



CTH7403NS-T52

N-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DS} 30V
- Drain-Source On-Resistance
 $R_{DS(ON)} 4m\Omega$, at $V_{GS}= 10V$, $I_D= 30A$
 $R_{DS(ON)} 7m\Omega$, at $V_{GS}= 4.5V$, $I_D= 15A$
- Continuous Drain Current at $T_C=25^\circ C$ $I_D =74A$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free
- ESD Protection

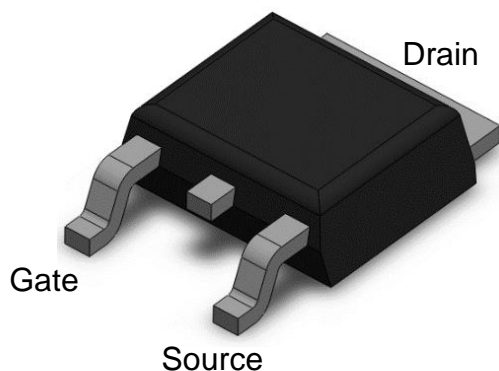
Applications

- Power Management in
- Battery Powered System
- DC/DC Converter
- Load Switch

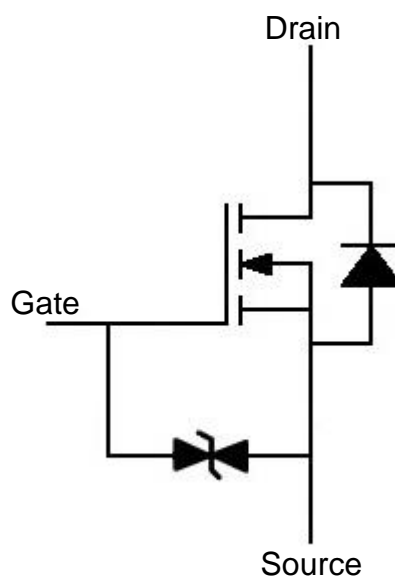
Description

The CTH7403NS-T52 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

Package Outline



Schematic





CTH7403NS-T52

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Absolute Maximum Rating at 25°C

| Symbol | Parameters | Test Conditions | Min | Note |
|------------------|--|-----------------|-----|------|
| V _{DS} | Drain-Source Voltage | 30 | V | |
| V _{GS} | Gate-Source Voltage | ±20 | V | |
| I _D | Continuous Drain Current @T _c =25°C | 74 | A | 1 |
| I _{DM} | Pulsed Drain Current | 296 | A | 1 |
| P _D | Total Power Dissipation @T _c =25°C | 42 | W | 2 |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C | |
| T _J | Operating Junction Temperature Range | -55 to 150 | °C | |

Thermal Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|------------------|-------------------------------------|-----------------|-----|-----|-----|-------|-------|
| R _{θJC} | Thermal Resistance Junction-Case | | -- | -- | 3.0 | °C/W | 1,4 |



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Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Static Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|------------|--------------------------------|---------------------------------|-----|-----|----------|---------|-------|
| B_{VDSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | - | - | V | |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS} = 30V, V_{GS} = 0V$ | - | - | 1 | μA | |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS} = \pm 20V, V_{DS} = 0V$ | - | - | ± 10 | μA | |

On Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|--------------|-------------------------------|-----------------------------------|-----|-----|-----|-----------|-------|
| $R_{DS(ON)}$ | Drain-Source On-Resistance | $V_{GS} = 10V, I_D = 30A$ | - | 4 | 4.8 | $m\Omega$ | 3 |
| $R_{DS(ON)}$ | Drain-Source On-Resistance | $V_{GS} = 4.5V, I_D = 15A$ | - | 7 | 9 | $m\Omega$ | 3 |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS} = V_{DS}, I_D = 250\mu A$ | 1.2 | - | 3.0 | V | |

