



CTL0422PS-R3

P-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage $V_{DS} - 20\text{ V}$
- Drain-Source On-Resistance
 $R_{DS(ON)} 45\text{m}\Omega$, at $V_{GS} = -4.5\text{V}$, $I_D = -4.0\text{A}$
 $R_{DS(ON)} 52\text{m}\Omega$, at $V_{GS} = -2.5\text{V}$, $I_D = -3.0\text{A}$
 $R_{DS(ON)} 60\text{m}\Omega$, at $V_{GS} = -1.8\text{V}$, $I_D = -2.0\text{A}$
- Continuous Drain Current at $T_C=25^\circ\text{C}$ $I_D = -4.0\text{A}$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

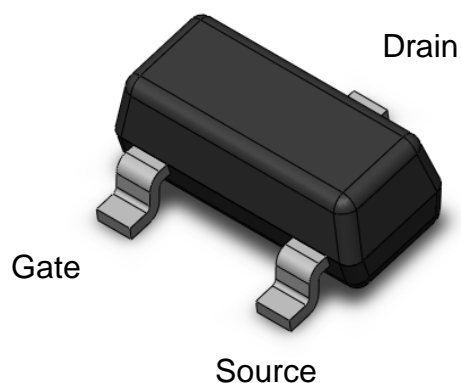
Applications

- Power Management
- Lithium Ion Battery

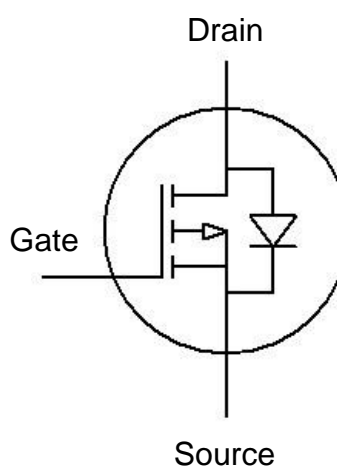
Description

The CTL0422PS-R3 is the P-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. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching and low in-line power loss are needed in a very small outline surface mount package.

Package Outline



Schematic



**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Test Conditions	Min	Notes
V _{DS}	Drain-Source Voltage	-20	V	
V _{GS}	Gate-Source Voltage	±8	V	
I _D	Continuous Drain Current	-4.0	A	1
I _{DM}	Pulsed Drain Current	-20	A	1
P _D	Total Power Dissipation	1.4	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 _{ΘJA4}	Thermal Resistance Junction-Ambient (t=10s)		--	100	--	°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 _{VDS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-20	-	-	V	
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -16V, V _{GS} = 0V	-	-	-1	μA	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±8V, V _{DS} = 0V	-	-	±100	nA	

On Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} = -4.5V, I _D = -4.0A	-	45	50	mΩ	3
		V _{GS} = -2.5V, I _D = -3.0A	-	52	65	mΩ	
		V _{GS} = -1.8V, I _D = -2.0A	-	60	75	mΩ	
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} = V _{DS} , I _D = -250μA	-0.25	-0.5	-1.0	V	3

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C _{ISS}	Input Capacitance	V _{GS} = 0V, V _{DS} = -10V f = 1MHz	-	220	-	pF	
C _{OSS}	Output Capacitance		-	95	-		
C _{RSS}	Reverse Transfer Capacitance		-	30	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T _{D(ON)}	Turn-On Delay Time	V _{DS} = -10V, V _{GS} = -4.5V, R _G = 3Ω, R _L = 2.5Ω,	-	560	-	ns	
T _R	Rise Time		-	4000	-		
T _{D(OFF)}	Turn-Off Delay Time		-	400	-		
T _F	Fall Time		-	4000	-		
Q _G	Total Gate Charge	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -4A	-	10.5	-	nC	
Q _{GS}	Gate-Source Charge		-	0.5	-		
Q _{GD}	Gate-Drain Charge		-	3	-		

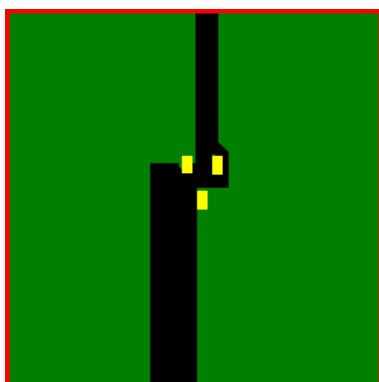


Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _D = -1A	-	-0.78	-1.0	V	
I _{SD}	Body Diode Continuous Current		-	-	-1	A	1

Note:

