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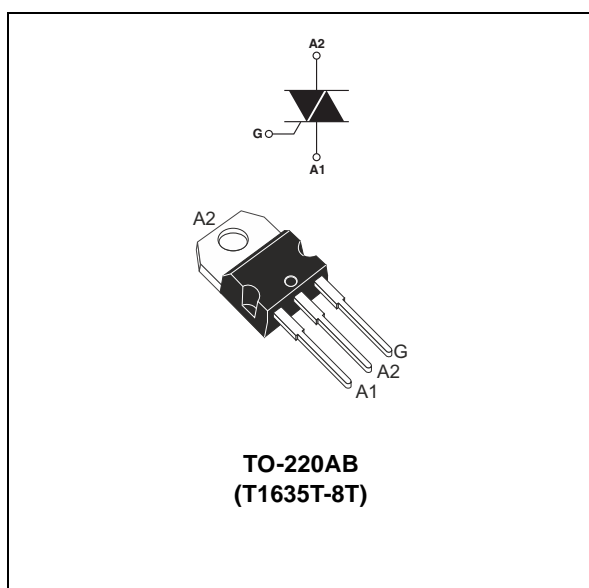
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T1635T-8T

16 A Snubberless™ Triac

Datasheet – production data



Features

- Medium current Triac
- High static and dynamic commutation
- Three quadrants
- ECOPACK®2 compliant component

Applications

- General purpose AC line load switching
- Motor control circuits
- Small home appliances
- Lighting
- Inrush current limiting circuits
- Overvoltage crowbar protection

Table 1. Device summary

Symbol	Value	Unit
$I_{T(rms)}$	16	A
V_{DRM}, V_{RRM}	800	V
V_{DSM}, V_{RSM}	900	V
I_{GT}	35	mA

Description

Available in through-hole package, the T1635T-8T Triac can be used for the on/off or phase angle control function in general purpose AC switching where high commutation capability is required. This device can be used without a snubber circuit when the limits defined in this datasheet are respected.

TM: Snubberless is a trademark of STMicroelectronics

Characteristics

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1 Characteristics

Table 2. Absolute ratings (limiting values, $T_j = 25\text{ °C}$ unless otherwise stated)

Symbol	Parameter		Value	Unit	
$I_{T(rms)}$	On-state rms current (full sine wave)		$T_c = 129\text{ °C}$	16	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	120	A
		F = 60 Hz	t = 16.7 ms	126	
I^2t	I^2t value for fusing, T_j initial = 25 °C		$t_p = 10\text{ ms}$	95	A ² s
V_{DRM}, V_{RRM}	Repetitive surge peak off-state voltage		$T_j = 150\text{ °C}$	600	V
			$T_j = 125\text{ °C}$	800	
V_{DSM}, V_{RSM}	Non repetitive surge peak off-state voltage		$t_p = 10\text{ ms}$	900	V
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}, t_r \leq 100\text{ ns}$		F = 100 Hz	100	A/ μ s
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu$ s	$T_j = 150\text{ °C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 150\text{ °C}$	1	W
T_{stg}	Storage junction temperature range			- 40 to + 150	°C
T_j	Operating junction temperature range			- 40 to + 150	
T_L	Maximum lead temperature for soldering during 10 s			260	°C

Table 3. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Test conditions	Quadrant		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}, R_L = 30\text{ }\Omega$	I - II - III	Min.	1.75	mA
			Max.	35	
V_{GT}	$V_D = 12\text{ V}, R_L = 30\text{ }\Omega$	I - II - III	Max.	1.3	V
V_{GD}	$V_D = V_{DRM}, R_L = 3.3\text{ k}\Omega, T_j = 125\text{ °C}$	I - II - III	Min.	0.2	V
$I_H^{(2)}$	$I_T = 500\text{ mA}$		Max.	40	mA
I_L	$I_G = 1.2 I_{GT}$	I - III	Max.	60	mA
		II		65	
dV/dt	$V_D = 536\text{ V}, \text{gate open}$	$T_j = 125\text{ °C}$	Min.	2000	V/ μ s
	$V_D = 402\text{ V}, \text{gate open}$	$T_j = 150\text{ °C}$		1000	V/ μ s
(di/dt)c	Without snubber (dV/dt)c > 20 V/ μ s)	$T_j = 125\text{ °C}$	Min.	16	A/ms
		$T_j = 150\text{ °C}$		8	

