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# LXA08T600, LXA08B600, LXA08FP600

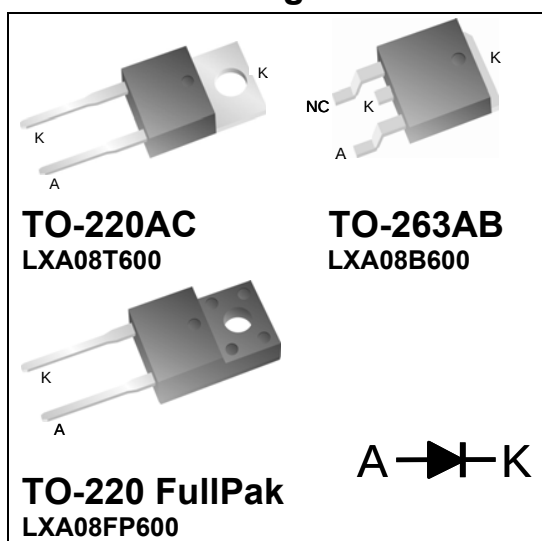
## Qspeed™ Family

600 V, 8 A X-Series PFC Diode

### Product Summary

|                                    |      |    |
|------------------------------------|------|----|
| $I_{F(AVG)}$                       | 8    | A  |
| $V_{RRM}$                          | 600  | V  |
| $Q_{RR}$ (Typ at 125 °C)           | 82   | nC |
| $I_{RRM}$ (Typ at 125 °C)          | 3.5  | A  |
| Softness $t_b/t_a$ (Typ at 125 °C) | 0.55 |    |

### Pin Assignment



### General Description

This device has the lowest  $Q_{RR}$  of any 600V Silicon diode. Its recovery characteristics increase efficiency, reduce EMI and eliminate snubbers.

### Applications

- Power Factor Correction (PFC) Boost Diode
- Motor drive circuits
- DC-AC Inverters

### Features

- LOW  $Q_{RR}$ , LOW  $I_{RRM}$ , LOW  $t_{RR}$
- High  $dI_F/dt$  capable (1000A/μs)
- Soft recovery
- FullPak Insulation = 2500V<sub>RMS</sub>

### Benefits

- Increases efficiency
- Eliminates need for snubber circuits
- Reduces EMI filter component size & count
- Enables extremely fast switching

### RoHS Compliant

Package uses Lead-free plating and Green mold compound.

Halogen free per IEC 61249-2-21.

### Absolute Maximum Ratings

Absolute maximum ratings are the values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

| Symbol       | Parameter                         | Conditions                                                 | Rating     | Units |
|--------------|-----------------------------------|------------------------------------------------------------|------------|-------|
| $V_{RRM}$    | Peak repetitive reverse voltage   |                                                            | 600        | V     |
| $I_{F(AVG)}$ | Average forward current           | $T_J = 150\text{ °C}, T_C = 122\text{ °C}$ (220AC, 263AB)  | 8          | A     |
|              |                                   | $T_J = 150\text{ °C}, T_C = 81\text{ °C}$ . (FullPak)      |            |       |
| $I_{FSM}$    | Non-repetitive peak surge current | 60 Hz, 1/2 cycle                                           | 60         | A     |
| $I_{FSM}$    | Non-repetitive peak surge current | 1/2 cycle of $t=28\text{ μs}$ Sinusoid, $T_C=25\text{ °C}$ | 350        | A     |
| $T_{J(MAX)}$ | Maximum junction temperature      |                                                            | 150        | °C    |
| $T_{STG}$    | Storage temperature               |                                                            | -55 to 150 | °C    |
|              | Lead soldering temperature        | Leads at 1.6 mm from case, 10 sec                          | 300        | °C    |
| $P_D$        | Power dissipation                 | $T_C = 25\text{ °C}$ . (220AC, 263AB)                      | 83         | W     |
|              |                                   | $T_C = 25\text{ °C}$ . (FullPak)                           | 34         | W     |