- 1. The power dissipation is limited by 150°C junction temperature.
- 2. Device mounted on a glass-epoxy board



FR-4
25.4 x 25.4 mm .
2 Oz Copper

Actual Size

- 3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 4. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

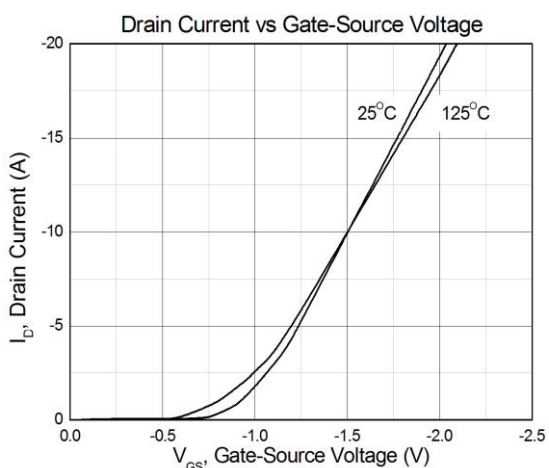


Figure 1

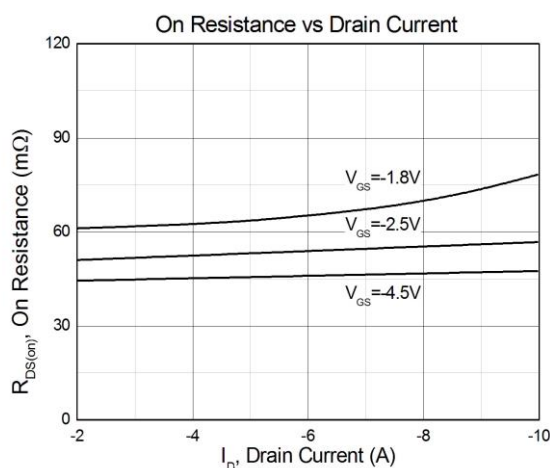


Figure 2