1. Minimum I_{GT} is guaranteed at 5% of I_{GT} max.
2. For both polarities of A2 referenced to A1

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Table 4. Static characteristics

Symbol	Test conditions		Value	Unit	
$V_T^{(1)}$	$I_{TM} = 22.6 \text{ A}$, $t_p = 380 \mu\text{s}$	$T_j = 25 \text{ }^\circ\text{C}$	Max.	1.55	V
$V_{t0}^{(1)}$	Threshold voltage	$T_j = 150 \text{ }^\circ\text{C}$	Max.	0.85	V
$R_d^{(1)}$	Dynamic resistance	$T_j = 150 \text{ }^\circ\text{C}$	Max.	27	m Ω
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM} = 800 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}$	Max.	7.5	μA
		$T_j = 125 \text{ }^\circ\text{C}$		1	mA
	$V_{DRM} = V_{RRM} = 600 \text{ V}$	$T_j = 150 \text{ }^\circ\text{C}$	Max.	3.0	

1. For both polarities of A2 referenced to A1

Table 5. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	1.1	$^\circ\text{C/W}$
$R_{th(j-a)}$	Junction to ambient	60	$^\circ\text{C/W}$

Figure 1. Maximum power dissipation versus on-state rms current (full cycle)

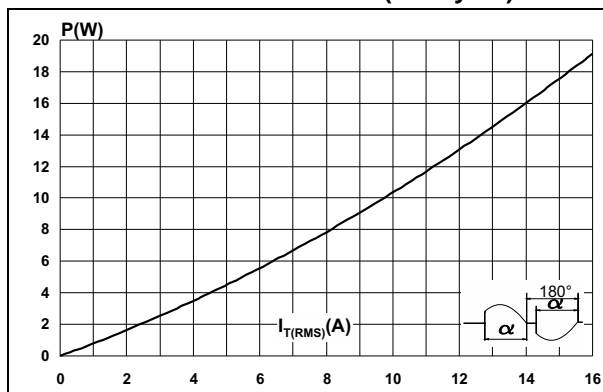


Figure 2. On-state rms current versus case temperature (full cycle)

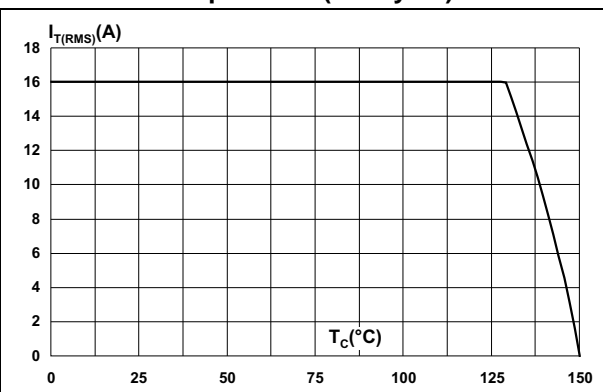


Figure 3. On-state rms current versus ambient temperature (free air convection)

