HCMA1707

Automotive grade
High current power inductors

Product features

- AEC-Q200 qualified
- High current carrying capacity
- Magnetically shielded, low EMI
- Frequency range up to 1 MHz
- Inductance range from 1.5 µH to 68 µH
- Current range from 5.2 A to 40 A
- 17.5 mm x 17.2 mm footprint surface mount package in a 7.0 mm height
- Iron powder core material

Applications

- Body electronics
  - Central body control module
  - Headlamps, tai lamps and interior lighting
  - Heating ventilation and air conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - Adaptive cruise control (ACC)
  - Automatic parking control
  - Collision avoidance system
  - Car black box system
- Infotainment and cluster electronics
  - Audio subsystem: head unit and trunk amp
  - Digital instrument cluster
  - In-vehicle infotainment (IVI) and navigation
- Chassis and safety electronics
  - Airbag control unit
  - Electronic stability control system (ESC)
  - Electric parking brake
  - Electronic Power Steering (EPS)
  - Anti-Lock Braking System (ABS)

Environmental Data

- Storage temperature range (Component): -55 °C to +125 °C
- Operating temperature range: -55 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant

Pb HALOGEN HF FREE RoHS

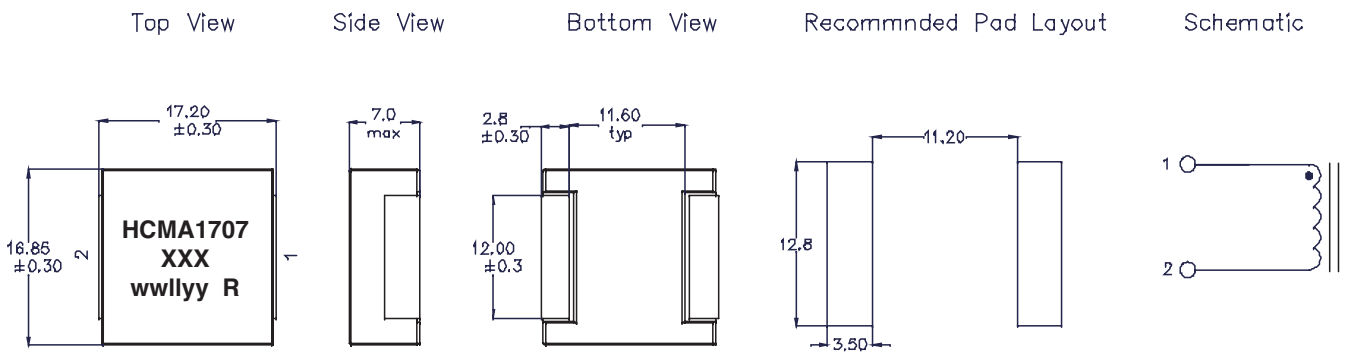
Powering Business Worldwide

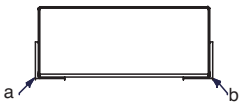
Product Specifications

Part Number[6]	OCL[1] ±20% (µH)	FLL min.[2] (µH)	I_{rms}[3] (A)	I_{sat}[4] (A)	DCR (mΩ) @ +20 °C (typical)	DCR (mΩ) @ +20 °C (maximum)	K-factor[5]
HCMA1707-1R5-R	1.5	0.96	40	40	1.85	2.15	124
HCMA1707-2R2-R	2.2	1.41	37	34	2.15	2.50	103
HCMA1707-4R7-R	4.7	3.01	27	24	4.12	4.72	76
HCMA1707-6R8-R	6.8	4.35	20	22	6.55	7.55	60
HCMA1707-8R2-R	8.2	5.25	16	20	8.10	8.70	55
HCMA1707-100-R	10	6.40	14	18	9.30	10	47
HCMA1707-150-R	15	9.60	12	13	14.5	15.5	43
HCMA1707-220-R	22	14.1	9.5	11	21	23	37
HCMA1707-330-R	33	21.1	9.0	10	35	37	28
HCMA1707-470-R	47	30.1	6.8	7.5	41	47	25
HCMA1707-680-R	68	43.5	5.2	6.5	74	85	20