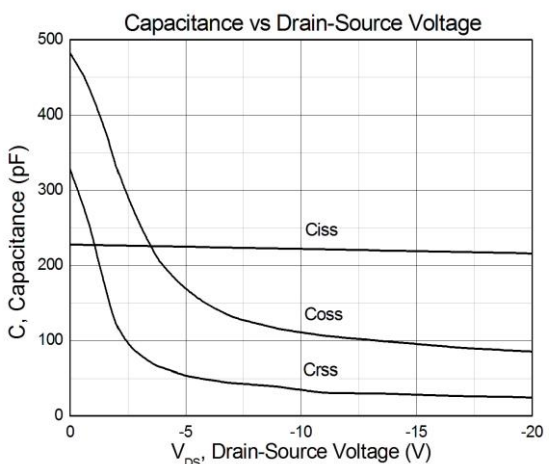


Figure 3

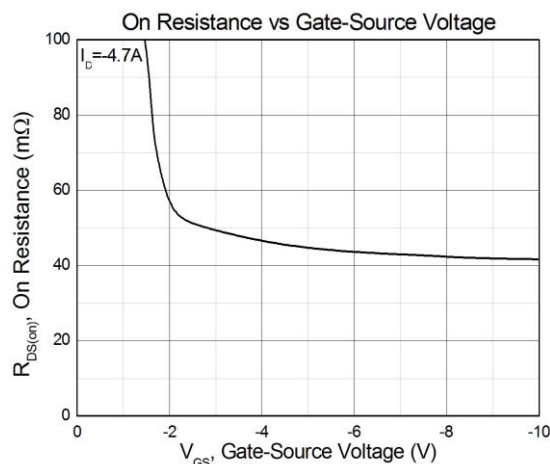


Figure 4

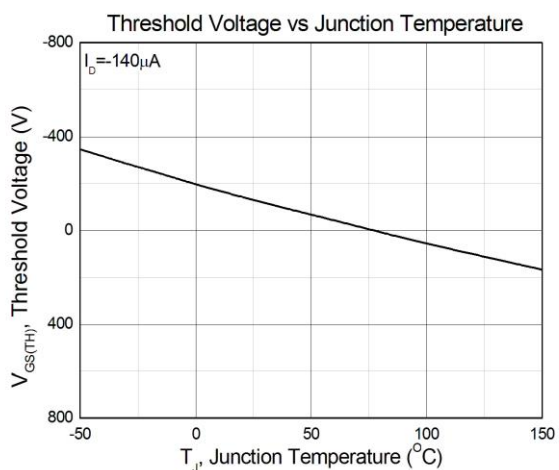


Figure 5

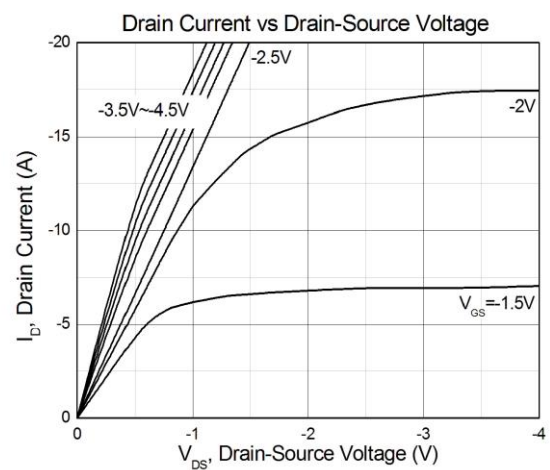
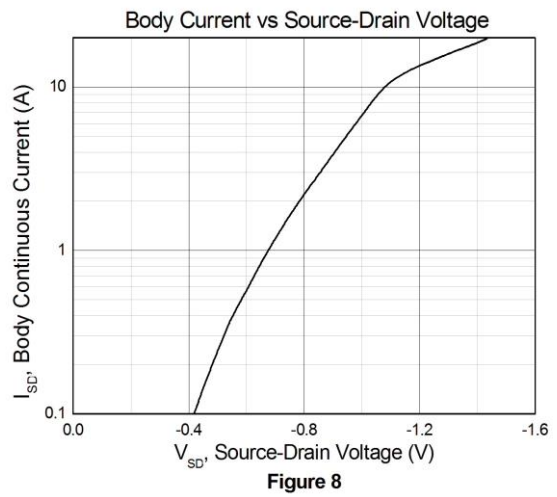
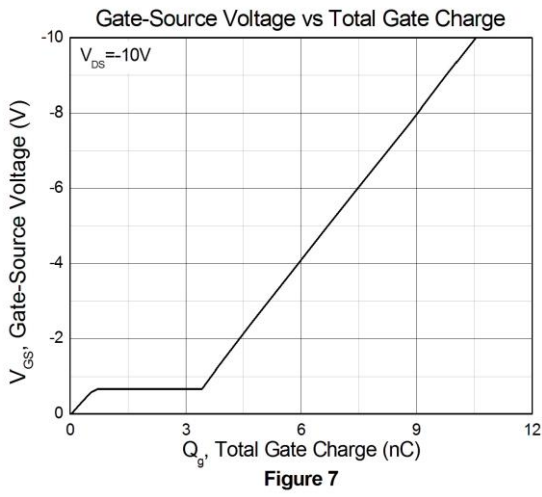


Figure 6



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Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

