

# SM8S

## Automotive grade 6600 W Transient voltage suppressor



### Product features

- Automotive grade (AEC-Q101 qualified)
- Low profile DO-218AB package
- Excellent clamping capability
- High surge capability
- 6600 W peak pulse power capability at 10/1000  $\mu$ s waveform
- Typical  $I_R$  less than 5  $\mu$ A
- Plastic package meets UL 94 V-0 flammability rating
- Meets moisture sensitivity level (MSL) level 1
- Terminal: tin plated, solderable per J-STD-002

### Applications

- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- Network systems and body electronics
- Power Train controls
- xEV and battery systems

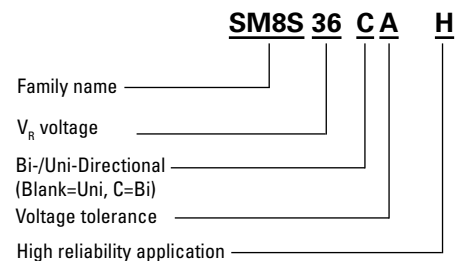
### Environmental compliance and general specifications

- ISO16750-2 P5A: 12 V system\*
- ISO16750-2 P5A: 24 V system\*
- AEC-Q101 qualified

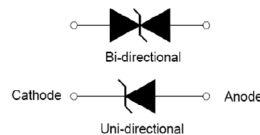
\*= Varies by test condition. Bi-polar not recommended



### Ordering part number



### PIN configuration



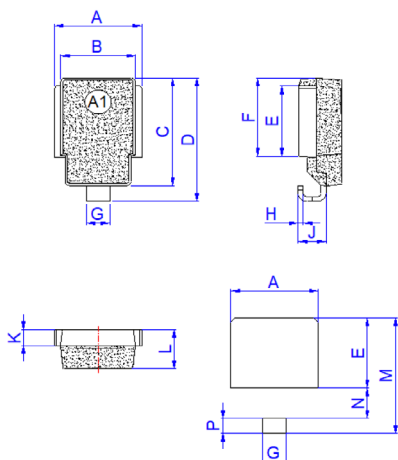
### Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage operating junction temperature range	$T_{STG}/T_J$	-55 to +175	°C
Steady state power dissipation at $T_C=+25\text{ °C}$	$P_D$	8	W
Peak pulse power dissipation on 10/1000 $\mu\text{s}$ waveform	$P_{PP}$	6600	W
Peak pulse power dissipation on 10/10000 $\mu\text{s}$ waveform	$P_{PP}$	5200	W
Peak forward surge current, 8.3 ms single half sine wave <sup>1</sup>	$I_{FSM}$	700	A
Typical thermal resistance junction to case	$R_{\theta JC}$	0.9	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	12	°C/W

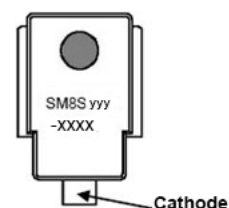
1. Measured on 8.3 ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle = 4 per minute maximum

### Mechanical parameters, pad layout- mm/inches



Dimension	Millimeters		Inches	
	Minimum	Maximum	Minimum	Maximum
A	9.5	10.5	0.374	0.413
B	8.3	8.7	0.327	0.342
C	13.3	13.7	0.524	0.539
D	15.0	16.0	0.592	0.628
E	8.5	9.1	0.335	0.358
F	9.5	10.1	0.374	0.398
G	2.4	3.0	0.094	0.118
H	0.5	0.7	0.020	0.028
J	2.7	3.7	0.106	0.146
K	1.9	2.1	0.075	0.083
L	4.7	5.1	0.185	0.201
M	14.2	14.8	0.559	0.583
N	3.5	4.1	0.138	0.161
P	1.6	2.2	0.063	0.087