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 0.0 Adc, +25 °C.
2. Full Load Inductance (FLL): Test parameters: 100 kHz, 0.25 V_{rms}, I_{sat}, +25 °C.
3. I_{rms}: DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed +125 °C under worst case operating conditions verified in the end application.
4. I_{sat} : Peak current for approximately 20% rolloff at +25 °C.
5. K-factor: Used to determine B_{pp} for core loss (see graph). B_{pp} = K * L * ΔI. B_{pp} :(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in amps).
6. Part Number Definition: HCMA1707-yyy-R
   - HCMA1707 = Product code and siz
     yyy= Inductance value in uH, R = decimal point,
     if no R is present then third character = number of zeros.
   - "-R" suffix = RoHS compliant

Dimensions (mm)



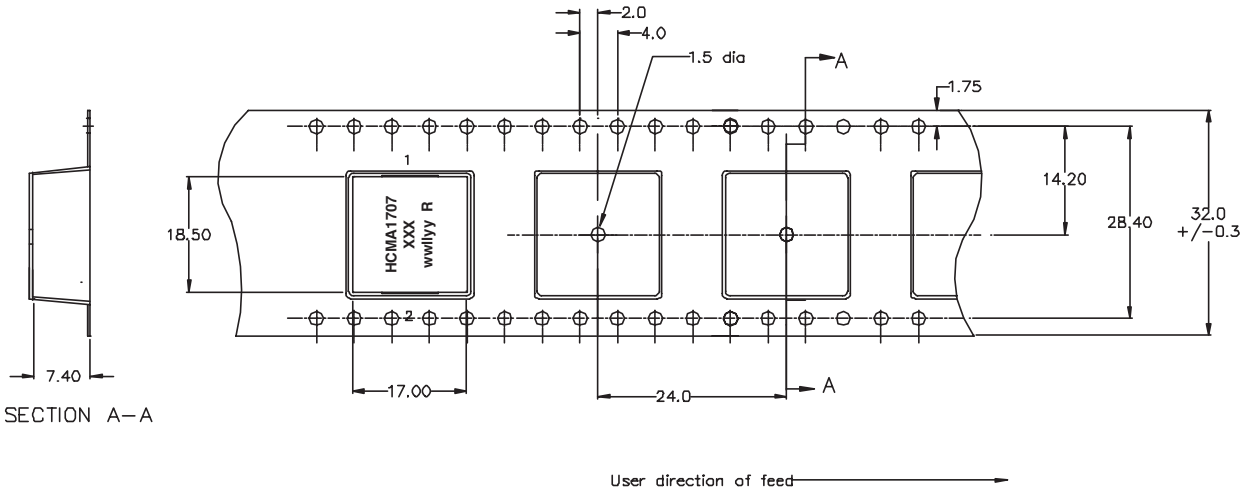


DCR measured between point "a" and point "b"

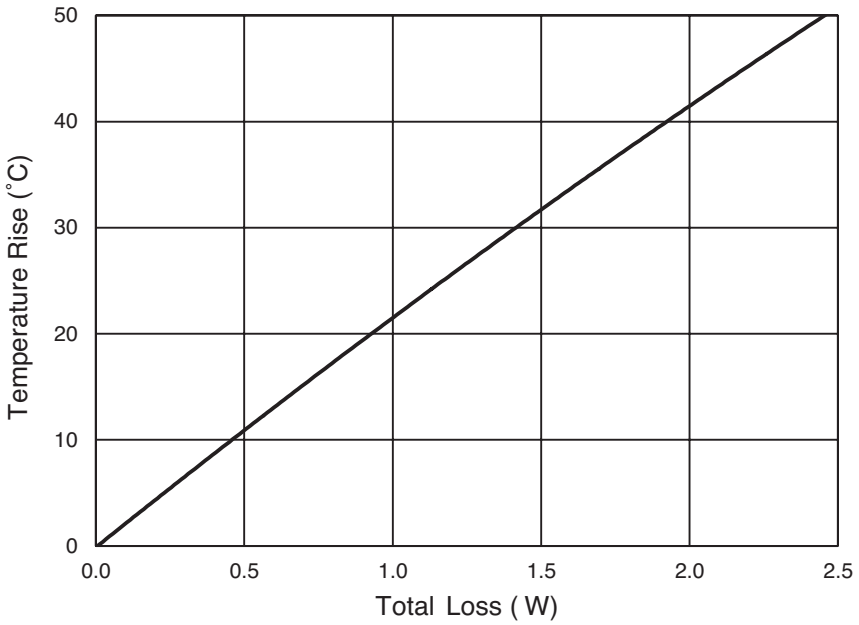
All soldering surfaces coplanar within 0.10 millimeters.
Part marking: HCMA1707; A = Automotive grade, XXX = initial inductance in µH, R = decimal point; if no R is present, last digit equals number of zeros.
wwllyy = date code, R = revision level
Color: Grey
Do not route traces or vias underneath the inductor