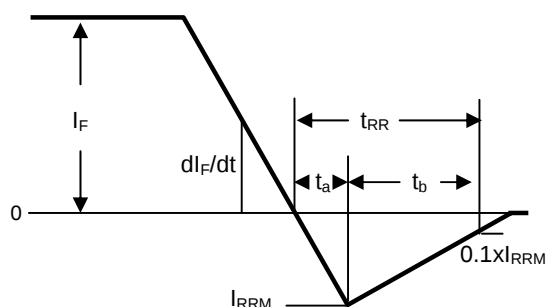
**LXA08T600/8B600/8FP600****Thermal Resistance**

| Symbol           | Resistance from:    | Conditions         | Rating | Units |
|------------------|---------------------|--------------------|--------|-------|
| R <sub>θJA</sub> | Junction to ambient | TO-220AC (Only)    | 62     | °C/W  |
| R <sub>θJC</sub> | Junction to case    | TO-220AC, TO-263AB | 1.5    | °C/W  |
|                  |                     | TO-220AC FullPak   | 3.7    | °C/W  |

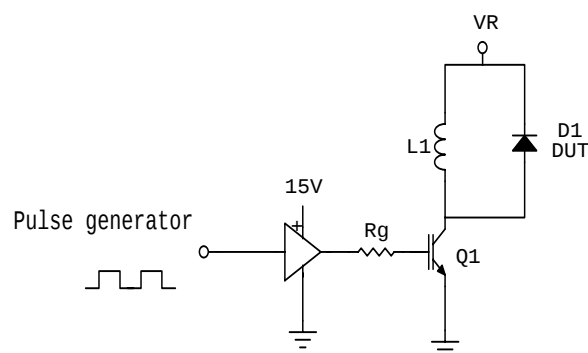
## Electrical Specifications at $T_J = 25\text{ }^{\circ}\text{C}$ (unless otherwise specified)

| Symbol                  | Parameter                           | Conditions                                                   | Min                    | Typ  | Max  | Units              |    |
|-------------------------|-------------------------------------|--------------------------------------------------------------|------------------------|------|------|--------------------|----|
| DC Characteristics      |                                     |                                                              |                        |      |      |                    |    |
| I <sub>R</sub>          | Reverse current                     | V <sub>R</sub> = 600V, T <sub>J</sub> = 25 °C                | -                      | -    | 250  | μA                 |    |
|                         |                                     | V <sub>R</sub> = 600V, T <sub>J</sub> = 125 °C               | -                      | 0.85 | -    | mA                 |    |
| V <sub>F</sub>          | Forward voltage                     | I <sub>F</sub> = 8A, T <sub>J</sub> = 25 °C                  | -                      | 2.35 | 2.94 | V                  |    |
|                         |                                     | I <sub>F</sub> = 8A, T <sub>J</sub> = 150 °C                 | -                      | 2.1  | -    | V                  |    |
| C <sub>J</sub>          | Junction capacitance                | V <sub>R</sub> = 10V, 1 MHz                                  | -                      | 40   | -    | pF                 |    |
| Dynamic Characteristics |                                     |                                                              |                        |      |      |                    |    |
| t <sub>RR</sub>         | Reverse recovery time               | dI/dt =200 A/μs<br>V <sub>R</sub> =400V, I <sub>F</sub> =8 A | T <sub>J</sub> =25 °C  | -    | 21.5 | 34                 | ns |
|                         |                                     |                                                              | T <sub>J</sub> =125 °C | -    | 33   | 53 <sub>(1)</sub>  | ns |
| Q <sub>RR</sub>         | Reverse recovery charge             | dI/dt =200 A/μs<br>V <sub>R</sub> =400V, I <sub>F</sub> =8 A | T <sub>J</sub> =25 °C  | -    | 31   | 48                 | nC |
|                         |                                     |                                                              | T <sub>J</sub> =125 °C | -    | 82   | 130 <sub>(1)</sub> | nC |
| I <sub>RRM</sub>        | Maximum reverse recovery current    | dI/dt =200 A/μs<br>V <sub>R</sub> =400V, I <sub>F</sub> =8 A | T <sub>J</sub> =25 °C  | -    | 2.2  | 2.8                | A  |
|                         |                                     |                                                              | T <sub>J</sub> =125 °C | -    | 3.5  | 4.5 <sub>(1)</sub> | A  |
| S                       | Softness factor = $\frac{t_b}{t_a}$ | dI/dt =200 A/μs<br>V <sub>R</sub> =400V, I <sub>F</sub> =8 A | T <sub>J</sub> =25 °C  | -    | 0.74 | -                  |    |
|                         |                                     |                                                              | T <sub>J</sub> =125 °C | -    | 0.55 | -                  |    |

**Note to component engineers:** X-Series diodes employ Schottky technologies in their design and construction. Therefore, Component Engineers should plan their test setups to be similar to those for traditional Schottky test setups. (For additional details, see Application Note AN-300.)



