

OBSELETE - PART DISCONTINUED

Description

The AZ1085C is a series of low dropout positive voltage regulators with a maximum dropout of 1.5V at 3A of load current.

The series features on-chip thermal shutdown. It also includes a bandgap reference and a current limiting circuit.

The AZ1085C is available in 1.5V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable versions. The fixed versions integrate the adjust resistors. The adjustable version can set the output voltage with two external resistors.

The AZ1085C series is available in standard packages of TO263, TO263-2, TO252-2 (3), TO252-2 (4) and TO252-2 (5).

Applications

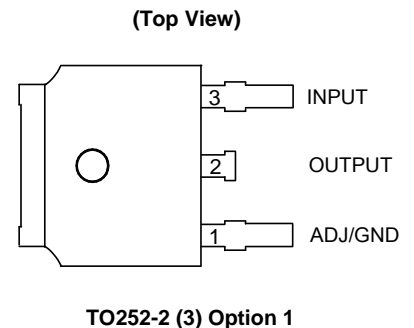
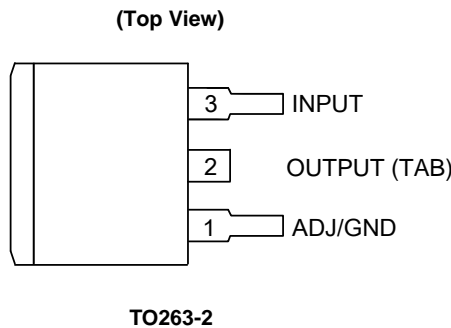
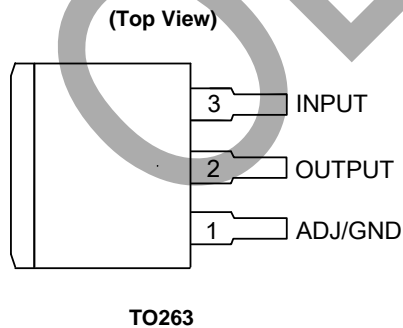
- High Efficiency Linear Regulators
- Battery Charger
- Post Regulation for Switching Supplies
- Microprocessor Supply
- Mother Board Power Supplies
- DVD-Video Player
- Telecom Equipment
- Set Top Boxes and Web Boxes Modules' Supply

Features

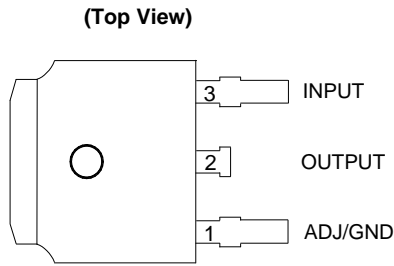
- Low Dropout Voltage: Typical 1.3V at 3A
- Current Limiting and Thermal Protection
- Output Current: 3A
- Current Limit: 4.5A
- Operating Junction Temperature: 0 to +125°C
- Compatible with Low ESR Ceramic Capacitor
- Line Regulation: 0.015% (Typ)
- Load Regulation: 0.1% (Typ)
- Lead-Free Packages: TO263, TO263-2
 - **Totally Lead-Free; RoHS Compliant (Notes 1 & 2)**
- Lead-Free Packages, Available in "Green" Molding Compound: TO263, TO263-2, TO252-2 (3), TO252-2 (4), TO252-2 (5)
 - **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
 - **Halogen and Antimony Free. "Green" Device (Note 3)**

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

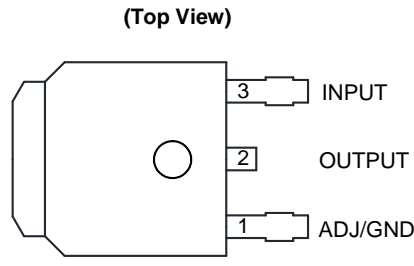
Pin Assignments



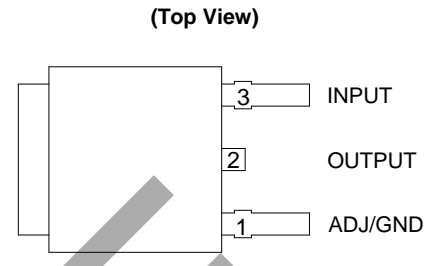
Pin Assignments (Cont.)



TO252-2 (3) Option 2

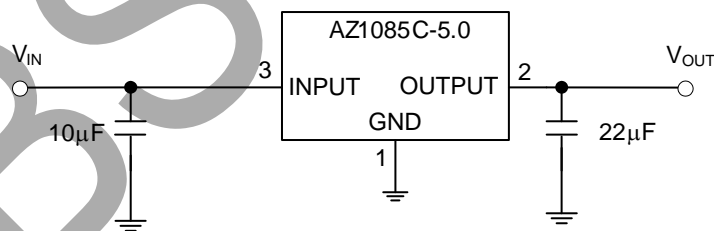
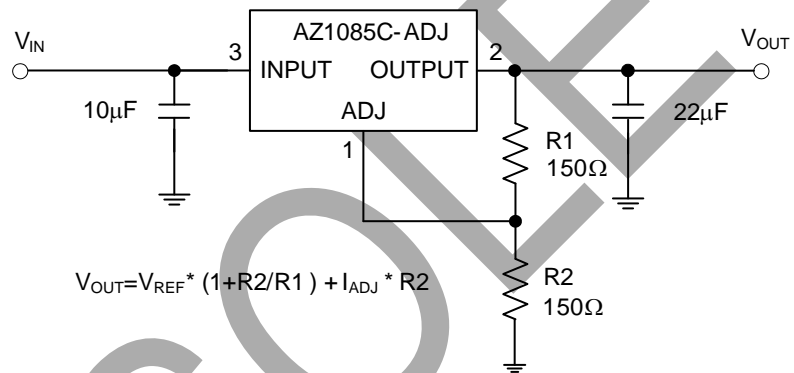


TO252-2 (4)



TO252-2 (5)

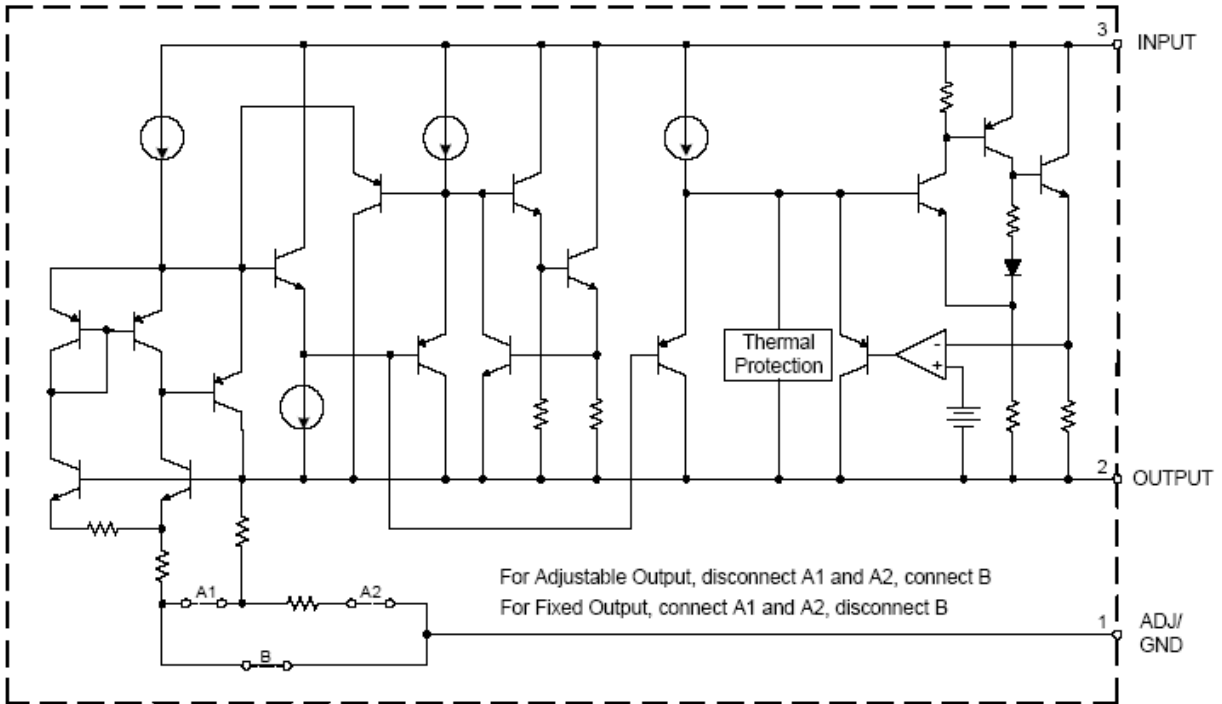
Typical Applications Circuit



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Functional Block Diagram



Absolute Maximum Ratings (Note 4)