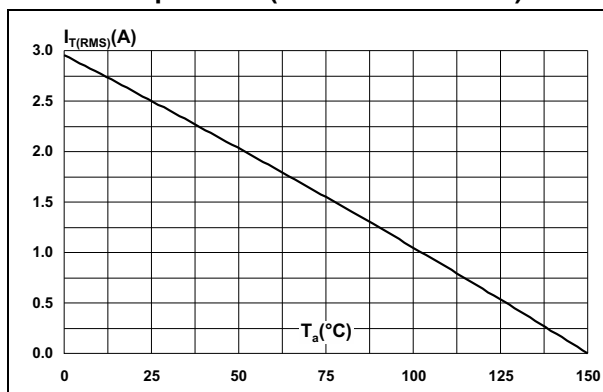
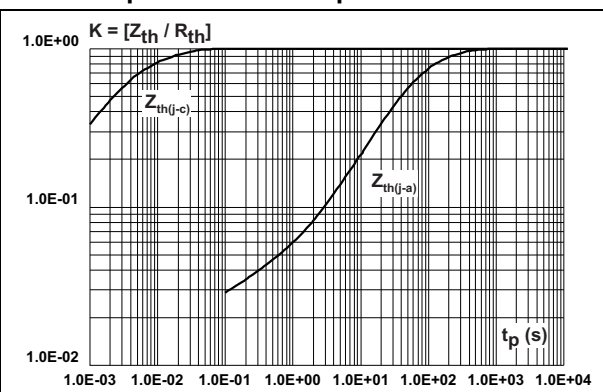


Figure 4. Relative variation of thermal impedance versus pulse duration



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Figure 5. On-state characteristics (maximum values)

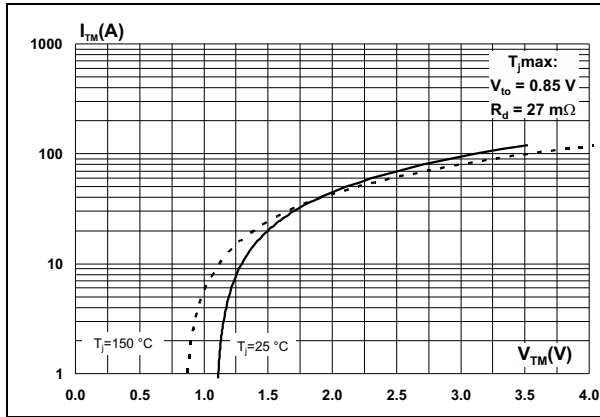


Figure 6. Surge peak on-state current versus number of cycles

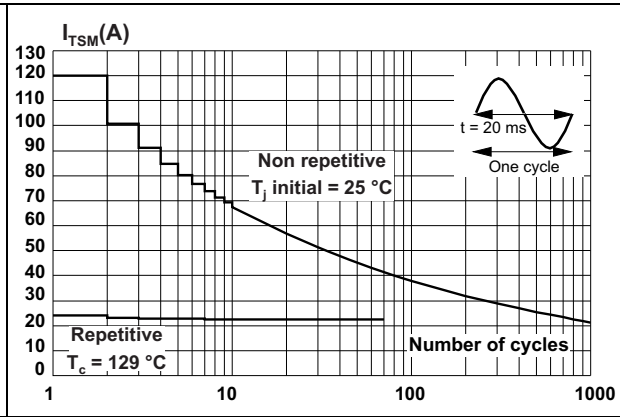


Figure 7. Non repetitive surge peak on-state current and corresponding values of I^2t