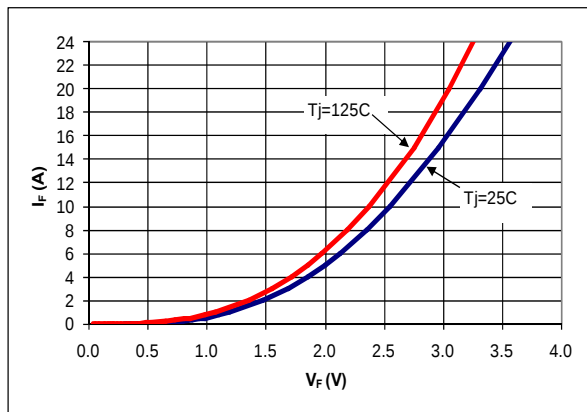
**Figure 1. Reverse Recovery Definitions**



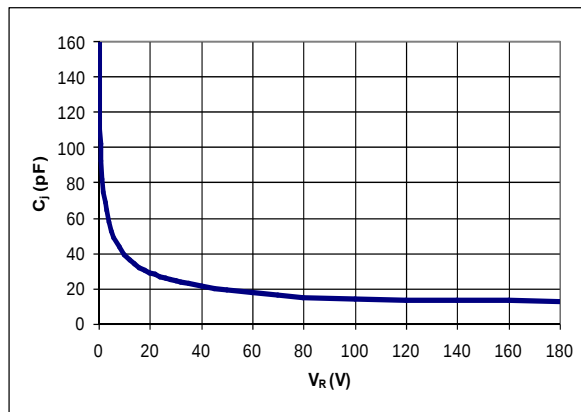
**Figure 2. Reverse Recovery Test Circuit**

**LXA08T600/8B600/8FP600**

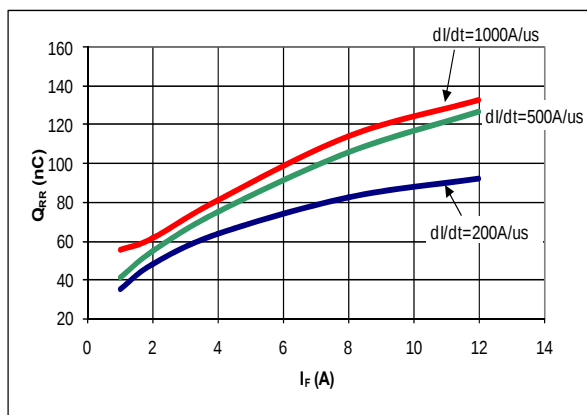
**Electrical Specifications at  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**