Packaging information (mm)

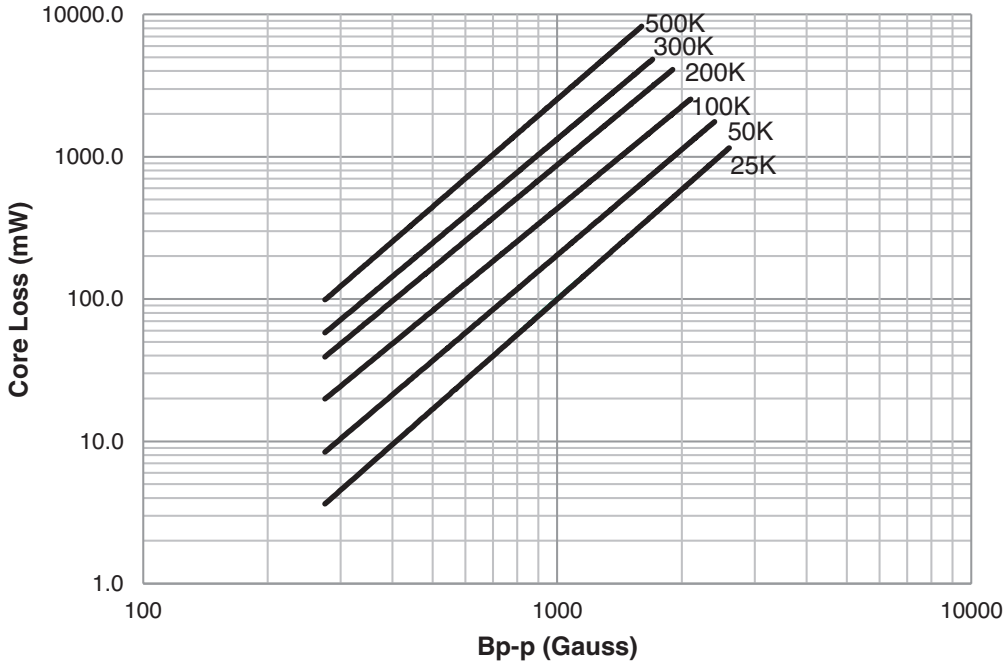
Supplied in tape and reel packaging , 350 parts per 13" diameter reel