| Symbol | Parameter | Rating | | Unit |
|---------------|--------------------------------------|-----------------------------------------|-----|------|
| V_{IN} | Input Voltage | 13.2 | | V |
| T_J | Operating Junction Temperature | +150 | | °C |
| T_{STG} | Storage Temperature Range | -65 to +150 | | °C |
| T_{LEAD} | Lead Temperature (Soldering, 10sec.) | +260 | | °C |
| θ_{JA} | Thermal Resistance (Note 5) | TO263 | 75 | °C/W |
| | | TO263-2 | 75 | |
| | | TO252-2 (3)/TO252-2 (4)/ TO252-2 (5) | 100 | |
| ESD | ESD (Human Body Model) | 2000 | | V |

- Notes:
- Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.
 - Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(max)}$, the junction-to-ambient thermal resistance, θ_{JA} , and the ambient temperature, T_A . The maximum allowable power dissipation at any ambient temperature is calculated using: $P_{D(max)} = (T_{J(max)} - T_A) / \theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

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Recommended Operating Conditions

| Symbol | Parameter | Min | Max | Unit |
|----------|--------------------------------------|-----|------|------|
| V_{IN} | Input Voltage | — | 12 | V |
| T_J | Operating Junction Temperature Range | 0 | +125 | °C |

Electrical Characteristics (Typicals and limits appearing in normal type apply for $T_J = +25^\circ\text{C}$. Limits appearing in **Boldface** type apply over the entire operating junction temperature range 0 to +125°C.)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------|
| V_{REF} | Reference Voltage | AZ1085C-ADJ, $I_{OUT} = 10\text{mA}$, $V_{IN}-V_{OUT} = 3\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $1.5\text{V} \leq V_{IN}-V_{OUT} \leq 5\text{V}$ | 1.238 1.225 | 1.250 1.250 | 1.262 1.275 | V |
| V_{OUT} | Output Voltage | AZ1085C-1.5, $I_{OUT} = 0\text{mA}$, $V_{IN} = 4.5\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $3.0\text{V} \leq V_{IN} \leq 6\text{V}$ | 1.485 1.47 | 1.5 1.5 | 1.515 1.53 | V |
| | | AZ1085C-1.8, $I_{OUT} = 0\text{mA}$, $V_{IN} = 4.8\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $3.3\text{V} \leq V_{IN} \leq 7\text{V}$ | 1.782 1.764 | 1.8 1.8 | 1.818 1.836 | V |
| | | AZ1085C-2.5, $I_{OUT} = 0\text{mA}$, $V_{IN} = 5.5\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $4.0\text{V} \leq V_{IN} \leq 7\text{V}$ | 2.475 2.45 | 2.5 2.5 | 2.525 2.55 | V |
| | | AZ1085C-3.3, $I_{OUT} = 0\text{mA}$, $V_{IN} = 6.3\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $4.8\text{V} \leq V_{IN} \leq 8\text{V}$ | 3.267 3.234 | 3.3 3.3 | 3.333 3.366 | V |
| | | AZ1085C-5.0, $I_{OUT} = 0\text{mA}$, $V_{IN} = 8\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $6.5\text{V} \leq V_{IN} \leq 10\text{V}$ | 4.95 4.9 | 5 5 | 5.05 5.1 | V |
| ΔV_{OUT} | Line Regulation | AZ1085C-ADJ, $I_{OUT} = 10\text{mA}$, $2.85\text{V} \leq V_{IN} \leq 10\text{V}$ | — | 0.015 0.035 | 0.2 0.2 | % |
| | | AZ1085C-1.5, $I_{OUT} = 10\text{mA}$, $3.0\text{V} \leq V_{IN} \leq 10\text{V}$ | — | 0.5 1 | 6 6 | mV |
| | | AZ1085C-1.8, $I_{OUT} = 10\text{mA}$, $3.3\text{V} \leq V_{IN} \leq 10\text{V}$ | — | 0.5 1 | 6 6 | mV |
| | | AZ1085C-2.5, $I_{OUT} = 10\text{mA}$, $4.0\text{V} \leq V_{IN} \leq 10\text{V}$ | — | 0.5 1 | 6 6 | mV |
| | | AZ1085C-3.3, $I_{OUT} = 10\text{mA}$, $4.8\text{V} \leq V_{IN} \leq 10\text{V}$ | — | 0.5 1 | 6 6 | mV |
| | | AZ1085C-5.0, $I_{OUT} = 10\text{mA}$, $6.5\text{V} \leq V_{IN} \leq 10\text{V}$ | — | 0.5 1 | 10 10 | mV |

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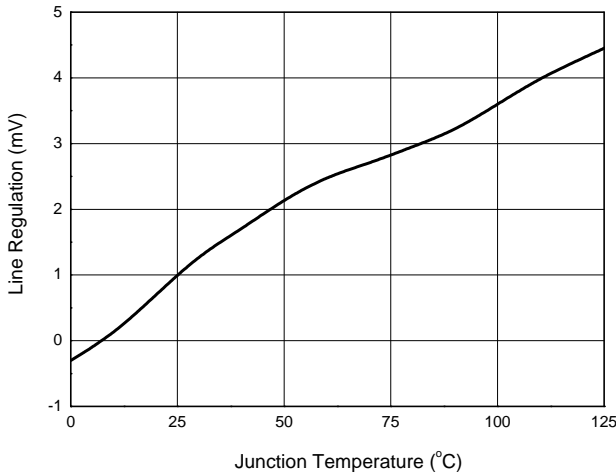
Electrical Characteristics (Cont. Typicals and limits appearing in normal type apply for $T_J = +25^\circ\text{C}$. Limits appearing in **Boldface** type apply over the entire operating junction temperature range 0 to $+125^\circ\text{C}$.)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------|-------------------|-------------------|--------------------|
| ΔV_{OUT} | Load Regulation | AZ1085C-ADJ, $0\text{mA} \leq I_{OUT} \leq 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | — | 0.1 0.2 | 0.3 0.4 | % |
| | | AZ1085C-1.5, $0\text{mA} \leq I_{OUT} \leq 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | — | 3 7 | 15 20 | mV |
| | | AZ1085C-1.8, $0\text{mA} \leq I_{OUT} \leq 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | — | 3 7 | 15 20 | mV |
| | | AZ1085C-2.5, $0\text{mA} \leq I_{OUT} \leq 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | — | 3 7 | 15 20 | mV |
| | | AZ1085C-3.3, $0\text{mA} \leq I_{OUT} \leq 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | — | 3 7 | 15 20 | mV |
| | | AZ1085C-5.0, $0\text{mA} \leq I_{OUT} \leq 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | — | 5 10 | 20 35 | mV |
| V_{DROP} | Dropout Voltage | $I_{OUT} = 3\text{A}, \Delta V_{REF}, \Delta V_{OUT} = 1\%$ | — | 1.3 | 1.5 | V |
| θ_{JC} | Thermal Resistance (Junction to Case) | TO263 | — | 6.34 | — | $^\circ\text{C/W}$ |
| | | TO263-2 | — | 6.34 | — | |
| | | TO252-2 (3)/TO252-2 (4)/TO252-2 (5) | — | 7.36 | — | |
| I_{LIMIT} | Current Limit | $V_{IN}-V_{OUT} = 3\text{V}$ | 3.2 | 4.5 | — | A |
| $I_{LOAD (MIN)}$ | Minimum Load Current | $V_{IN} = 10\text{V}$ (AZ1085C-ADJ) | — | 3 | 10 | mA |
| I_Q | Quiescent Current | $V_{IN} = 10\text{V}$ (AZ1085C) | — | 5 | 10 | mA |
| PSRR | Ripple Rejection | $f_{RIPPLE} = 120\text{Hz}, C_{OUT} = 25\mu\text{F}, I_{OUT} = 3\text{A}, V_{IN}-V_{OUT} = 3\text{V}$ | 60 | 72 | — | dB |
| I_{ADJ} | Adjust Pin Current | $V_{IN} = 4.25\text{V}, I_{OUT} = 10\text{mA}$ | — | 55 | 120 | μA |
| ΔI_{ADJ} | Adjust Pin Current Change | $10\text{mA} \leq I_{OUT} \leq 3\text{A}, 1.5\text{V} \leq V_{IN}-V_{OUT} \leq 6\text{V}$ | — | 0.2 | 5 | μA |
| — | Long Term Stability | $T_A = +125^\circ\text{C}, 1000\text{Hrs}$ | — | 0.5 | — | % |
| — | Temperature Stability | $I_{OUT} = 10\text{mA}, V_{IN}-V_{OUT} = 1.5\text{V}$ | — | 0.5 | — | % |
| — | RMS Noise (% of V_{OUT}) | $T_A = +25^\circ\text{C}, 10\text{Hz} \leq f \leq 10\text{kHz}$ | — | 0.003 | — | % |