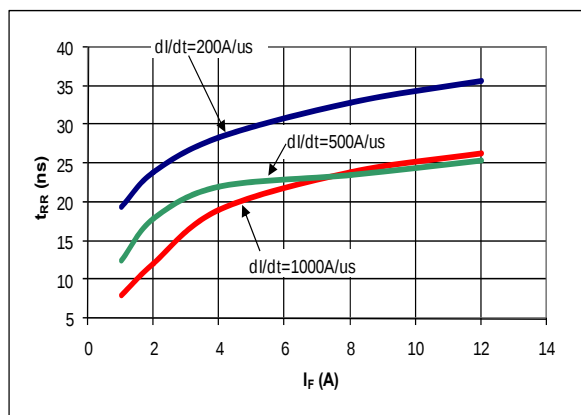
**Figure 3. Typical  $I_F$  vs  $V_F$**



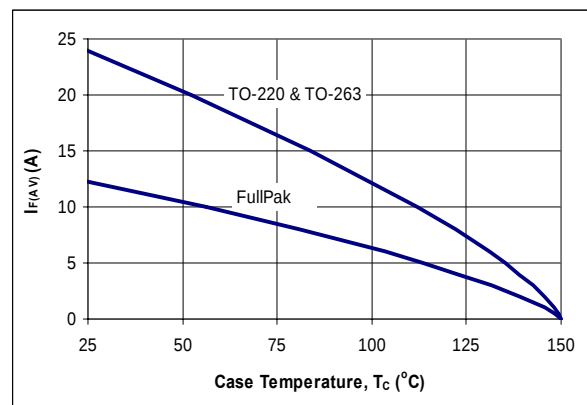
**Figure 4. Typical  $C_j$  vs  $V_R$**



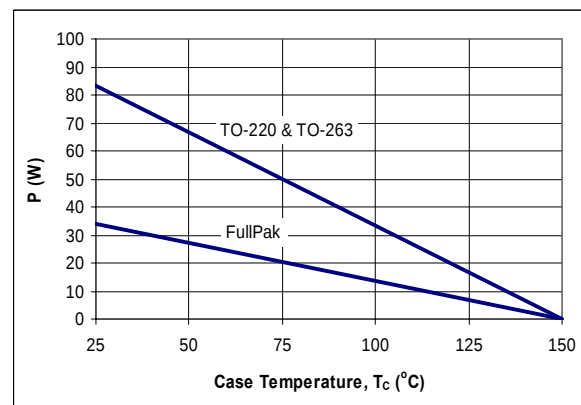
**Figure 5. Typical  $Q_{RR}$  vs  $I_F$  at  $T_J = 125^\circ\text{C}$**