### Part marking

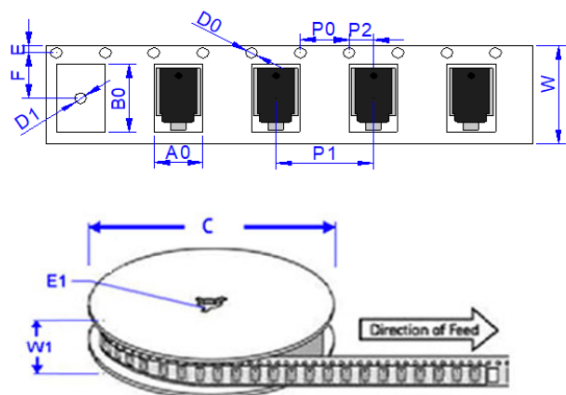


Part marking:  
-xxxx = Date code  
yyy- Refer to marking designator listed in Electrical characteristics table

### Packaging information - mm/inches

Drawing not to scale.

Supplied in tape and reel packaging, 750 parts per 13" diameter reel (EIA-481 compliant)



Dimensions	Millimeters	Inches
A0	10.80 ± 0.3	0.425 ± 0.012
B0	16.13 ± 0.3	0.635 ± 0.012
C	330.0	13.0 ± 0.012
D0	1.55 ± 0.2	0.061 ± 0.008
D1	1.55 ± 0.2	0.061 ± 0.008
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.30 ± 0.2	0.524 ± 0.008
F	11.50 ± 0.2	0.453 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	16.00 ± 0.2	0.630 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	24.00 ± 0.2	0.945 ± 0.008
W1	25.85 ± 0.2	1.018 ± 0.008

Electrical specifications (+25 °C)

Part number		Marking		V <sub>R</sub> (V)	I <sub>R</sub> @ V <sub>R</sub> μA @ +25°C	I <sub>R</sub> @ V <sub>R</sub> μA @ +175°C	V <sub>BR</sub> @ I <sub>T</sub>		I <sub>T</sub> (mA)	V <sub>C</sub> @ I <sub>PP</sub> max (V)	I <sub>PP</sub> (A)
Uni-polar	Bi-polar	Uni	Bi				min (V)	max (V)			
SM8S10AH	/	SM8S10A	/	10	5	250	11.1	12.3	5	17	388
SM8S11AH	/	SM8S11A	/	11	5	150	12.2	13.5	5	18.2	363
SM8S12AH	SM8S12CAH	SM8S12A	SM8S12C	12	5	150	13.3	14.7	5	19.9	332
SM8S13AH	SM8S13CAH	SM8S13A	SM8S13C	13	5	150	14.4	15.9	5	21.5	307
SM8S14AH	SM8S14CAH	SM8S14A	SM8S14C	14	5	150	15.6	17.2	5	23.2	284
SM8S15AH	SM8S15CAH	SM8S15A	SM8S15C	15	5	150	16.7	18.5	5	24.4	270
SM8S16AH	SM8S16CAH	SM8S16A	SM8S16C	16	5	150	17.8	19.7	5	26	253
SM8S17AH	SM8S17CAH	SM8S17A	SM8S17C	17	5	150	18.9	20.9	5	27.6	239
SM8S18AH	SM8S18CAH	SM8S18A	SM8S18C	18	5	150	20	22.1	5	29.2	226
SM8S20AH	SM8S20CAH	SM8S20A	SM8S20C	20	5	150	22.2	24.5	5	32.4	204
SM8S22AH	SM8S22CAH	SM8S22A	SM8S22C	22	5	150	24.4	26.9	5	35.5	186
SM8S24AH	SM8S24CAH	SM8S24A	SM8S24C	24	5	150	26.7	29.5	5	38.9	170
SM8S26AH	SM8S26CAH	SM8S26A	SM8S26C	26	5	150	28.9	31.9	5	42.1	157
SM8S28AH	SM8S28CAH	SM8S28A	SM8S28C	28	5	150	31.1	34.4	5	45.4	145
SM8S30AH	SM8S30CAH	SM8S30A	SM8S30C	30	5	150	33.3	36.8	5	48.4	136
SM8S33AH	SM8S33CAH	SM8S33A	SM8S33C	33	5	150	36.7	40.6	5	53.3	124
SM8S36AH	SM8S36CAH	SM8S36A	SM8S36C	36	5	150	40	44.2	5	58.1	114
SM8S40AH	/	SM8S40A	/	40	5	150	44.4	49.1	5	64.5	102
SM8S43AH	/	SM8S43A	/	43	5	150	47.8	52.8	5	69.4	95.1