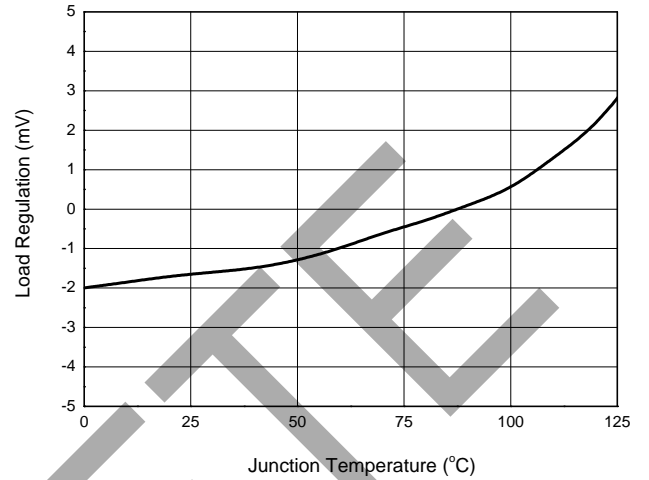
Performance Characteristics

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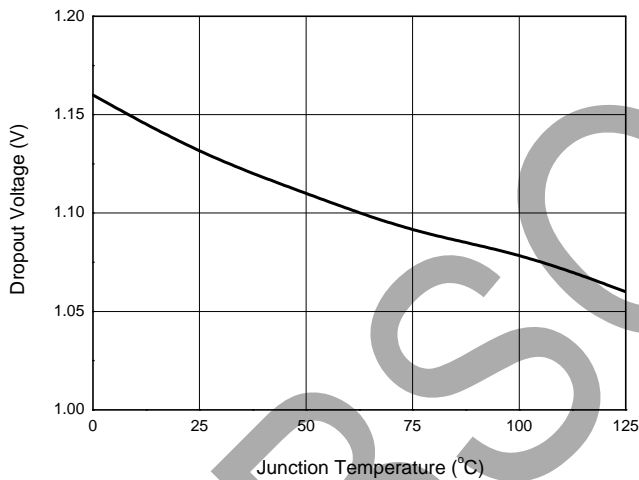
Line Regulation vs. Junction Temperature



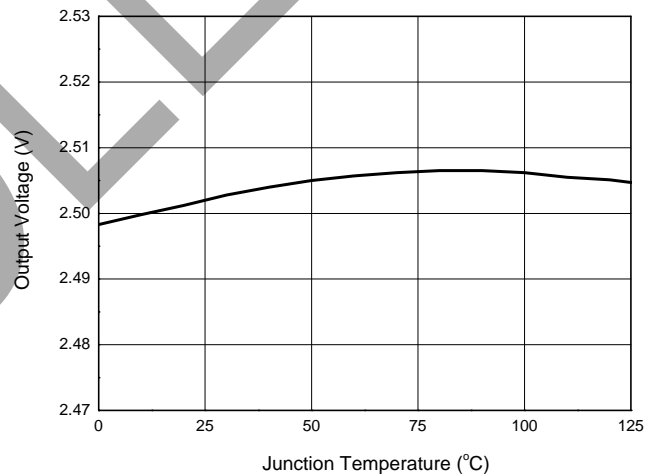
Load Regulation vs. Junction Temperature



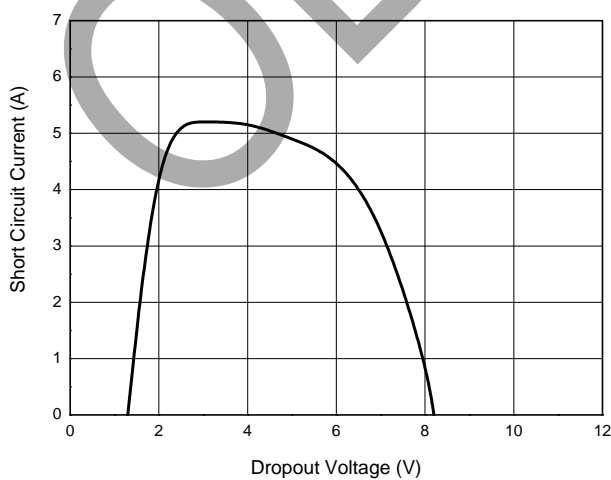
Dropout Voltage vs. Junction Temperature



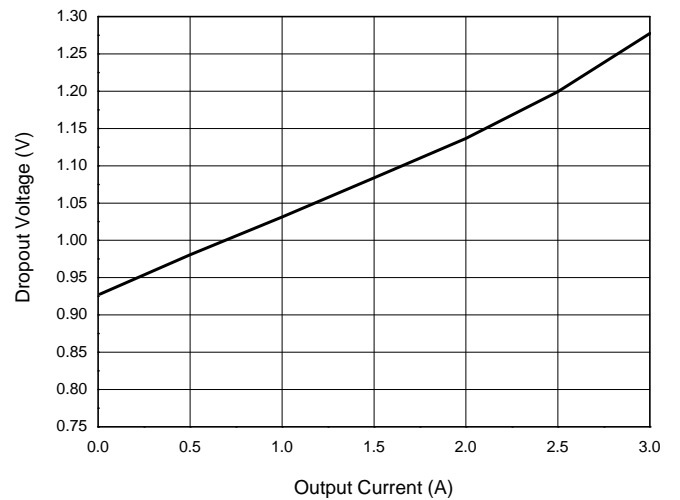
Output Voltage vs. Junction Temperature



Short Circuit Current vs. Dropout Voltage

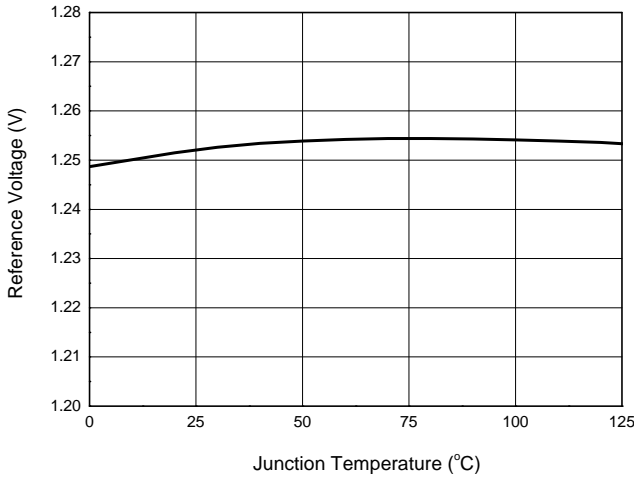


Dropout Voltage vs. Output Current

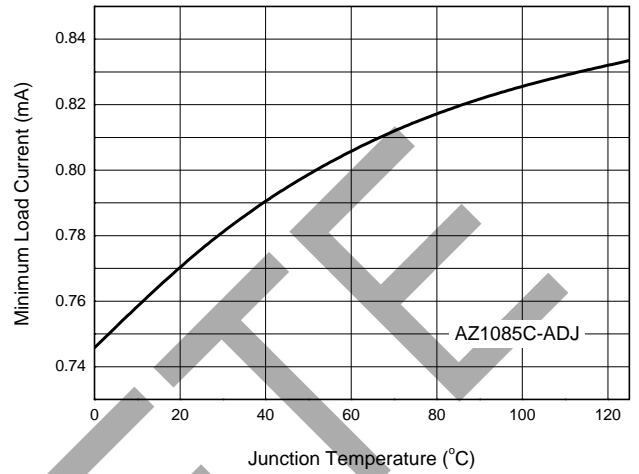


Performance Characteristics (Cont.)