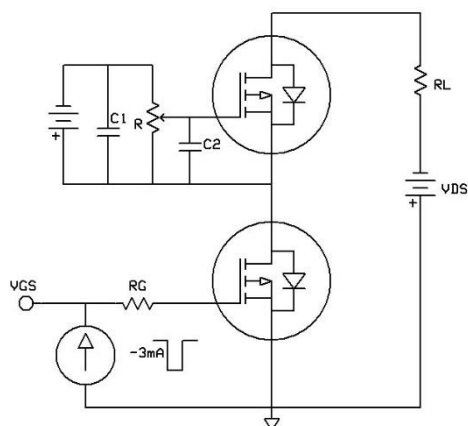


Figure 10: Gate Charge Waveform

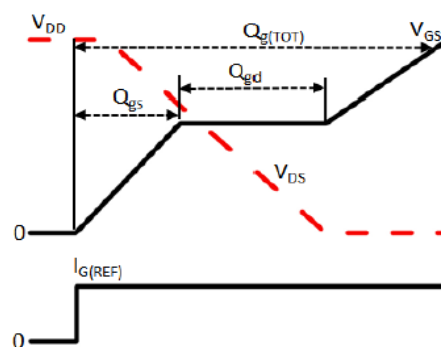


Figure 11: Switching Time Test Circuit

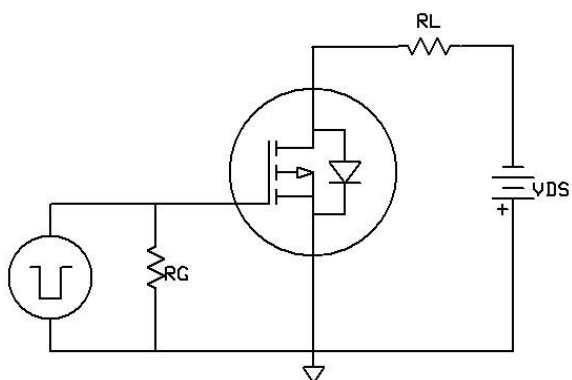
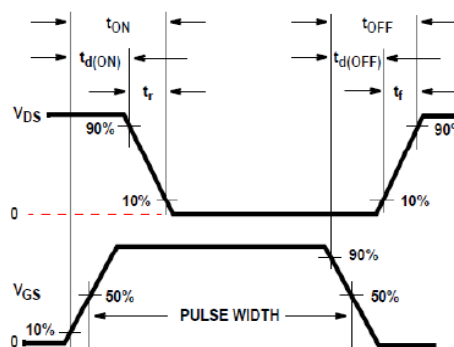
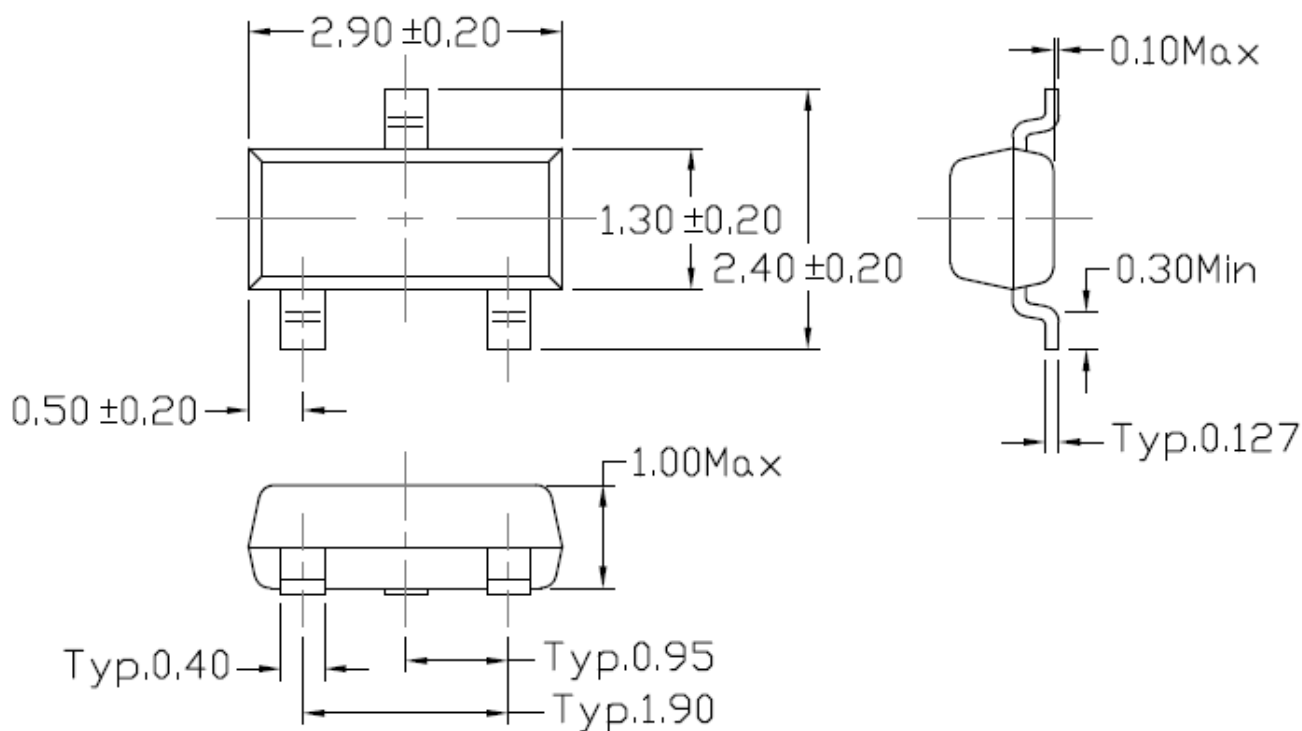


Figure 12: Switching Time Waveform



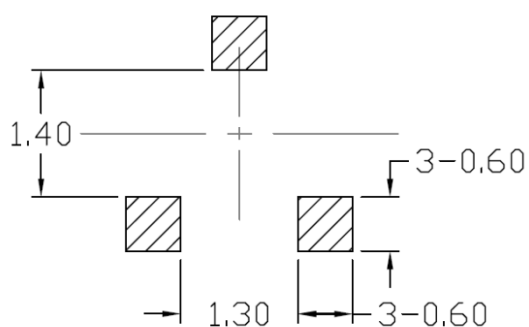


Package Dimension (SOT-23)