Surge waveform: 10/1000 μs

V<sub>R</sub>: Stand-off voltage – Maximum voltage that can be applied

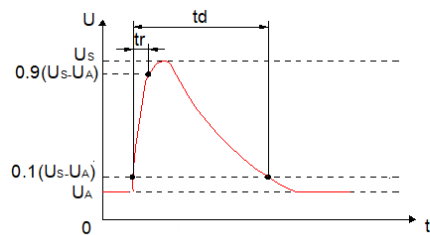
V<sub>BR</sub>: Breakdown voltage

V<sub>C</sub>: Clamping voltage – Peak voltage measured across the suppressor at a specified I<sub>PP</sub>

I<sub>R</sub>: Reverse leakage current

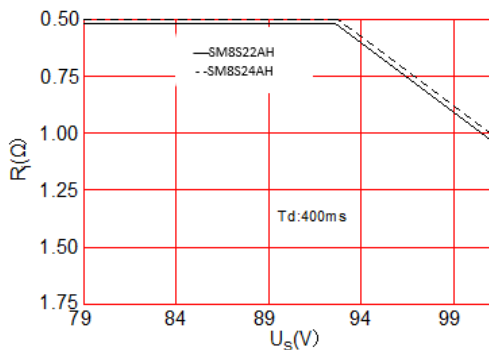
I<sub>T</sub>: Test current

ISO16750-2 Test pulse 5A

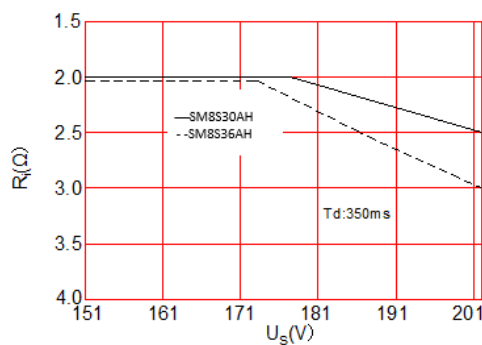


Parameter	12V system	24V system
U <sub>s</sub>	79~101V	151~202V
R <sub>i</sub>	0.5~4Ω	1~8Ω
t <sub>d</sub>	40~400ms	100~350ms
t <sub>r</sub>	5~10ms	5~10ms