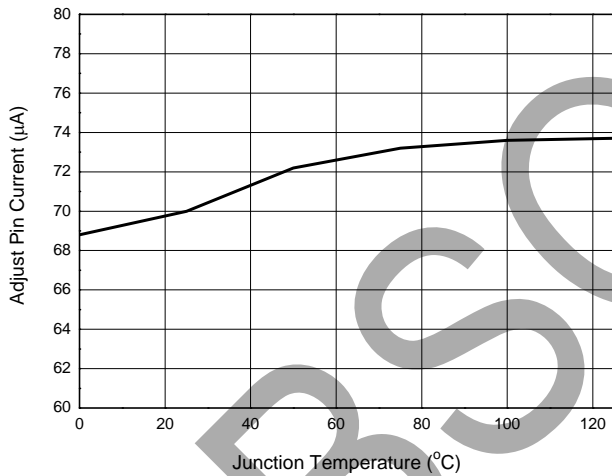
Reference Voltage vs. Junction Temperature



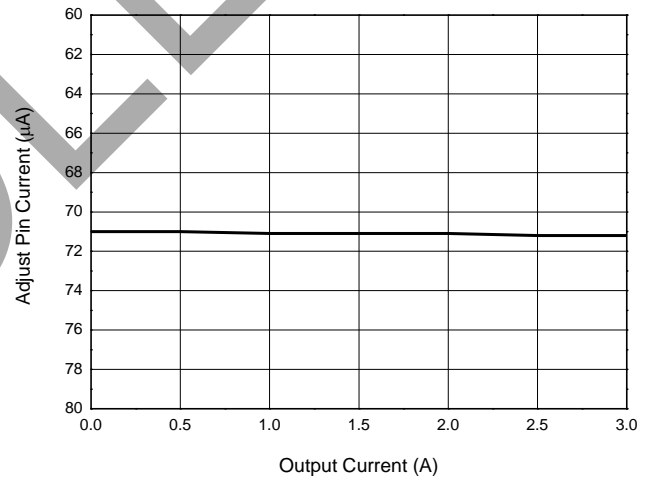
Minimum Load Current vs. Junction Temperature



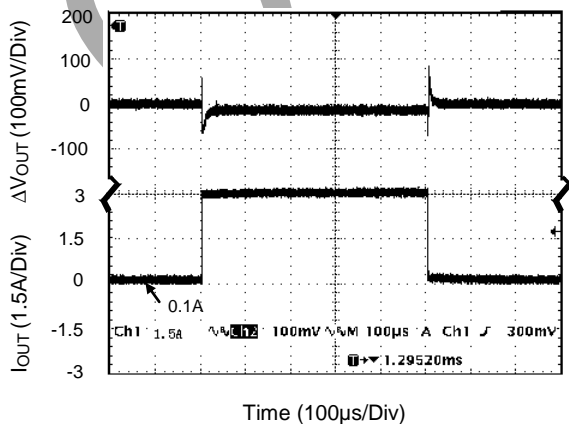
Adjust Pin Current vs. Junction Temperature



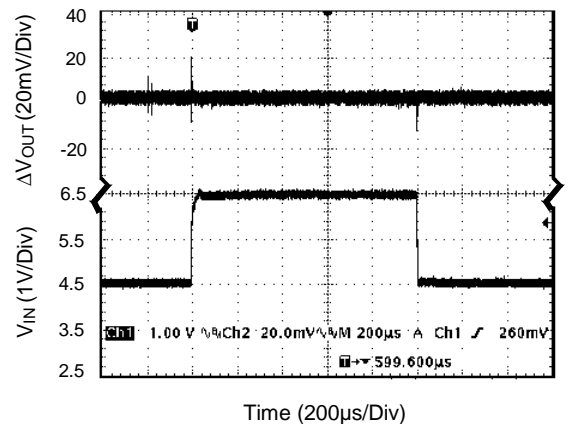
Adjust Pin Current vs. Output Current



Load Transient Response
(Conditions: $V_{IN} = 5.5V$, $V_{OUT} = 2.5V$,
 $I_{OUT} = 100mA$ to $3A$, $C_{IN} = C_{OUT} = 10\mu F$)



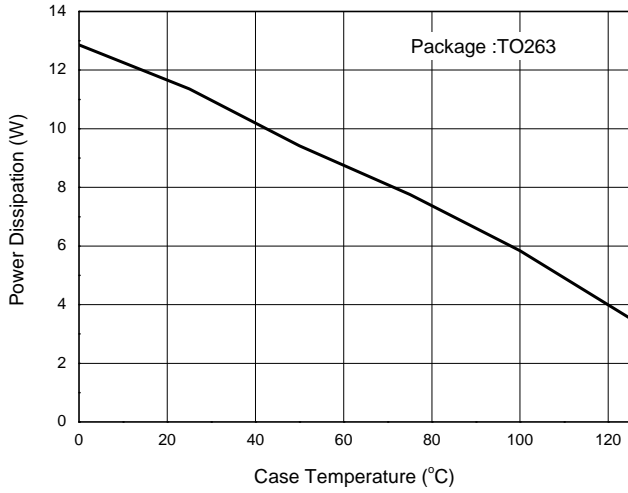
Line Transient Response
(Conditions: $V_{IN} = 4.5V$ to $6.5V$, $V_{OUT} = 2.5V$,
 $I_{OUT} = 200mA$, $C_{IN} = 1\mu F$, $C_{OUT} = 10\mu F$)



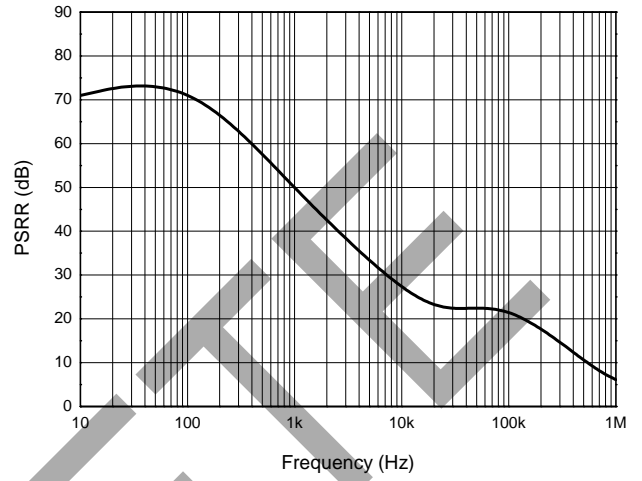
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Performance Characteristics (Cont.)