Note: Dimensions in mm

Recommended pad layout for surface mount leadform



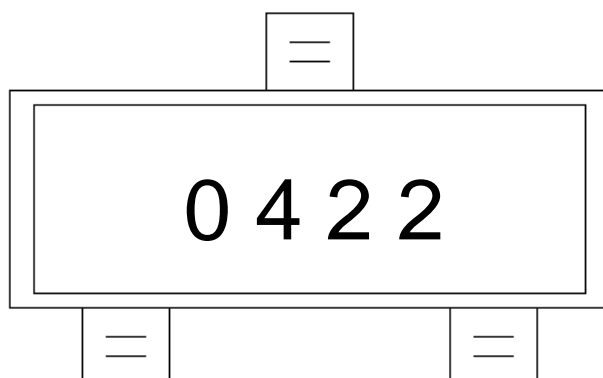
Note: Dimensions in mm



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Marking Information



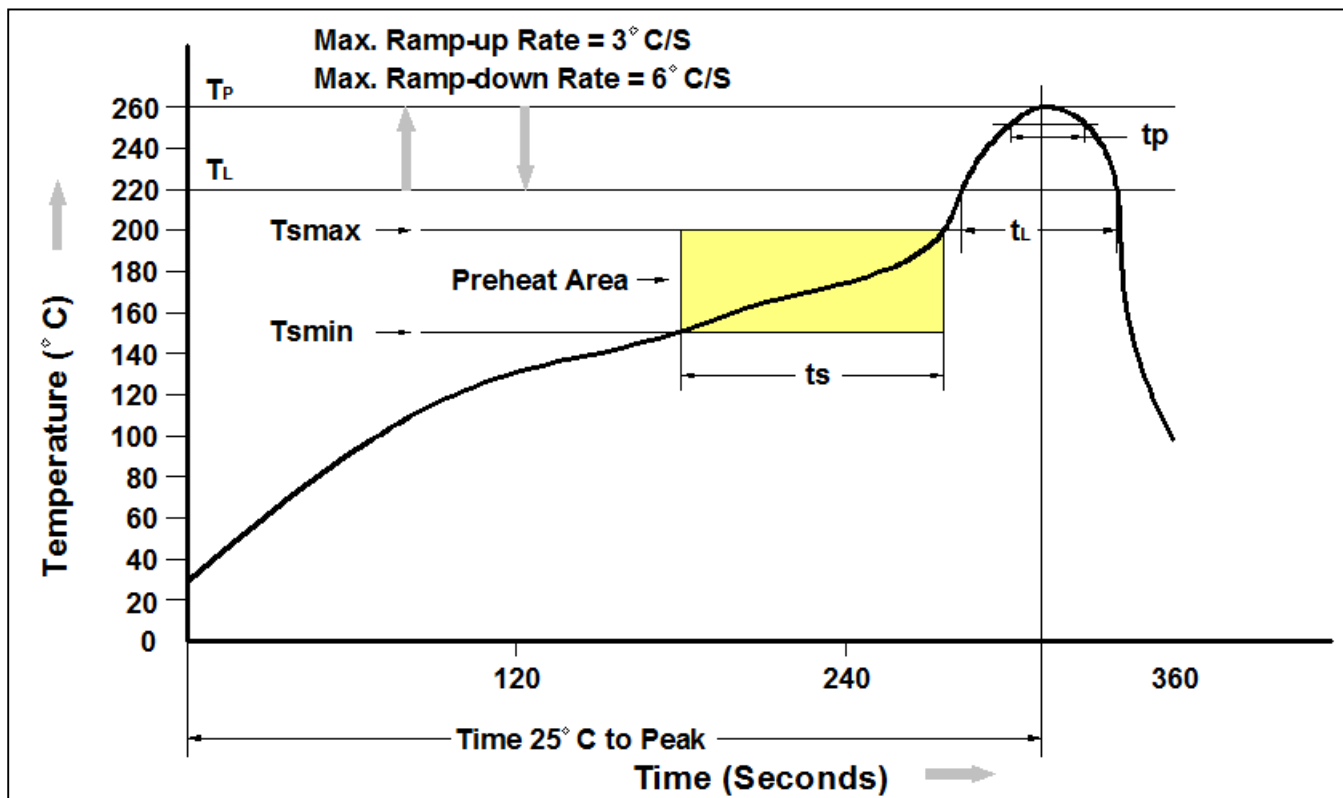
0422: Device Number

Ordering Information

Part Number	Description	Quantity
CTL0422PS-R3	SOT-23 Reel	3000 pcs



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	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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