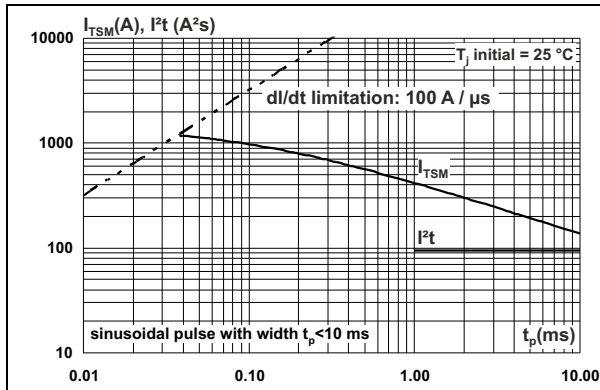


Figure 8. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

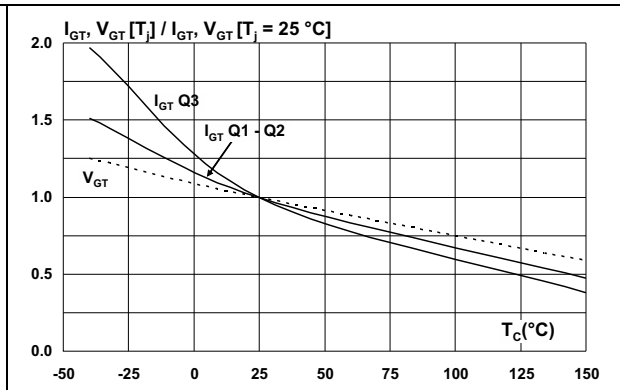


Figure 9. Relative variation of static dV/dt immunity versus junction temperature (typical values)

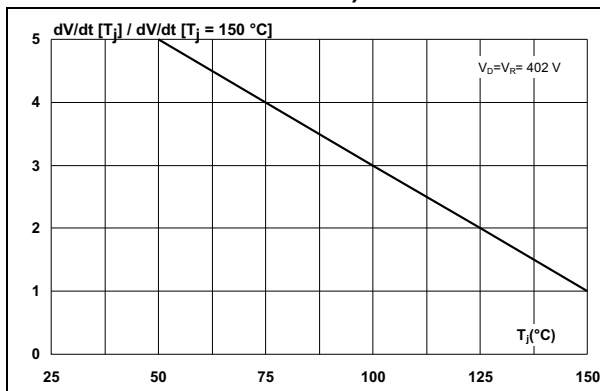
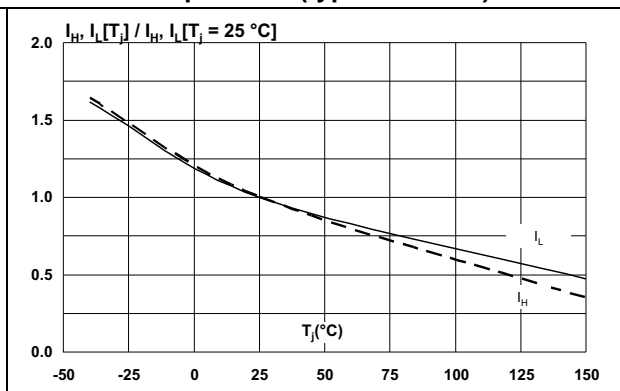


Figure 10. Relative variation of holding current and latching current versus junction temperature (typical values)



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Figure 11. Relative variation of critical rate of decrease of main current (di/dt)_c versus reapplied (dV/dt)_c

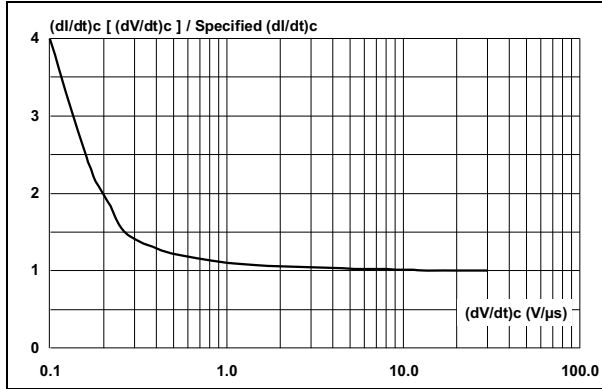


Figure 12. Relative variation of critical rate of decrease of main current (di/dt)_c versus junction temperature (typical values)