ISO16750-2 5 A 12 V system

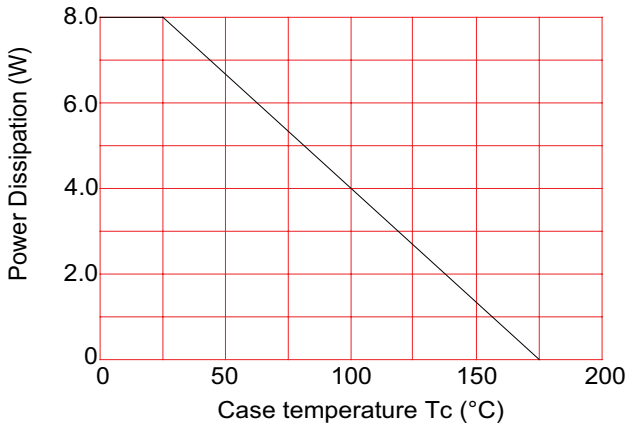


ISO16750-2 5 A 24 V system

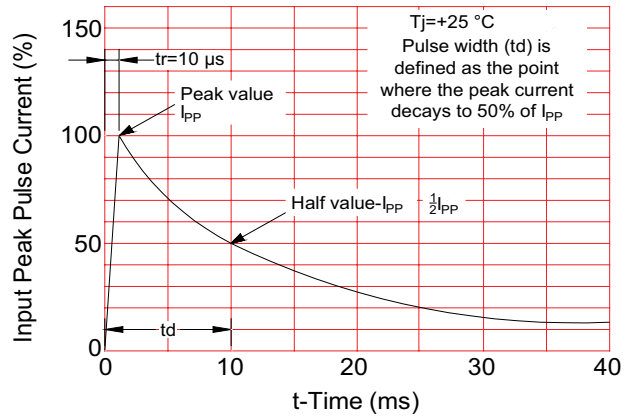


**Ratings and V-I characteristic curves** (+25 °C unless otherwise noted)  
**Uni-polar curves**

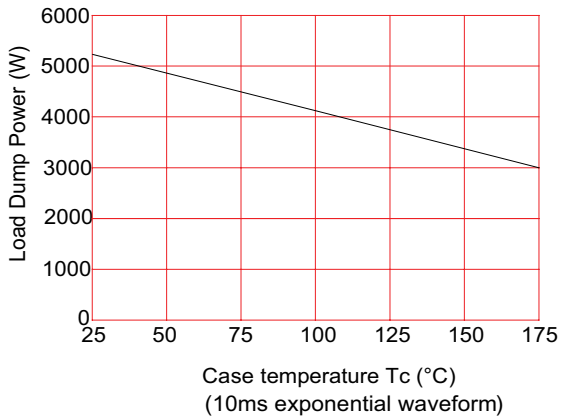
**Power derating curve**



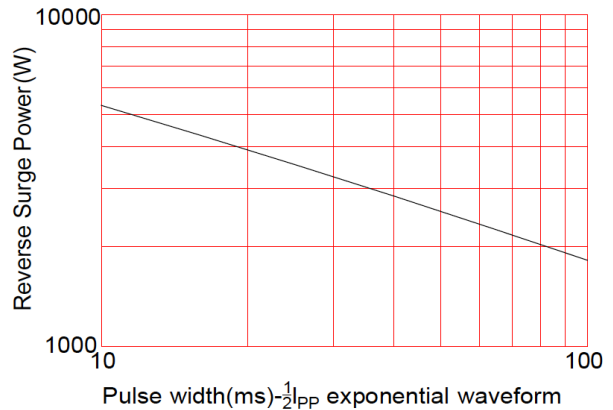
**Pulse waveform**



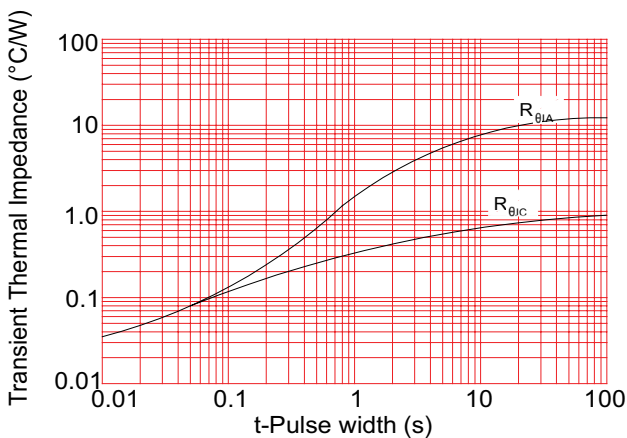
**Load dump power characteristics**



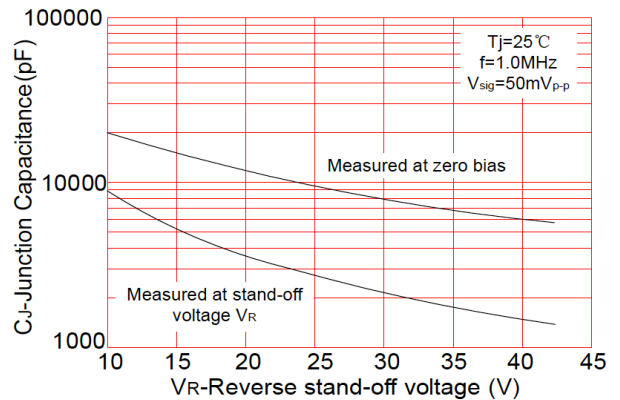
**Reverse surge power**



**Typical transient thermal impedance**

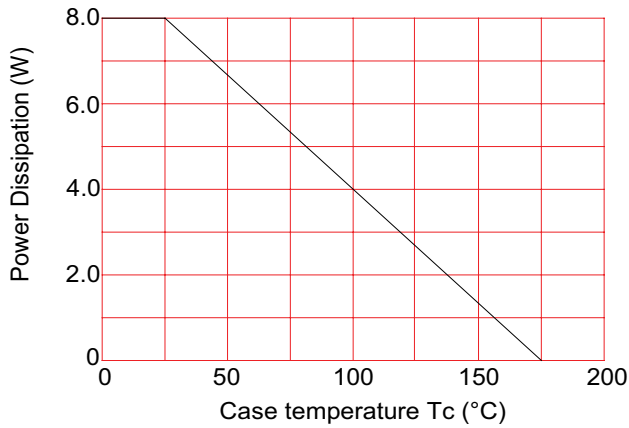


**Typical junction capacitance**

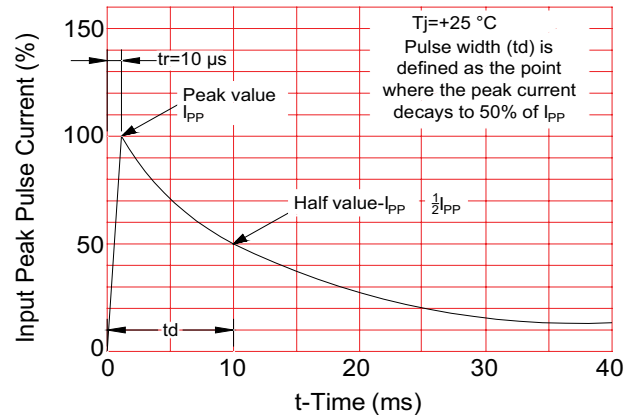