Power Dissipation vs. Case Temperature



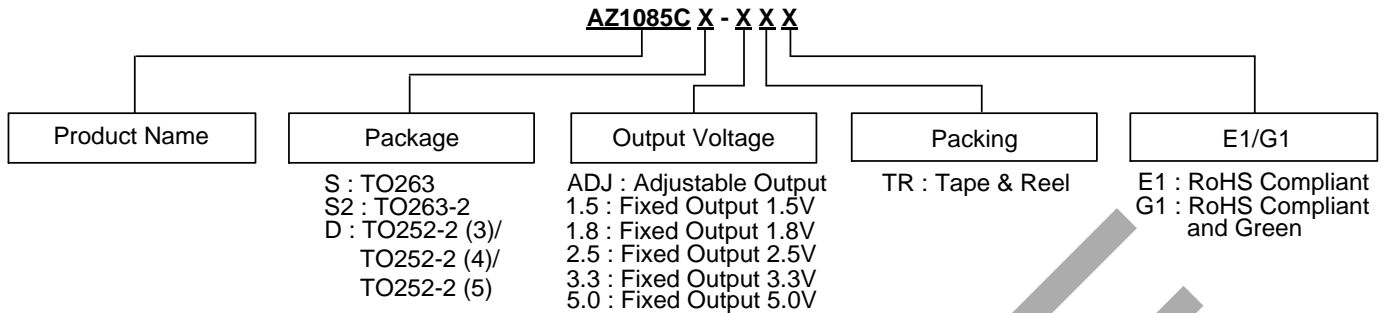
PSRR vs. Frequency



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OBSOLETE

Ordering Information



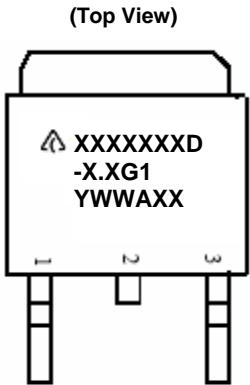
OBSELETE - PART DISCONTINUED

| Package | Temperature Range | Part Number | | Marking ID | | Packing |
|---------------------|-------------------|-------------------|--------------------------|-----------------|--------------------------|------------------|
| | | RoHS Compliant | RoHS Compliant and Green | RoHS Compliant | RoHS Compliant and Green | |
| TO263 | 0 to +125°C | AZ1085CS-ADJTRE1 | AZ1085CS-ADJTRG1 | AZ1085CS-ADJE1 | AZ1085CS-ADJG1 | 800/Tape & Reel |
| TO263 | 0 to +125°C | AZ1085CS-1.5TRE1 | AZ1085CS-1.5TRG1 | AZ1085CS-1.5E1 | AZ1085CS-1.5G1 | 800/Tape & Reel |
| TO263 | 0 to +125°C | AZ1085CS-1.8TRE1 | AZ1085CS-1.8TRG1 | AZ1085CS-1.8E1 | AZ1085CS-1.8G1 | 800/Tape & Reel |
| TO263 | 0 to +125°C | AZ1085CS-2.5TRE1 | AZ1085CS-2.5TRG1 | AZ1085CS-2.5E1 | AZ1085CS-2.5G1 | 800/Tape & Reel |
| TO263 | 0 to +125°C | AZ1085CS-3.3TRE1 | AZ1085CS-3.3TRG1 | AZ1085CS-3.3E1 | AZ1085CS-3.3G1 | 800/Tape & Reel |
| TO263 | 0 to +125°C | AZ1085CS-5.0TRE1 | AZ1085CS-5.0TRG1 | AZ1085CS-5.0E1 | AZ1085CS-5.0G1 | 800/Tape & Reel |
| TO263-2 | 0 to +125°C | AZ1085CS2-ADJTRE1 | AZ1085CS2-ADJTRG1 | AZ1085CS2-ADJE1 | AZ1085CS2-ADJG1 | 800/Tape & Reel |
| TO263-2 | 0 to +125°C | AZ1085CS2-1.5TRE1 | AZ1085CS2-1.5TRG1 | AZ1085CS2-1.5E1 | AZ1085CS2-1.5G1 | 800/Tape & Reel |
| TO263-2 | 0 to +125°C | AZ1085CS2-1.8TRE1 | AZ1085CS2-1.8TRG1 | AZ1085CS2-1.8E1 | AZ1085CS2-1.8G1 | 800/Tape & Reel |
| TO263-2 | 0 to +125°C | AZ1085CS2-2.5TRE1 | AZ1085CS2-2.5TRG1 | AZ1085CS2-2.5E1 | AZ1085CS2-2.5G1 | 800/Tape & Reel |
| TO263-2 | 0 to +125°C | AZ1085CS2-3.3TRE1 | AZ1085CS2-3.3TRG1 | AZ1085CS2-3.3E1 | AZ1085CS2-3.3G1 | 800/Tape & Reel |
| TO263-2 | 0 to +125°C | AZ1085CS2-5.0TRE1 | AZ1085CS2-5.0TRG1 | AZ1085CS2-5.0E1 | AZ1085CS2-5.0G1 | 800/Tape & Reel |
| TO252-2 (3)/(4)/(5) | 0 to +125°C | — | AZ1085CD-ADJTRG1 | — | AZ1085CD-ADJG1 | 2500/Tape & Reel |
| TO252-2 (3)/(4)/(5) | 0 to +125°C | — | AZ1085CD-1.5TRG1 | — | AZ1085CD-1.5G1 | 2500/Tape & Reel |
| TO252-2 (3)/(4)/(5) | 0 to +125°C | — | AZ1085CD-1.8TRG1 | — | AZ1085CD-1.8G1 | 2500/Tape & Reel |
| TO252-2 (3)/(4)/(5) | 0 to +125°C | — | AZ1085CD-2.5TRG1 | — | AZ1085CD-2.5G1 | 2500/Tape & Reel |
| TO252-2 (3)/(4)/(5) | 0 to +125°C | — | AZ1085CD-3.3TRG1 | — | AZ1085CD-3.3G1 | 2500/Tape & Reel |
| TO252-2 (3)/(4)/(5) | 0 to +125°C | — | AZ1085CD-5.0TRG1 | — | AZ1085CD-5.0G1 | 2500/Tape & Reel |



Marking Information

(1) TO252-2 Series



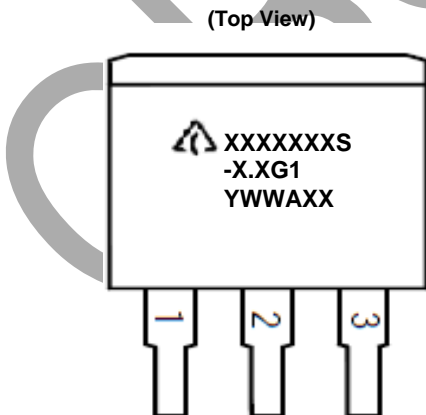
First and Second Lines: Logo and Marking ID
(See Ordering Information)
Third Line: Date Code
Y: Year
WW: Work Week of Molding
A: Assembly House Code
XX: 7th and 8th Digits of Batch Number

(2) TO263-2 Series



First and Second Lines: Logo and Marking ID
(See Ordering Information) (G1 may be E1 depending on product)
Third Line: Date Code
Y: Year
WW: Work Week of Molding
A: Assembly House Code
XX: 7th and 8th Digits of Batch Number