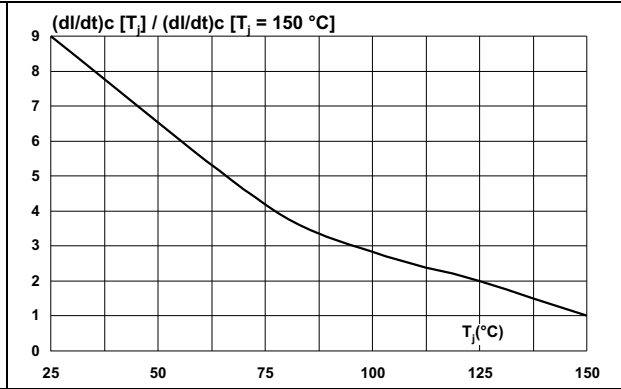
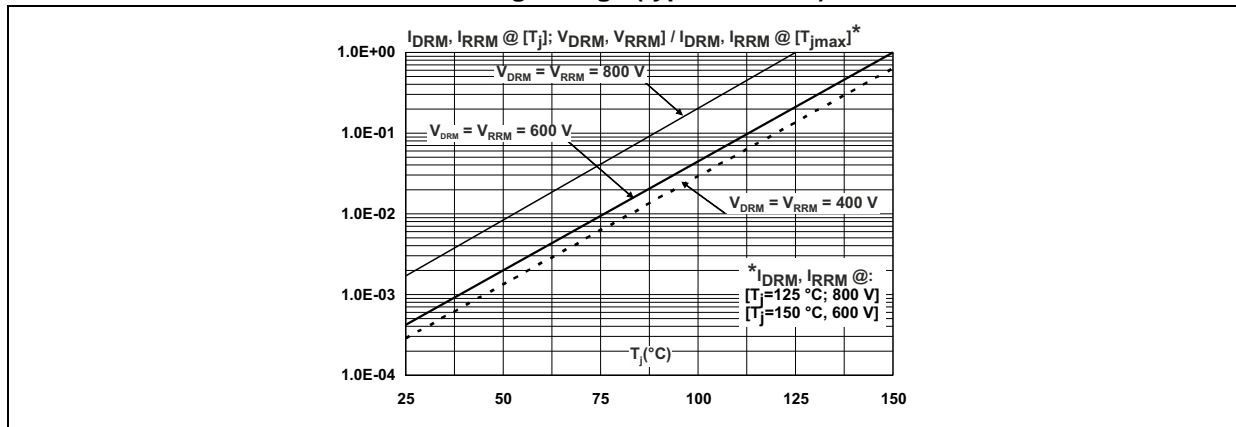


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage (typical values)