**Ratings and V-I characteristic curves** (+25 °C unless otherwise noted)  
**Bi-polar curves**

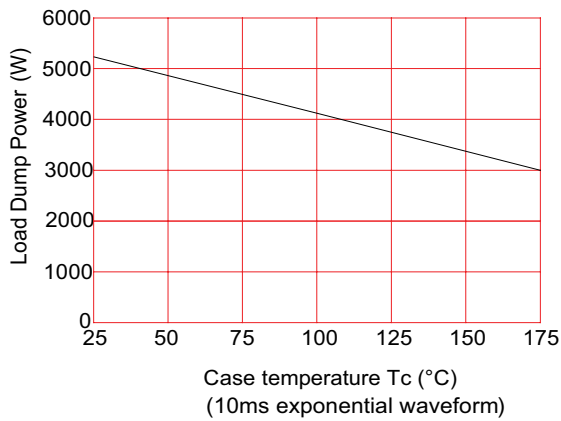
**Power derating curve**



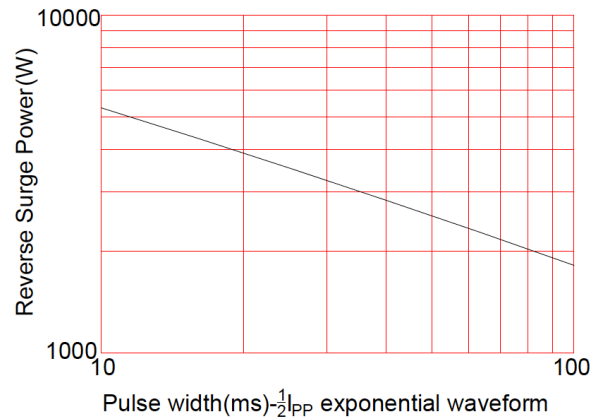
**Pulse waveform**



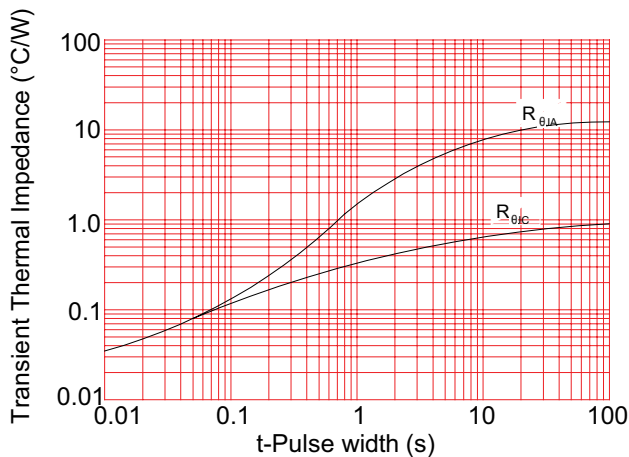
**Load dump power characteristics**



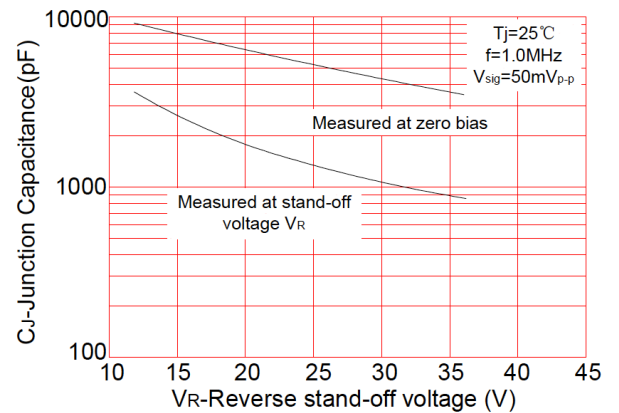
**Reverse surge power**



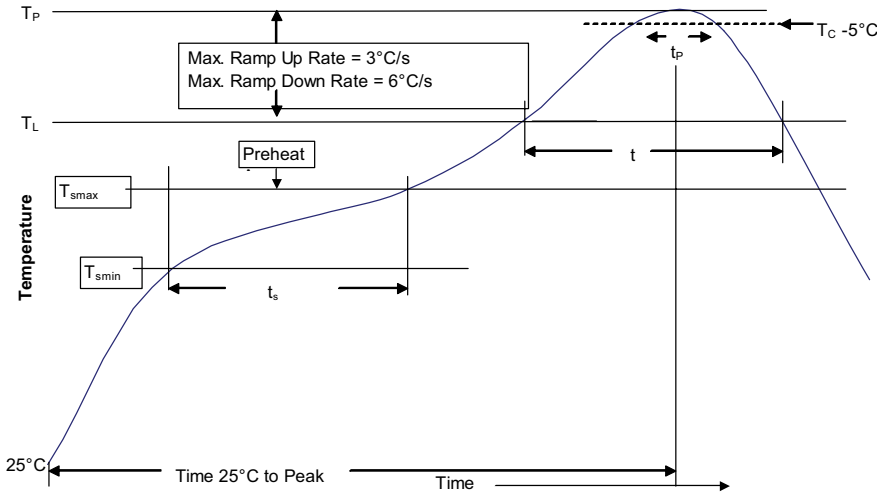
**Typical transient thermal impedance**



**Typical junction capacitance**



**Solder reflow profile**



**Table 1 - Standard SnPb solder ( $T_C$ )**

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

**Table 2 - Lead (Pb) free solder ( $T_C$ )**

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

**Reference 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 - 180 seconds
Ramp up rate $T_L$ to $T_p$	3 °C/ second max.	3 °C/ second max.
Liquidous temperature ( $T_L$ )	183 °C	217 °C
Time ( $t_L$ ) maintained above $T_L$	60-150 seconds	60-150 seconds
Peak package body temperature ( $T_p$ )*	Table 1	Table 2 (+0, -5 °C)
Time ( $t_p$ )* within 5 °C of the specified classification temperature ( $T_C$ )	20 seconds*	40 seconds*
Ramp-down rate ( $T_p$ to $T_L$ )	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.

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Printed in USA  
Publication No. ELX1060 BU-ELX21060  
June 2021

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