Temperature rise vs. total loss

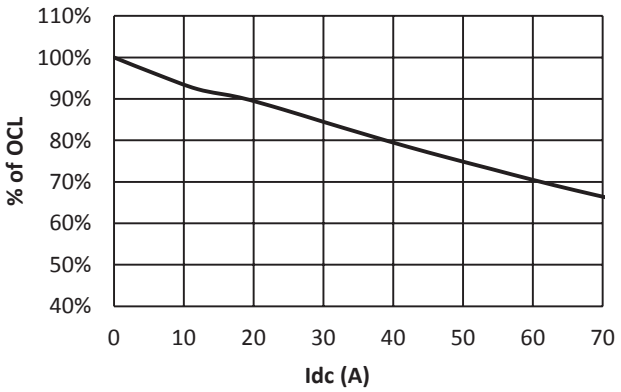


Core loss vs. B_{p-p}

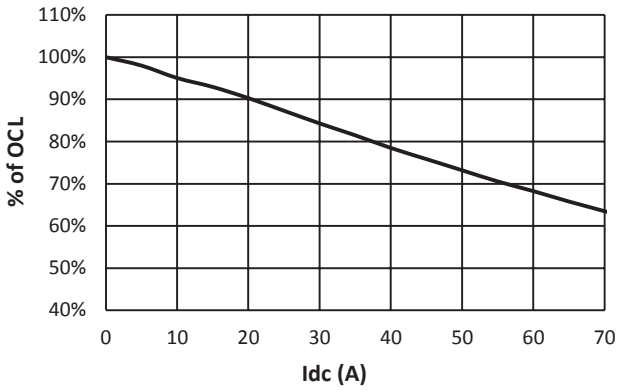


Inductance characteristics

HCMA1707 -1R5-R

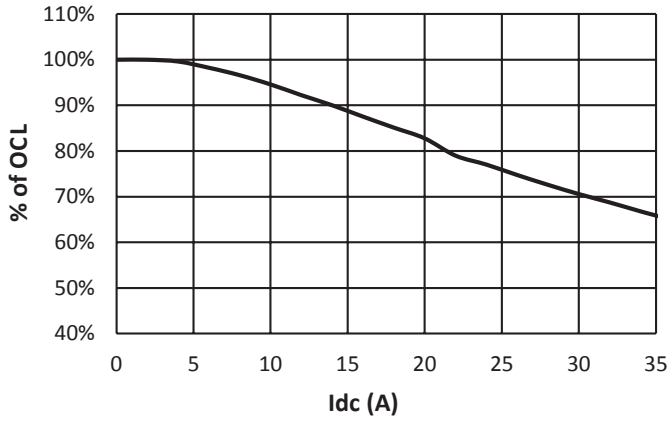


HCMA1707 -2R2-R

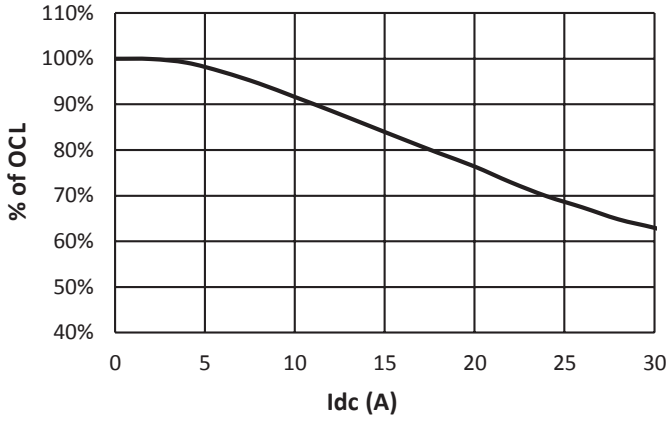


Inductance characteristics

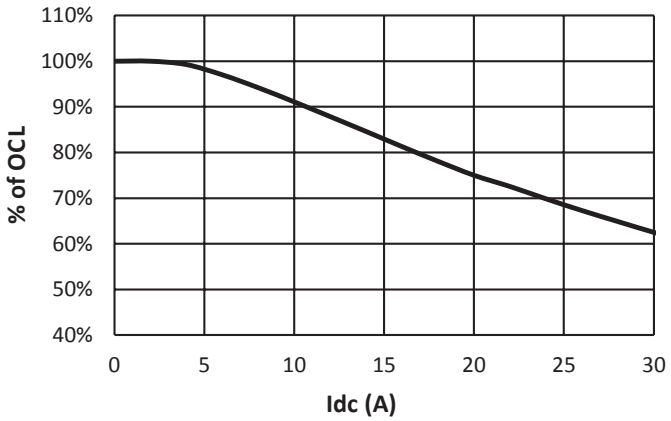
HCMA1707 -4R7-R



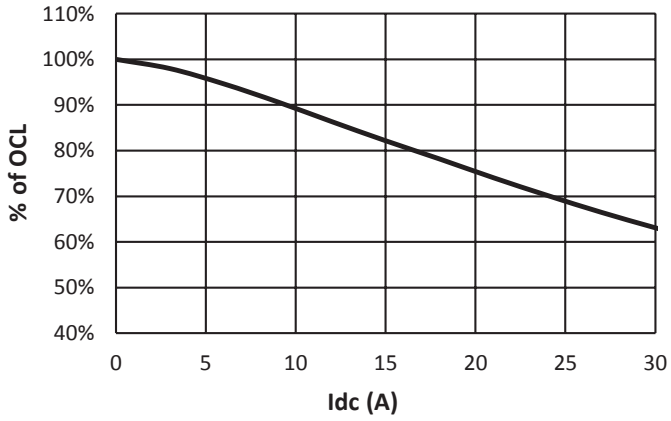
HCMA1707 -6R8-R



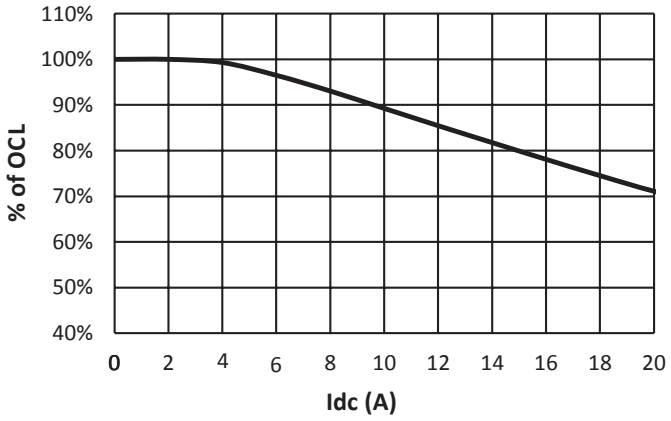
HCMA1707 -8R2-R



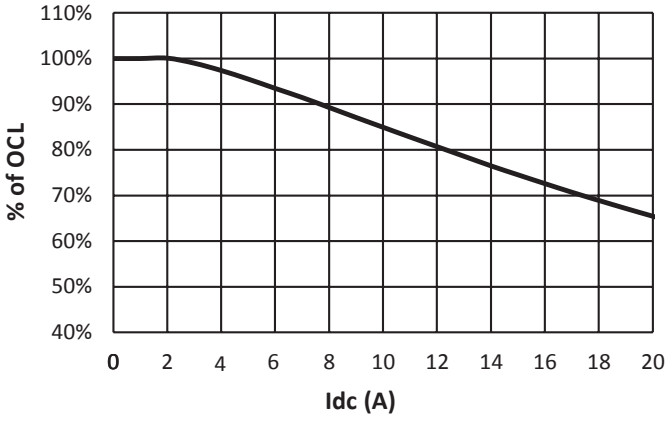
HCMA1707 -100-R



HCMA1707 -150-R

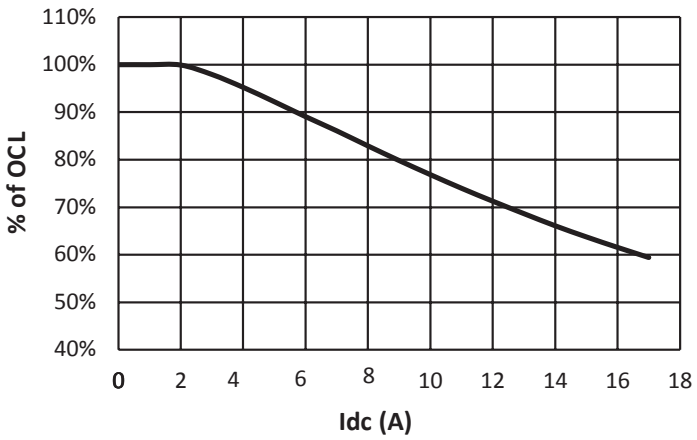