(3) TO263 Series

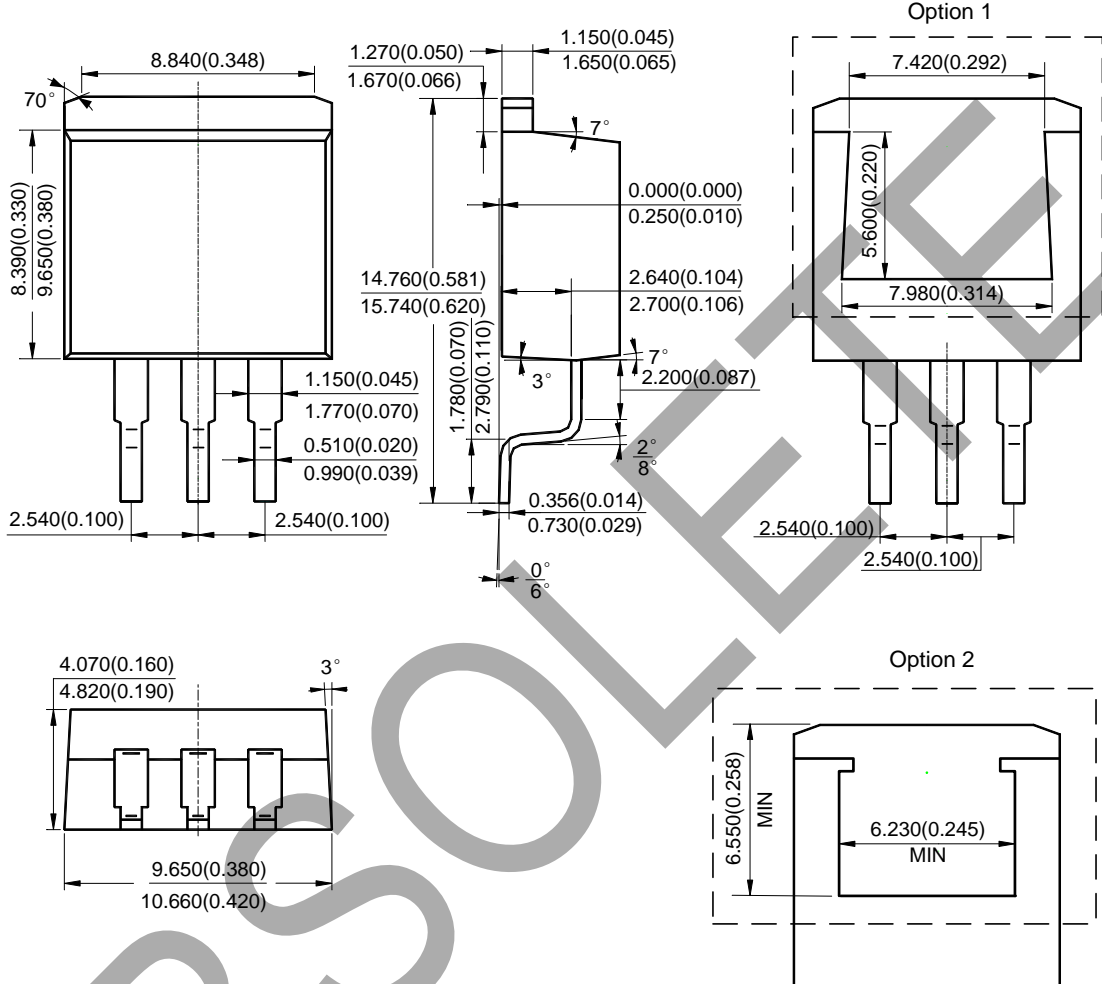


First and Second Lines: Logo and Marking ID
(See Ordering Information) (G1 may be E1 depending on product)
Third Line: Date Code
Y: Year
WW: Work Week of Molding
A: Assembly House Code
XX: 7th and 8th Digits of Batch Number

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Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: TO263

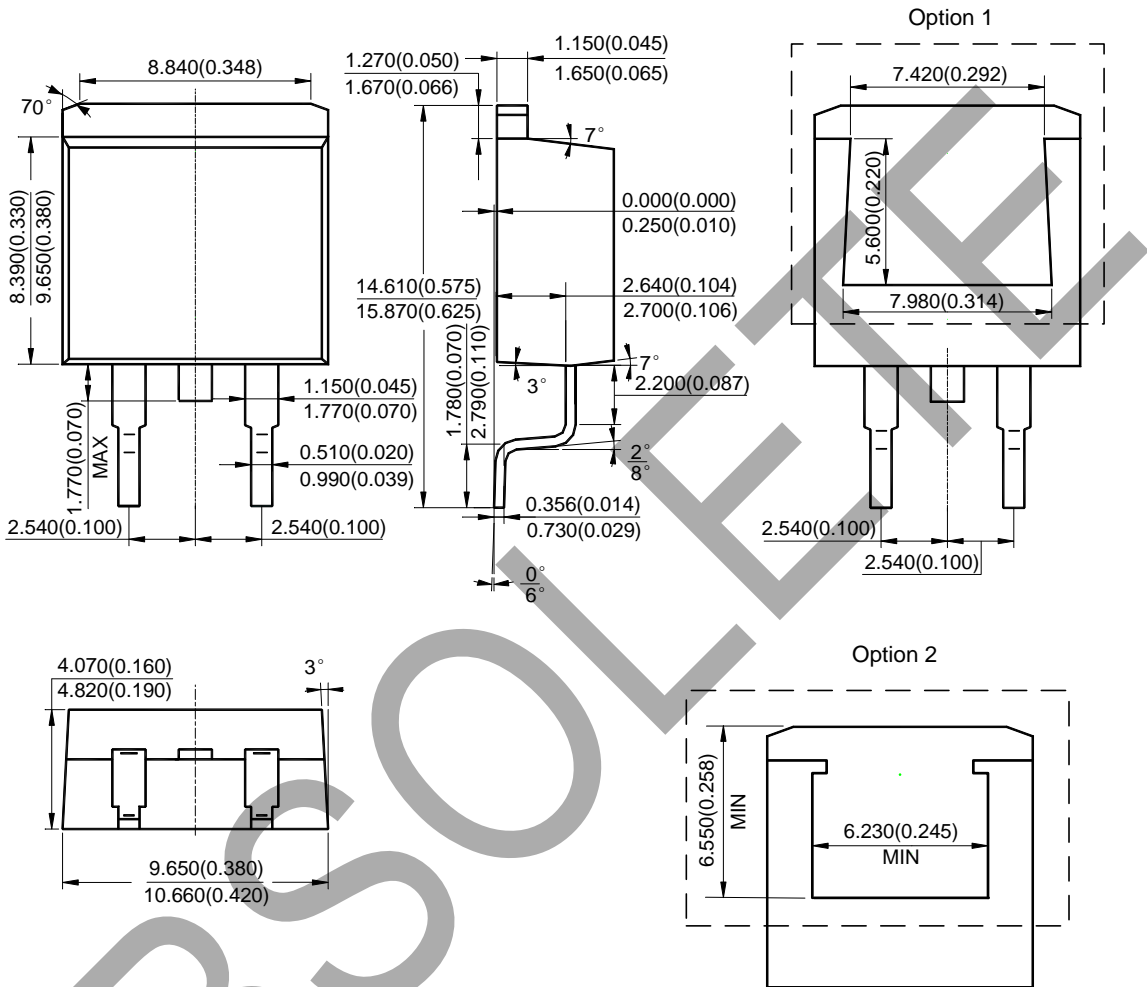


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OBSOLETE

Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(2) Package Type: TO263-2

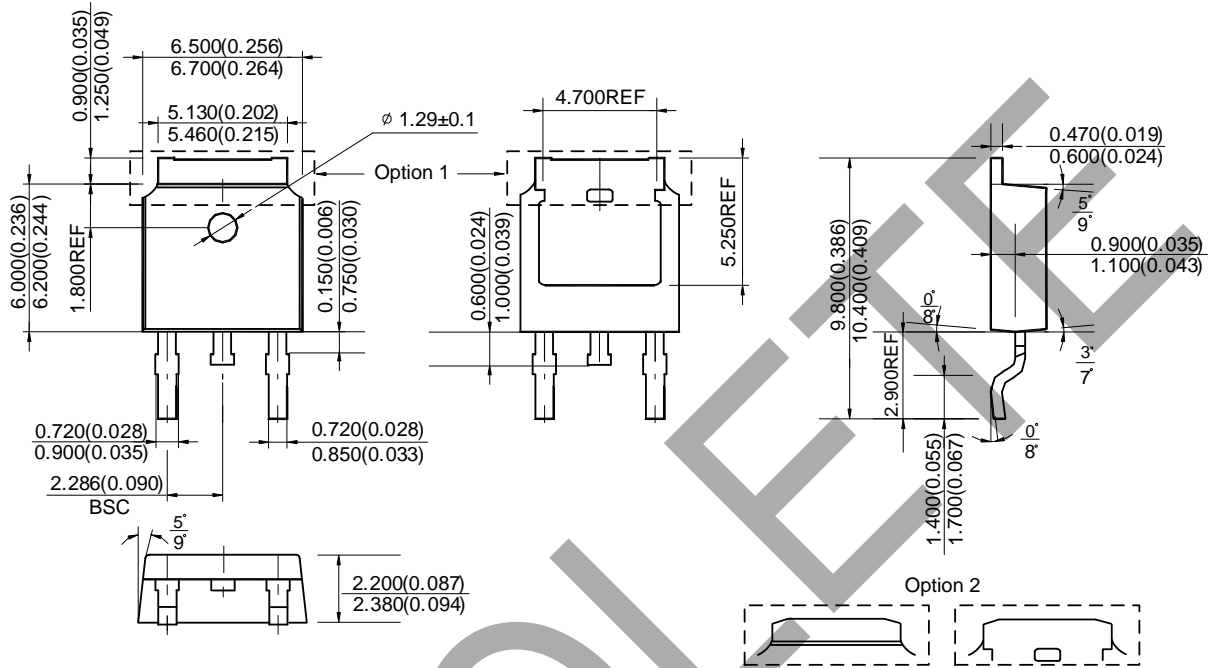


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Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(3) Package Type: TO252-2 (3)