**Figure 6. Typical  $t_{RR}$  vs  $I_F$  at  $T_J = 125^\circ\text{C}$**

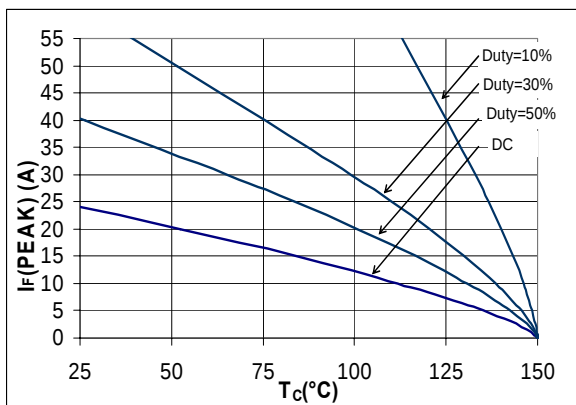


**Figure 7. DC Current Derating Curve**

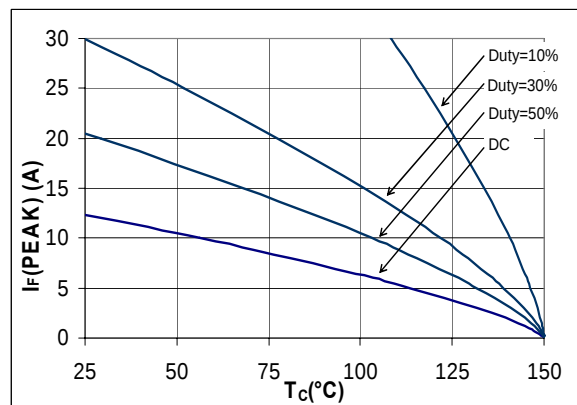


**Figure 8. Power Derating Curve**

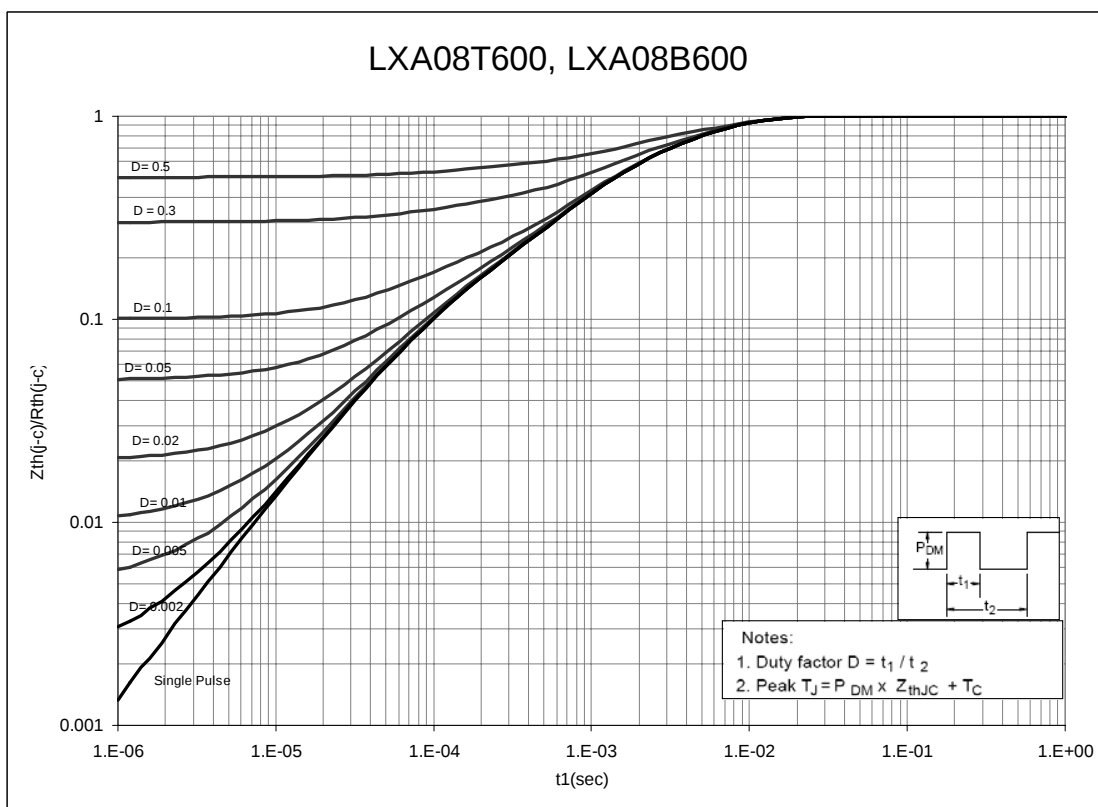
**LXA08T600/8B600/8FP600**



**Figure 9. IF(PEAK) vs TC, f=70 kHz, TO-220 and TO-263**

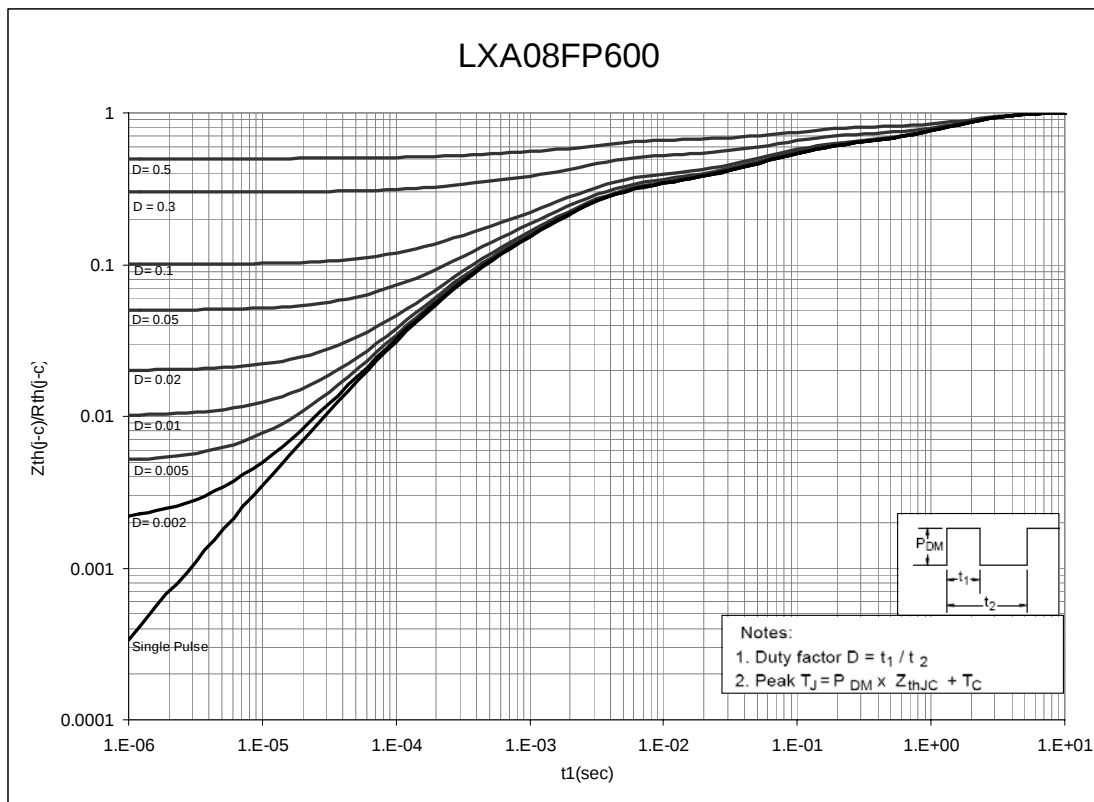


**Figure 10. IF(PEAK) vs TC, f=70 kHz, FullPak**



**Figure 11. Normalized Maximum Transient Thermal Impedance, TO-220 and TO-263**

**LXA08T600/8B600/8FP600**

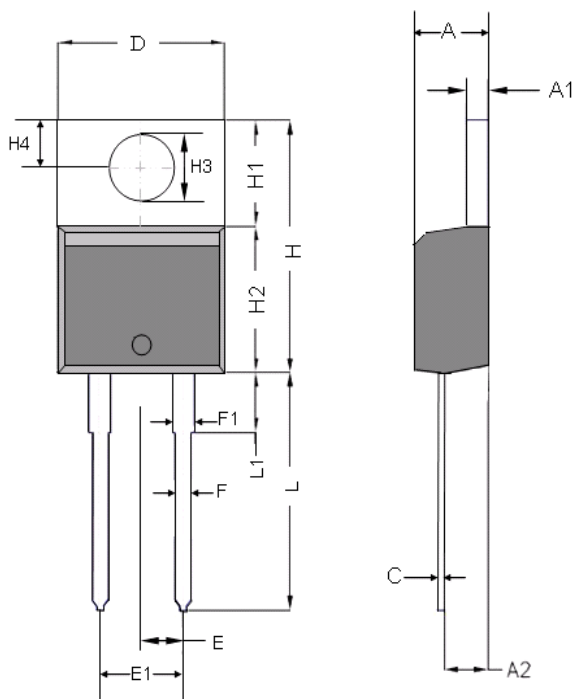


**Figure 12. Normalized Maximum Transient Thermal Impedance, FullPak**

**LXA08T600/8B600/8FP600**

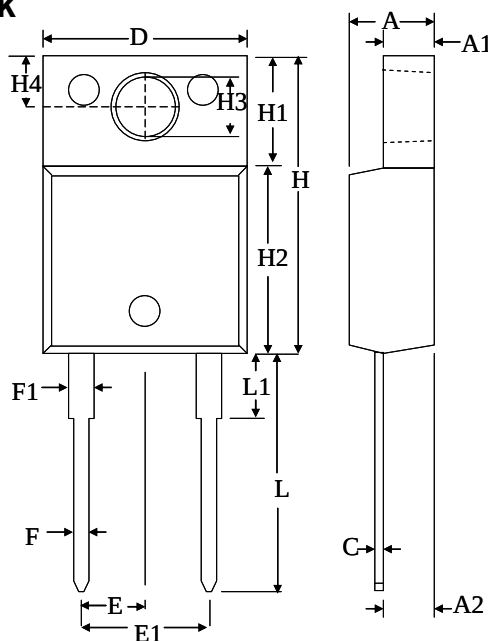
## Dimensional Outline Drawings

### TO-220AC



| Dim | Millimeters |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 4.32        | 4.70  |
| A1  | 1.14        | 1.40  |
| A2  | 2.03        | 2.79  |
| C   | 0.34        | 0.610 |
| D   | 9.65        | 10.67 |
| E   | 2.49        | 2.59  |
| E1  | 4.98        | 5.18  |
| F   | 0.508       | 1.016 |
| F1  | 1.14        | 1.78  |
| H   | 14.71       | 16.51 |
| H1  | 5.84        | 6.55  |
| H2  | 8.51        | 9.25  |
| H3  | 3.53        | 3.96  |
| H4  | 2.54        | 3.05  |
| L   | 12.70       | 14.22 |
| L1  | -           | 6.35  |