HCMA1707 -220-R

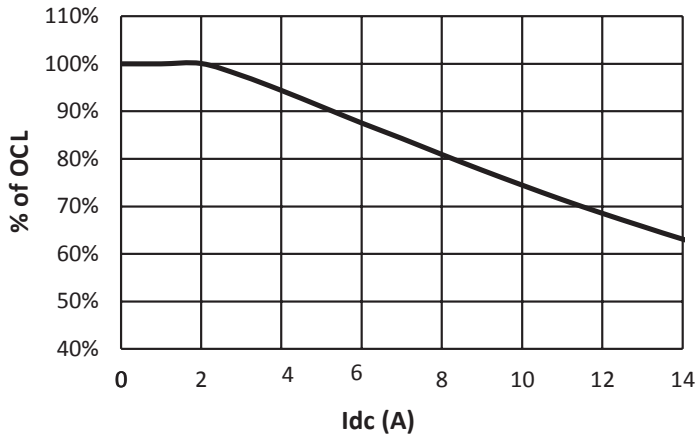


Inductance characteristics

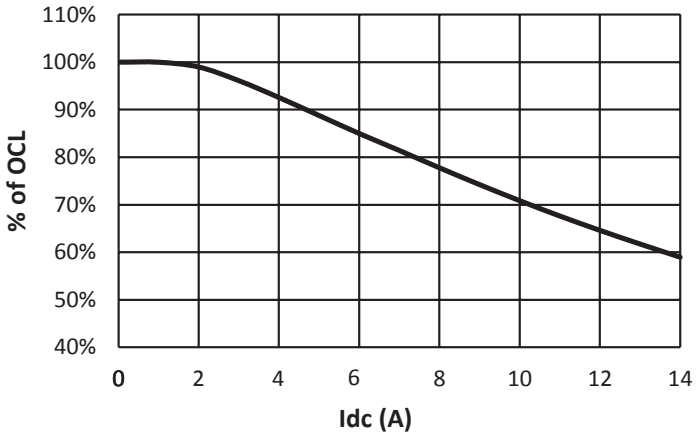
HCMA1707-330-R



HCMA1707-470-R



HCMA1707-680-R



Solder reflow profile

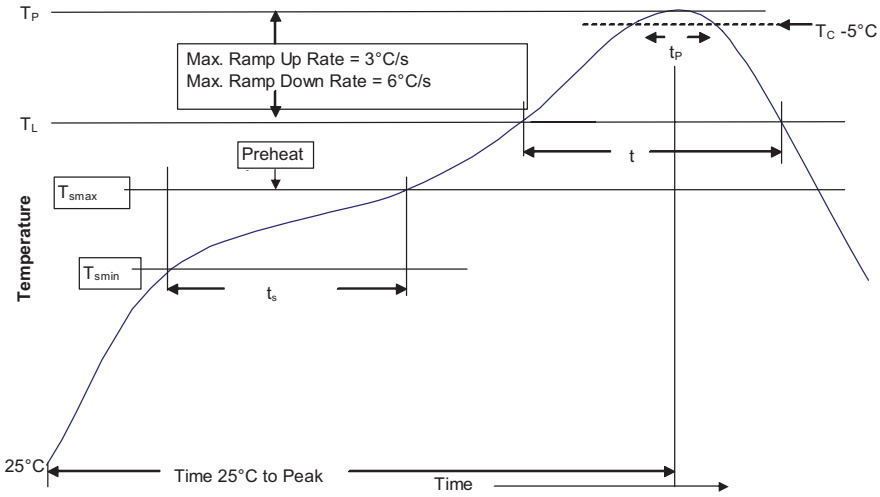


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_C)

Package Thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6mm	260°C	260°C	260°C
1.6 – 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Reference JDEC J-STD-020

Profile Feature		Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak	• Temperature min. (T_{smin})	100°C	150°C
	• Temperature max. (T_{smax})	150°C	200°C
	• Time (T_{smin} to T_{smax}) (t_s)	60-120 Seconds	60-120 Seconds
Average ramp up rate T_{smax} to T_p		3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T_L) Time at liquidous (t_L)		183°C 60-150 Seconds	217°C 60-150 Seconds
Peak package body temperature (T_P)*		Table 1	Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_C)		20 Seconds**	30 Seconds**
Average ramp-down rate (T_p to T_{smax})		6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature		6 Minutes Max.	8 Minutes Max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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