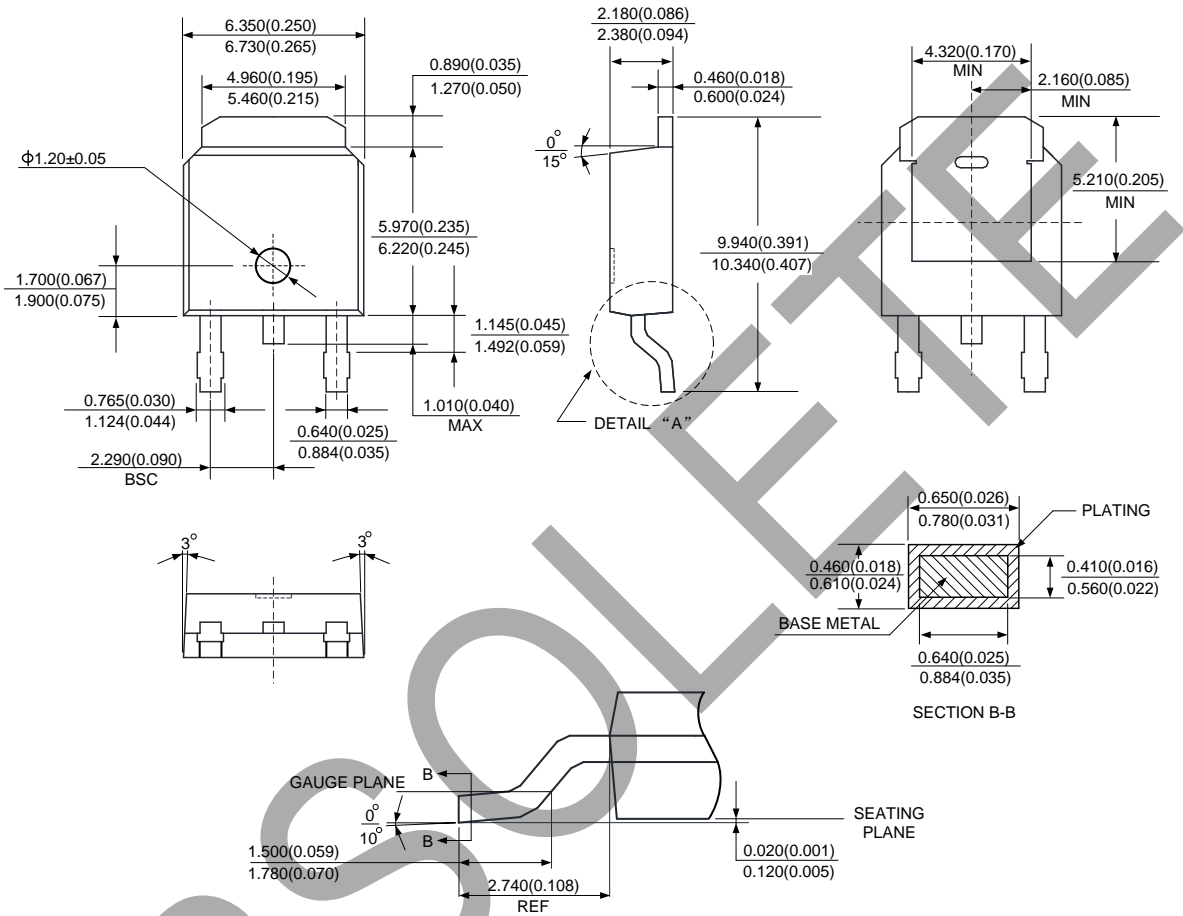


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OBSOLETE

Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(4) Package Type: TO252-2 (4)

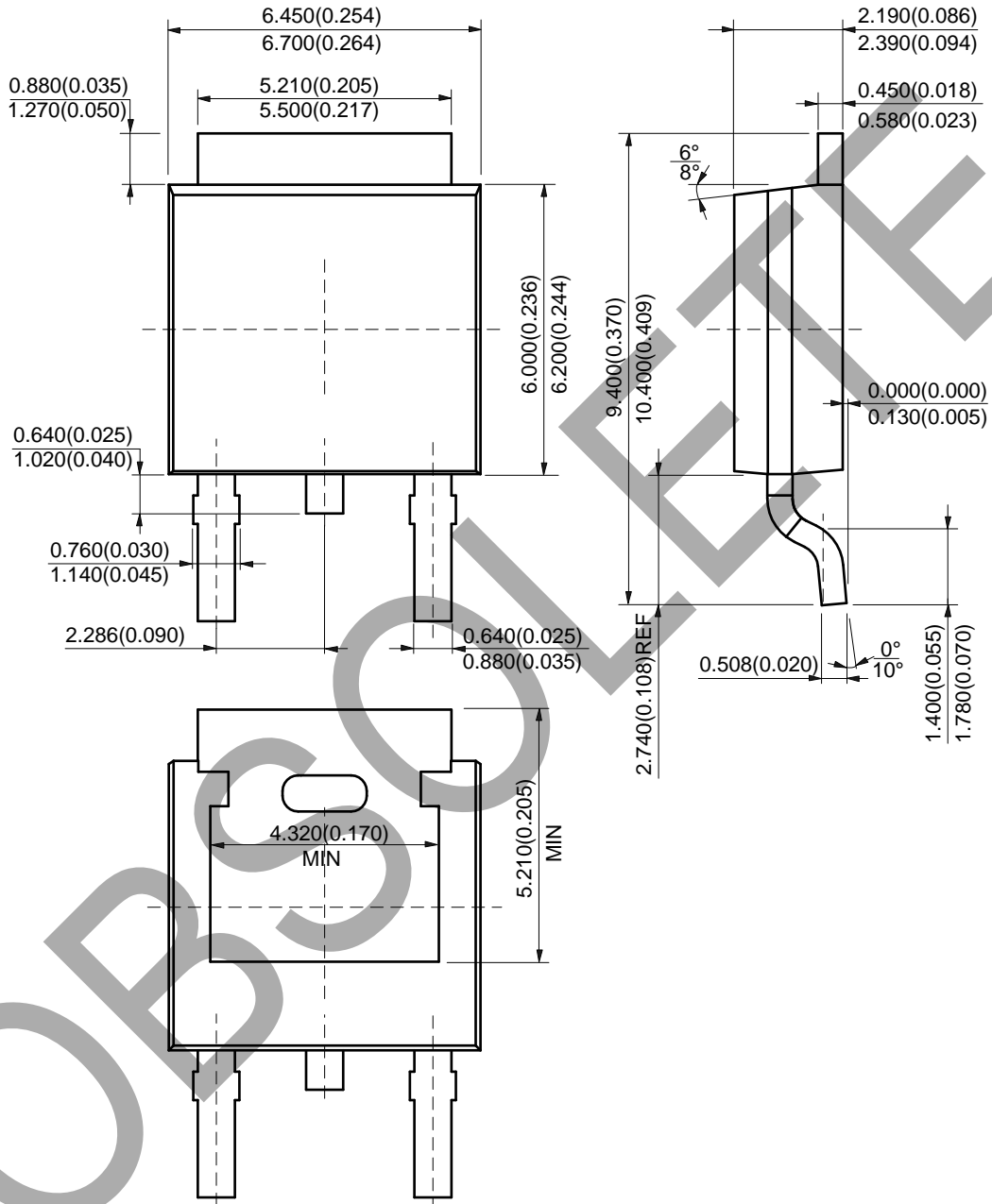


OBSOLETE - PART DISCONTINUED

OBSOLETE

Package Outline Dimensions (Cont. All dimensions in mm(inch).)