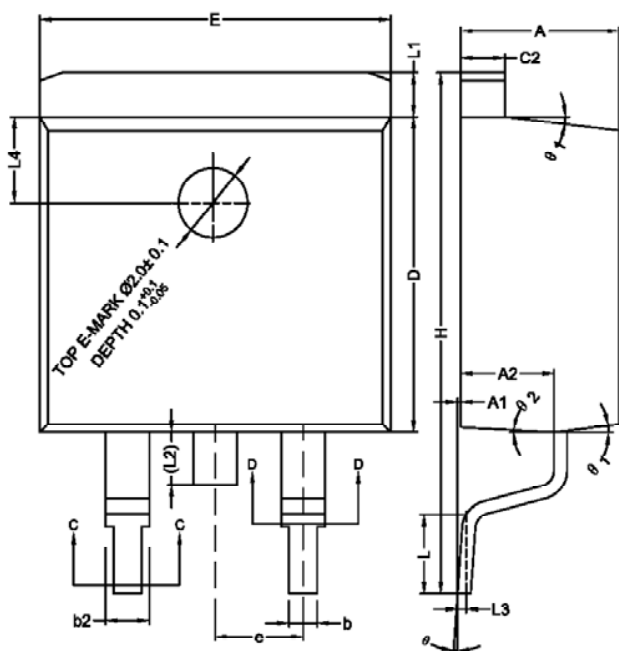
### FullPak



| Dim | Millimeters |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 4.54        | 4.80  |
| A1  | 2.57        | 2.83  |
| A2  | 2.51        | 2.62  |
| C   | 0.42        | 0.58  |
| D   | 10.25       | 10.72 |
| E   | 2.54 (BSC)  |       |
| E1  | 5.08 (BSC)  |       |
| F   | 0.624       | 0.776 |
| F1  | 1.10        | 1.65  |
| H   | 15.86       | 16.12 |
| H1  | 6.06        | 6.56  |
| H2  | 9.55        | 9.81  |
| H3  | 2.95        | 3.05  |
| H4  | 3.15        | 3.25  |
| L   | 13.33       | 14.18 |
| L1  | 3.18        | 3.43  |

**LXA08T600/8B600/8FP600**

**TO-263AB**



| Dim | Millimeters |          |
|-----|-------------|----------|
|     | MIN         | MAX      |
| A   | 4.40        | 4.70     |
| A1  | 0.00        | 0.25     |
| A2  | 2.59        | 2.79     |
| b   | 0.77        | 0.90     |
| b2  | 1.23        | 1.36     |
| c2  | 1.22        | 1.32     |
| D   | 9.05        | 9.25     |
| E   | 10.06       | 10.26    |
| e   | 2.54 BSC    | 2.54 BSC |
| H   | 14.70       | 15.50    |
| L   | 2.00        | 2.60     |
| L1  | 1.17        | 1.40     |
| L2  | —           | 1.75     |
| L3  | 0.25 BSC    | 0.25 BSC |
| L4  | 2.00 BSC    | 2.00 BSC |
| Θ   | 0°          | 8°       |
| Θ1  | 5°          | 9°       |
| Θ2  | 1°          | 5°       |

| Mechanical Mounting Method        | Maximum Torque / Pressure specification                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------|
| Screw through hole in package tab | 1 Newton Meter (nm) or 8.8 inch-pounds (lb-in)                                              |
| Clamp against package body        | 12.3 kilogram-force per square centimeter (kgf/cm <sup>2</sup> ) or 175 lbf/in <sup>2</sup> |

**Soldering time and temperature:** This product has been designed for use with high-temperature, lead-free solder. The component leads can be subjected to a maximum temperature of 300 °C, for up to 10 seconds. See Application Note AN-303, for more details.

**Ordering Information**

| Part Number           | Package           | Packing        |
|-----------------------|-------------------|----------------|
| LXA08T600, LXA08FP600 | TO-220AC, FullPak | 50 units/tube  |
| LXA08B600             | TO-263AB          | 800 units/reel |

The information contained in this document is subject to change without notice.

**LXA08T600/8B600/8FP600**

| Revision | Notes                                    | Date  |
|----------|------------------------------------------|-------|
| 1.9      | Released by Qspeed                       | 06/10 |
| 1.10     | Converted to Power Integrations Document | 01/11 |

## LXA08T600/8B600/8FP600

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