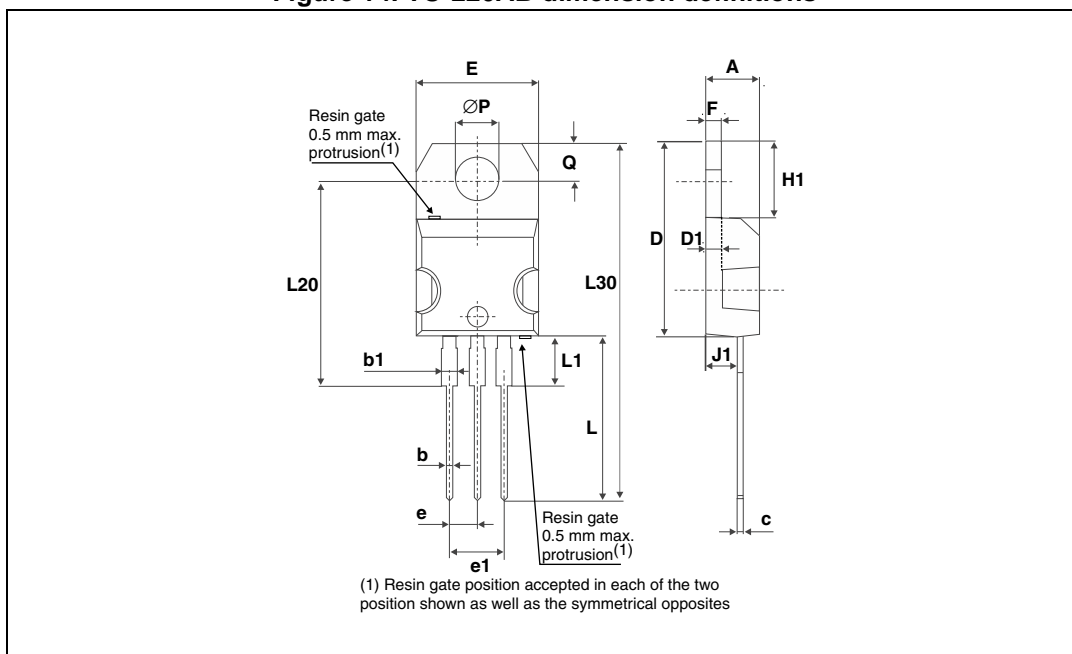


2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Recommended torque: 0.4 to 0.6 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 14. TO-220AB dimension definitions



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Package information

Table 6. TO-220AB dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.17	0.18
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.027
D	15.25	15.75	0.60	0.62
D1	1.27 typ.		0.05 typ.	
E	10	10.40	0.39	0.41
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.19	0.20
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.24	0.26
J1	2.40	2.72	0.094	0.107
L	13	14	0.51	0.55
L1	3.50	3.93	0.137	0.154
L20	16.40 typ.		0.64 typ.	
L30	28.90 typ.		1.13 typ.	
ØP	3.75	3.85	0.147	0.151
Q	2.65	2.95	0.104	0.116

3 Ordering information

Figure 15. Ordering information scheme

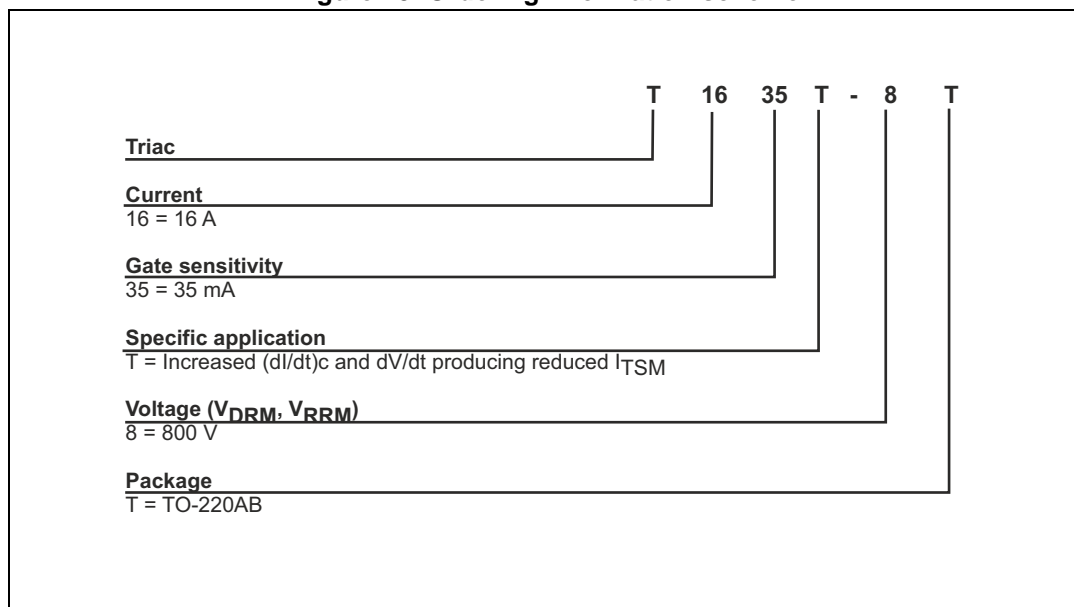


Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T1635T-8T	T1635T-8T	TO-220AB	2.0 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Aug-2013	1	Initial release.
01-Jul-2014	2	Updated Table 2 .
28-Jul-2014	3	Updated Table 5 .

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