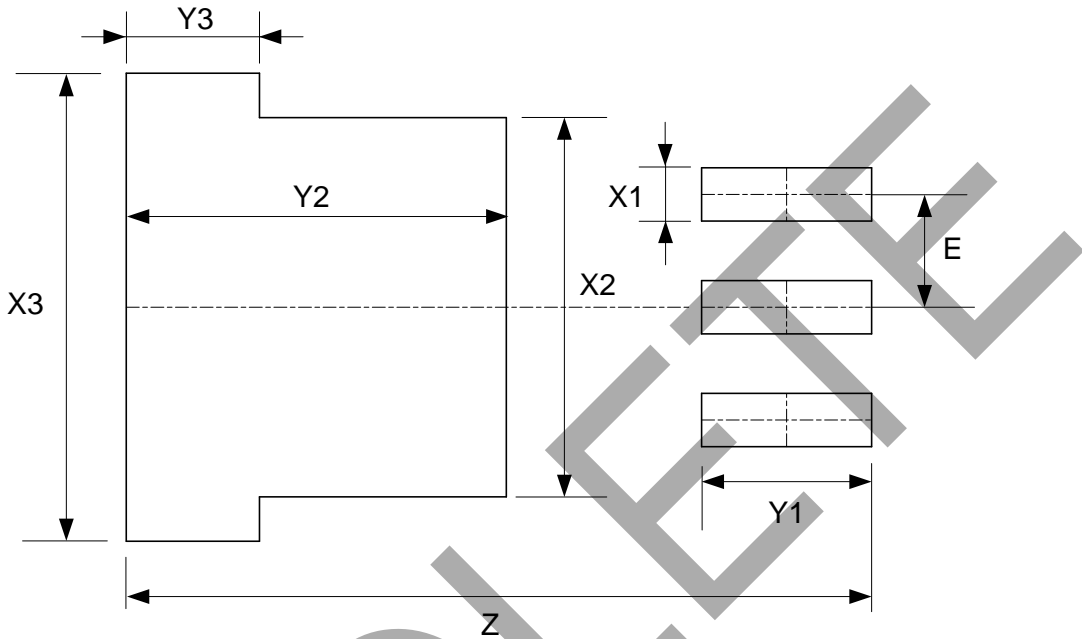
(5) Package Type: TO252-2 (5)



OBSOLETE - PART DISCONTINUED

Suggested Pad Layout

(1) Package Type: TO263



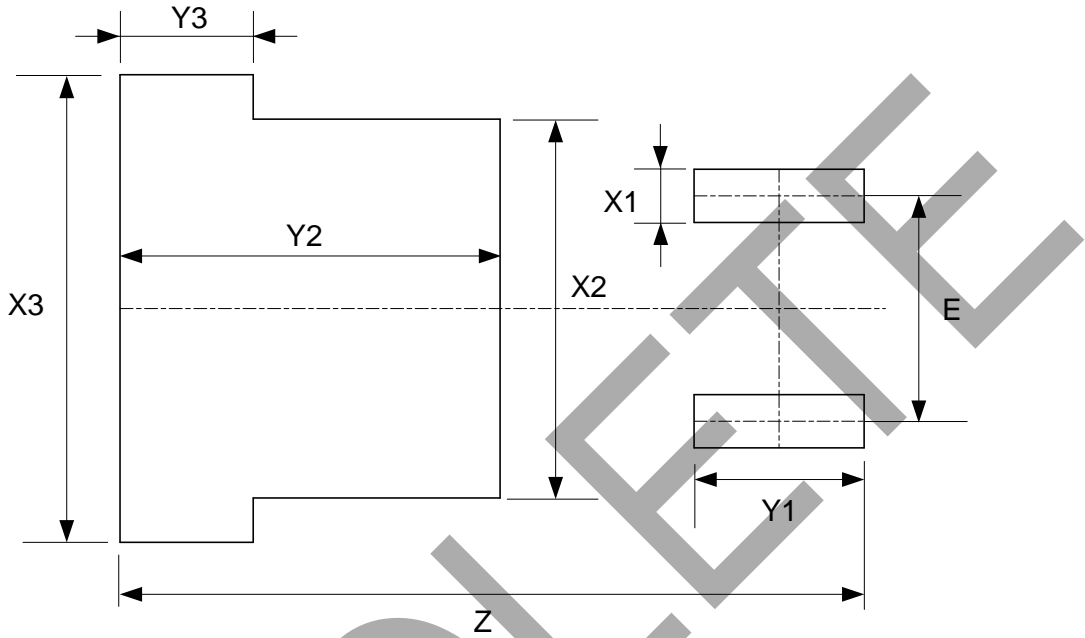
| | | | | |
|------------|-------------------|-------------------|-------------------|-------------------|
| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2 (mm)/(inch) | X3 (mm)/(inch) |
| Value | 16.760/0.660 | 1.200/0.047 | 8.540/0.336 | 10.540/0.415 |
| Dimensions | Y1 (mm)/(inch) | Y2 (mm)/(inch) | Y3 (mm)/(inch) | E (mm)/(inch) |
| Value | 3.830/0.151 | 8.560/0.337 | 3.000/0.118 | 2.540/0.100 |

OBSOLETE - PART DISCONTINUED

OBSOLETE

Suggested Pad Layout (Cont.)

(2) Package Type: TO263-2

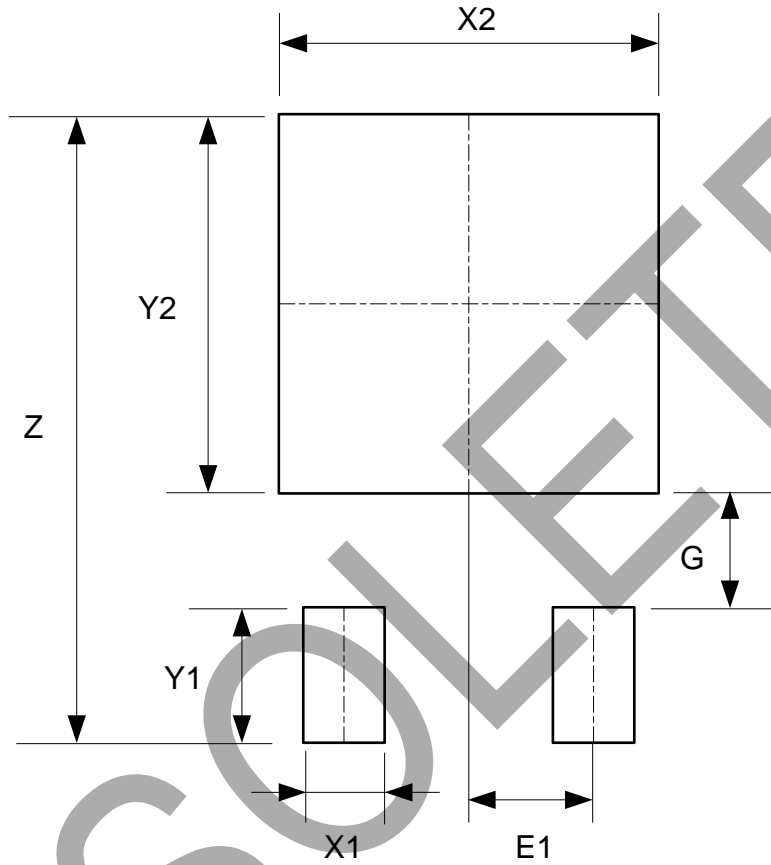


| | | | | |
|------------|-------------------|-------------------|-------------------|-------------------|
| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2 (mm)/(inch) | X3 (mm)/(inch) |
| Value | 16.760/0.660 | 1.200/0.047 | 8.540/0.336 | 10.540/0.415 |
| