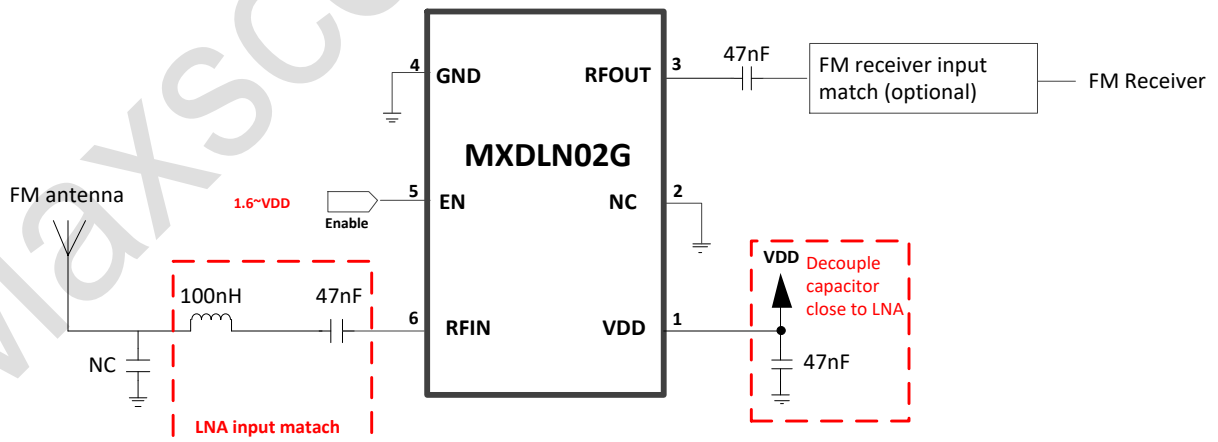


Figure 3 Application B: Separated antenna, matching to 50 Ohm

Pin Descriptions

Table 1. Pin Descriptions

| Pin | Pin Name | I/O | Pin Description |
|-----|----------|-----|---|
| 1 | VDD | AP | Power supply |
| 2 | NC | - | - |
| 3 | RFOUT | AO | LNA output |
| 4 | GND | AG | Analog VSS |
| 5 | EN | DI | Pull high enable, pull low into power down mode |
| 6 | RFIN | AI | LNA input from antenna |

Note: *DI* (digital input), *DO* (digital output), *DIO* (digital bidirectional), *AI* (analog input), *AO* (analog output), *AIO* (analog bidirectional), *AP* (analog power), *AG* (analog ground)

Absolute Maximum Ratings

Table 2.

| Parameters | Range | Units |
|--------------------------------|--------------|-------|
| Power supply | -0.3 ~ 3.8 | V |
| Other Pin to GND | -0.3~VDD+0.3 | V |
| Maximum RF Input Power | 25 | dBm |
| Operation Temperature Range | -40~85 | °C |
| Junction Temperature | 150 | °C |
| Storage temperature Range | -65~160 | °C |
| Lead Temperature (soldering) | 260 | °C |
| Soldering Temperature (reflow) | 260 | °C |
| Human Body Mode ESD | -6000~+6000 | V |
| Charge Device Mode ESD | -500~+500 | V |

Specifications

DC Characteristics

Typically $T_A=25^{\circ}\text{C}$ VDD=2.8V, VEN=1.8V, unless otherwise noted

Table 3.

| Parameters | Condition | Min | Typ | Max | Units |
|----------------|-------------------|-----|-----|-----|-------|
| Supply Voltage | | 1.6 | 2.8 | 3.3 | V |
| Supply Current | EN=High, VDD=2.8V | 8 | 10 | 13 | mA |
| EN Input High | | 1.6 | 1.8 | VDD | V |
| EN Input Low | | 0 | 0 | 0.3 | V |

AC Characteristics

Typically $T_A=25^{\circ}\text{C}$ $V_{DD}=2.8\text{V}$, $V_{EN}=1.8\text{V}$, all data measured on Maxscend's EVB, unless otherwise noted

Table 4. AC Specifications, no any matching network, 50 Ohm port

| Parameters | Conditions | Min | Typ | Max | Units |
|------------------------------------|------------|------|------|------|---------------|
| RF Frequency Range | | 50 | - | 150 | MHz |
| Operation Current | | 8 | 10 | 13 | mA |
| Power Down Current | | - | 0.05 | 0.1 | μA |
| Power Gain | Note1 | 18 | 20 | 22 | dB |
| Input Power 1-dB Compression Point | | -20 | -17 | - | dBm |
| Noise Figure | Note1 | - | 0.9 | 1.2 | dB |
| Input Return Loss | Note1 | -4.5 | -3.5 | -3.0 | dB |
| Output Return Loss | Note1 | -10 | -9 | -5 | dB |
| Reverse Isolation | Note1 | - | -32 | -28 | dB |
| Stability | Note1 | 1.3 | - | - | N/A |

Note1: measuring at 50 Ohm load

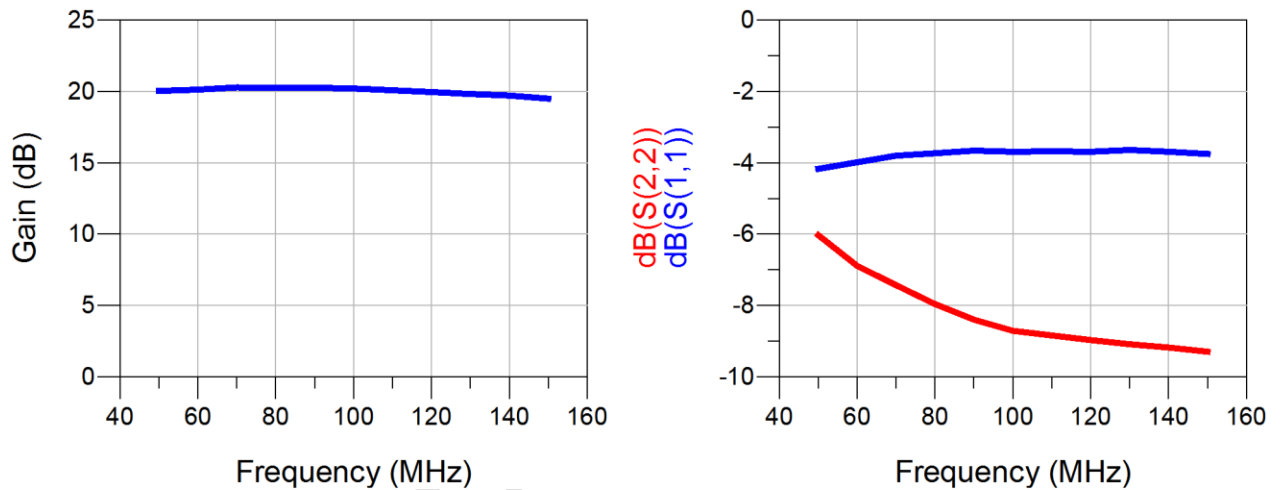


Figure 4 Power Gain & Input/output return loss

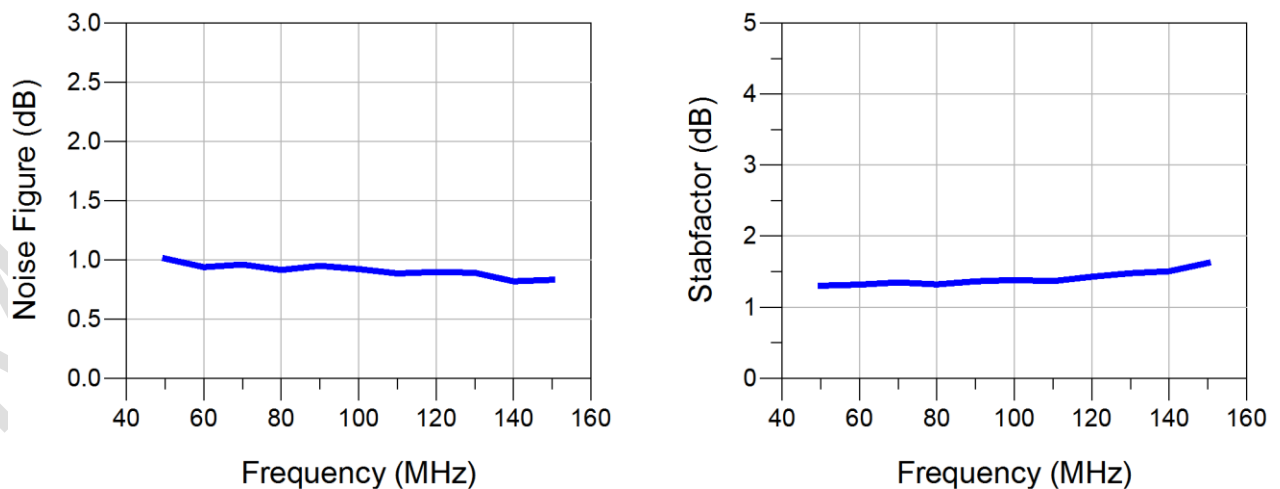


Figure 5 Noise Figure & Stability factor

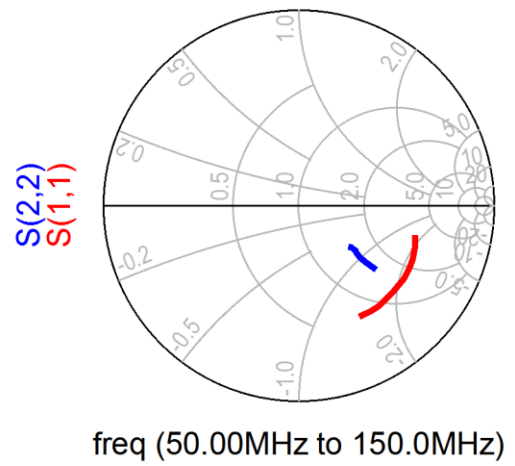
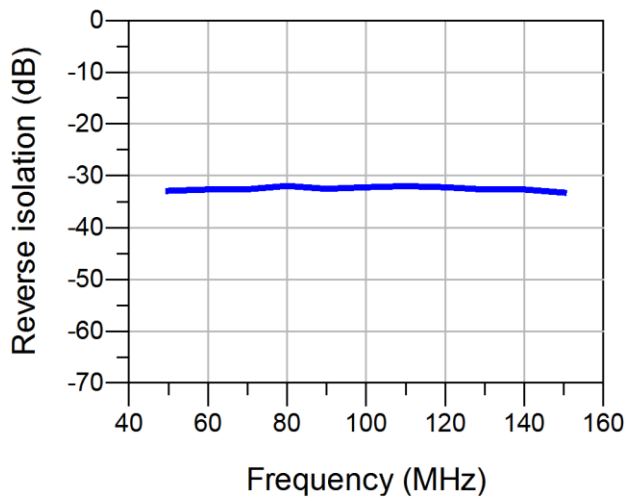