Dynamic Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|-----------|------------------------------|-----------------|-----|------|------|-------|-------|
| C_{ISS} | Input Capacitance | $V_{GS} = 0V,$ | - | 2400 | 2700 | pF | |
| C_{OSS} | Output Capacitance | $V_{DS} = 15V$ | - | 350 | - | | |
| C_{RSS} | Reverse Transfer Capacitance | $f = 1MHz$ | - | 110 | - | | |

Switching Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|--------------|----------------------------|-------------------|-----|-----|-----|-------|-------|
| $T_{D(ON)}$ | Turn-On Delay Time | $V_{DS} = 15V,$ | - | 23 | - | ns | |
| T_R | Rise Time | $V_{GS} = 10V,$ | - | 17 | - | | |
| $T_{D(OFF)}$ | Turn-Off Delay Time | $R_G = 6\Omega,$ | - | 76 | - | | |
| T_F | Fall Time | $R_L = 15\Omega,$ | - | 15 | - | | |
| Q_G | Total Gate Charge | $V_{DS} = 15V,$ | - | 27 | - | nC | |
| Q_{GS} | Gate-Source Charge | $V_{GS} = 4.5V,$ | - | 11 | - | | |
| Q_{GD} | Gate-Drain (Miller) Charge | $I_D = 17A,$ | - | 14 | - | | |



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Drain-Source Diode Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|----------|-------------------------------|------------------------------|-----|-----|-----|-------|-------|
| V_{SD} | Body Diode Forward Voltage | $V_{GS} = 0V, I_{SD} = 2.7A$ | - | 0.8 | 1.2 | V | 1 |
| I_{SD} | Body Diode Continuous Current | | - | - | 2.7 | A | 1 |

Note:

1. The power dissipation is limited by 150°C junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

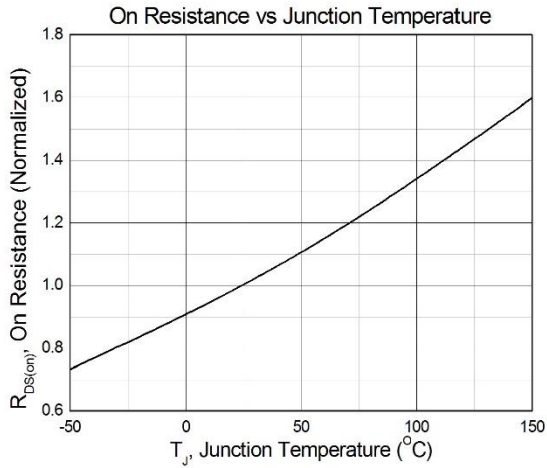


Figure 1

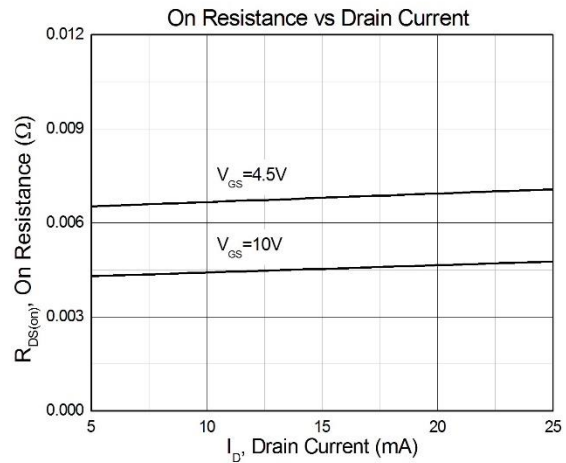


Figure 2

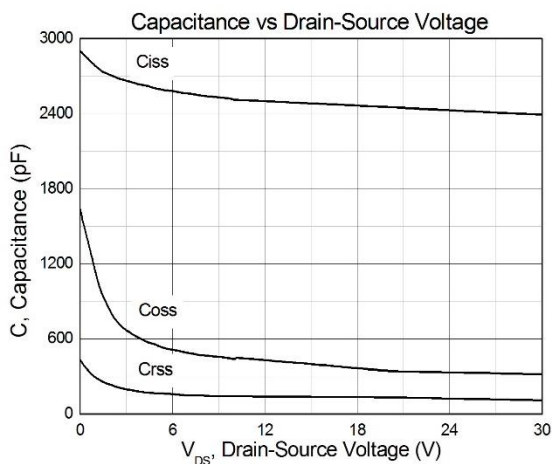


Figure 3

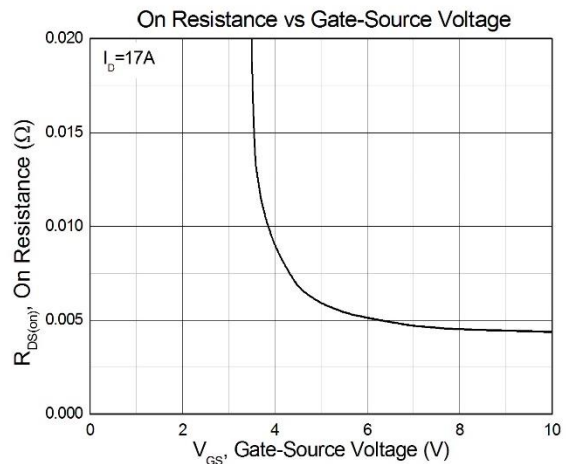


Figure 4

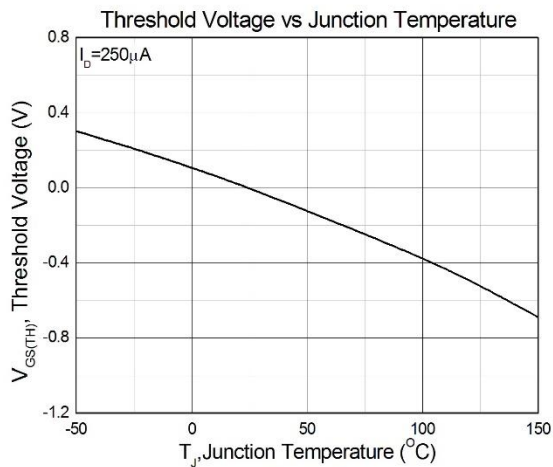


Figure 5

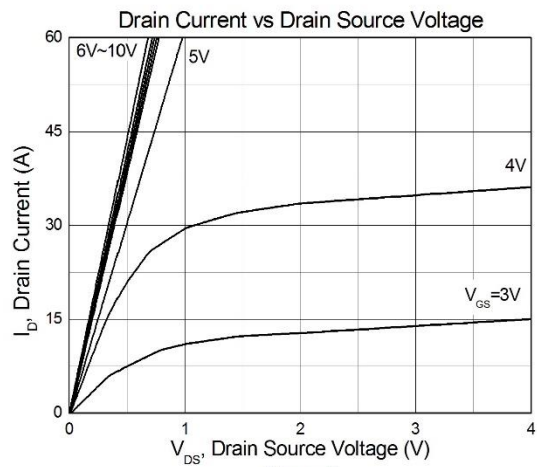


Figure 6

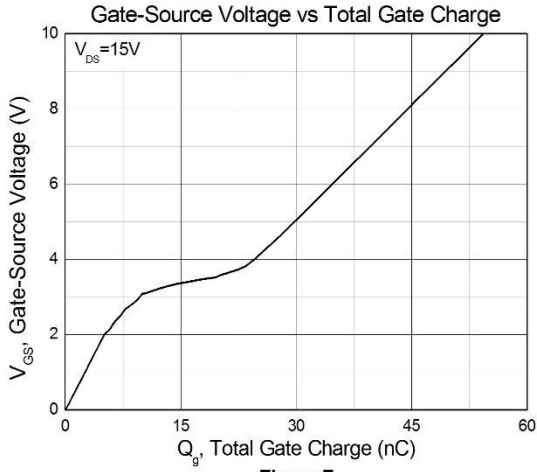


Figure 7

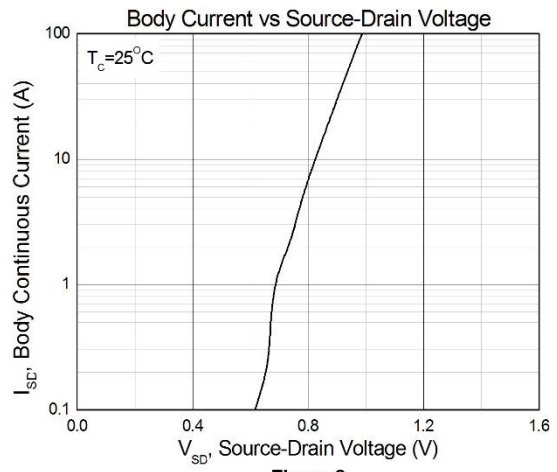


Figure 8



Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

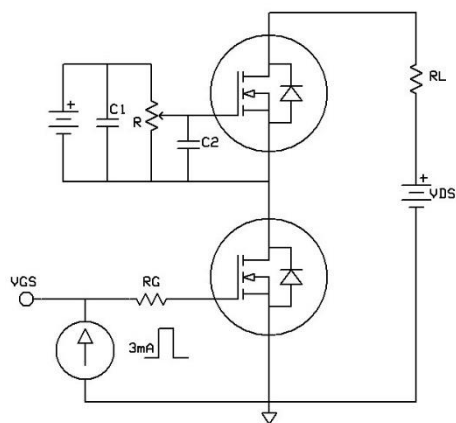


Figure 10: Gate Charge Waveform

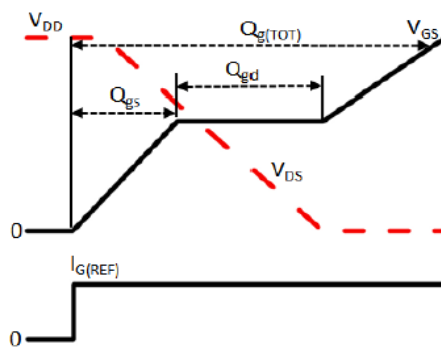


Figure 11: Switching Time Test Circuit

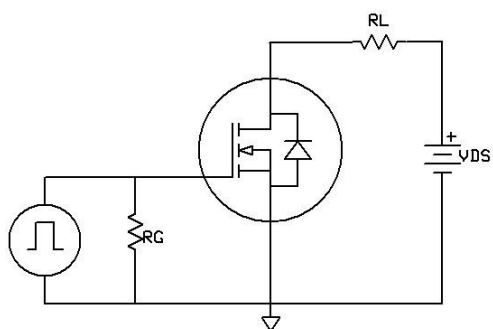
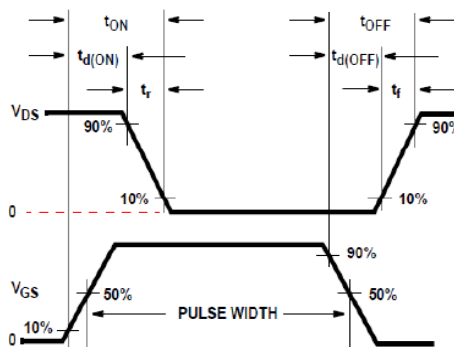
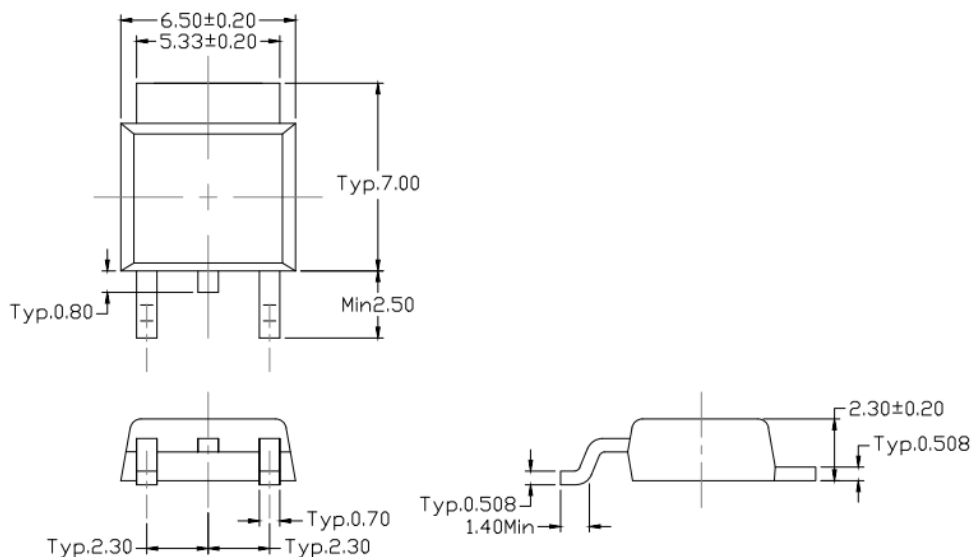


Figure 12: Switching Time Waveform



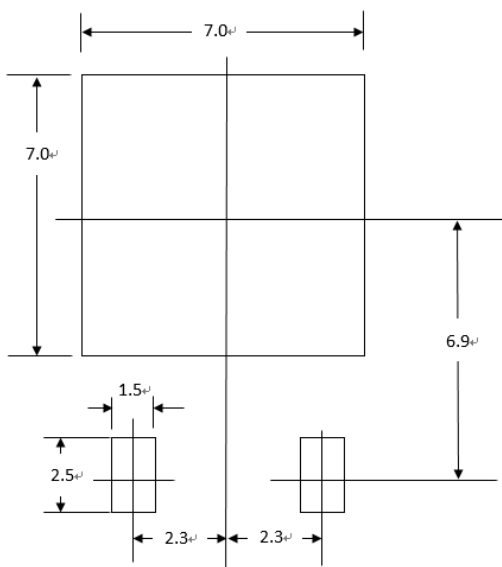


Package Dimension (TO-252)



Dimensions in mm unless otherwise stated

Recommended pad layout for surface mount leadform



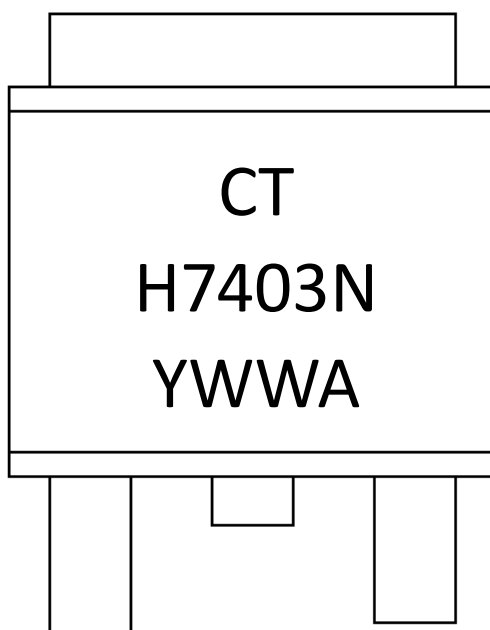
Dimensions in mm unless otherwise stated



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Marking Information



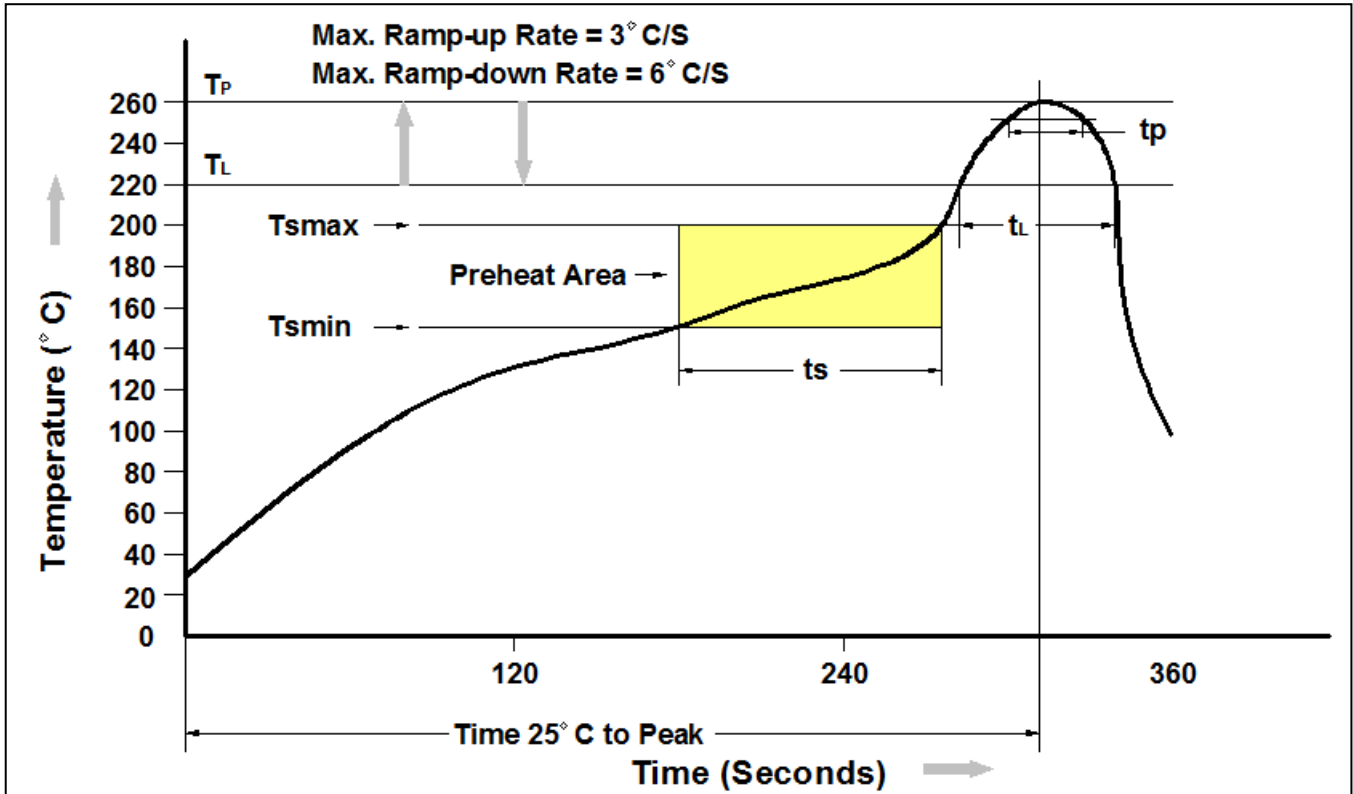
CT : Denotes “ CT Micro”
H7403N : Device Number
Y : Fiscal Year
WW : Work Week
A : Production Code

Ordering Information

| Part Number | Description | Quantity |
|--------------------|--------------------|-----------------|
| CTH7403NS-T52 | TO-252 Reel | 2500 pcs |



Reflow Profile



| Profile Feature | Pb-Free Assembly Profile |
|-----------------------------------|--------------------------|
| Temperature Min. (Tsmmin) | 150°C |
| Temperature Max. (Tsmmax) | 200°C |
| Time (ts) from (Tsmmin to Tsmmax) | 60-120 seconds |
| Ramp-up Rate (tL to tp) | 3°C/second max. |
| Liquidous Temperature (TL) | 217°C |
| Time (tL) Maintained Above (TL) | 60 – 150 seconds |
| Peak Body Package Temperature | 260°C +0°C / -5°C |
| Time (tp) within 5°C of 260°C | 30 seconds |
| Ramp-down Rate (TP to TL) | 6°C/second max |
| Time 25°C to Peak Temperature | 8 minutes max. |



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