Figure 6 Reverse isolation & Smith chart

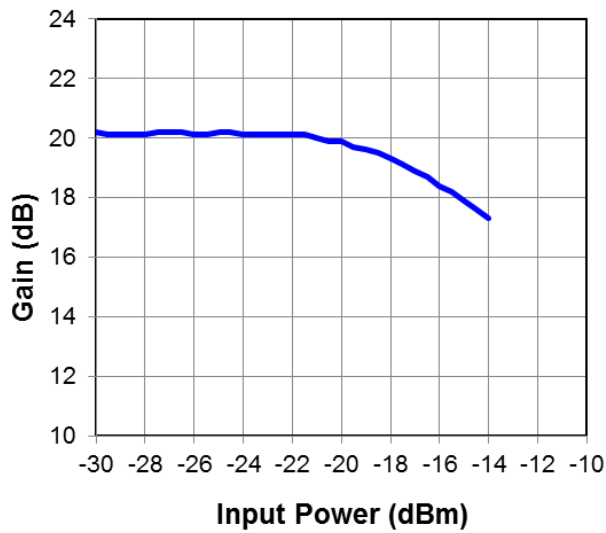


Figure 7 Gain curve over input power

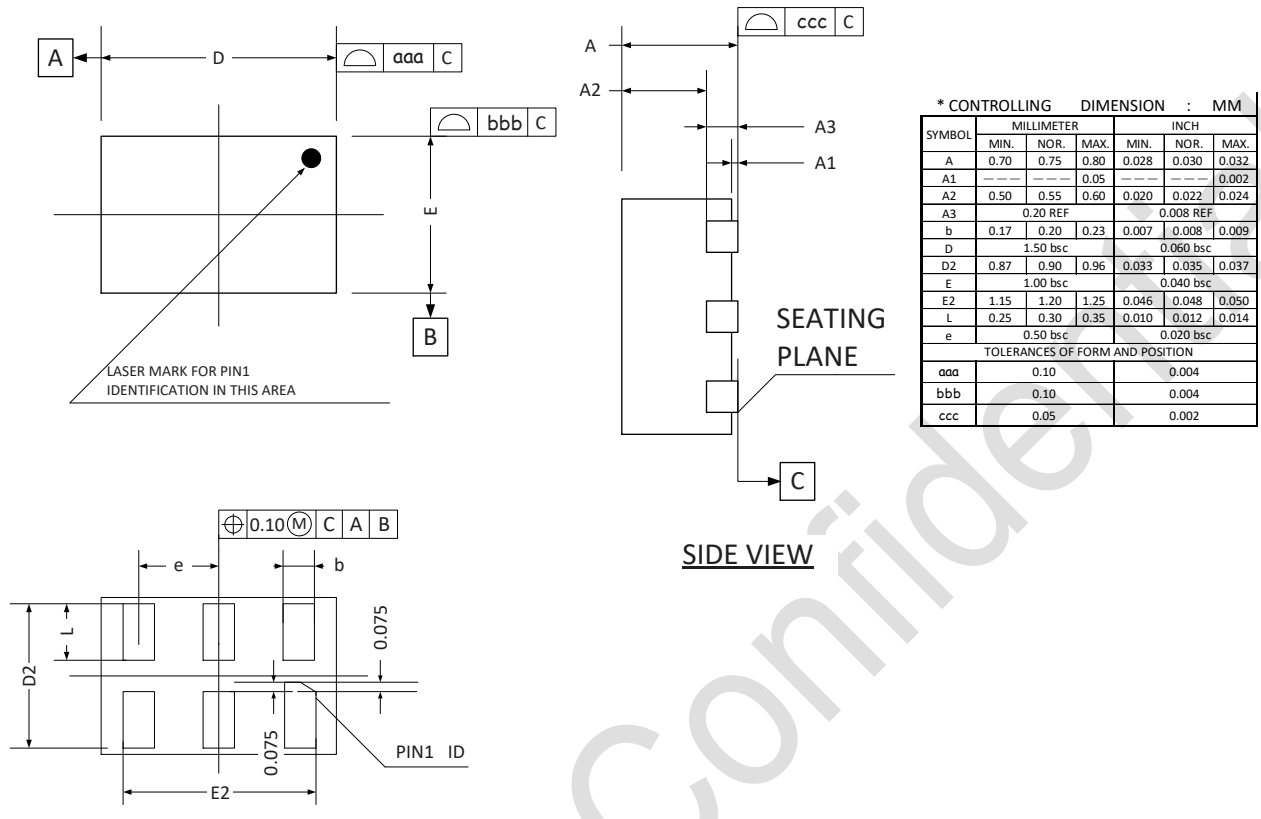
Package Outline Dimensions


Figure 8 MXDLN02G outline dimension

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Reflow Chart

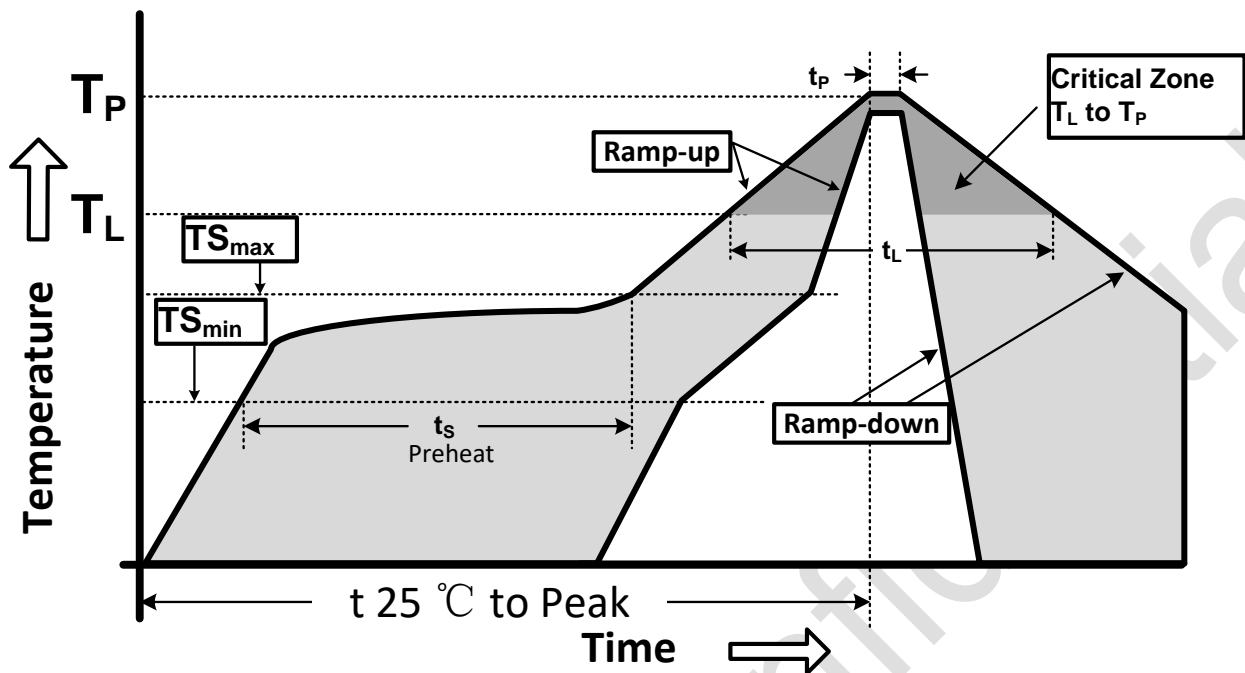


Figure 9 Recommended Lead-Free Reflow Profile

Table 5. Reflow condition

| Profile Parameter | Lead-Free Assembly, Convection, IR/Convection |
|--|---|
| Ramp-up rate ($T_{S_{\text{max}}}$ to T_P) | 3°C/second max. |
| Preheat temperature ($T_{S_{\text{min}}}$ to $T_{S_{\text{max}}}$) | 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.

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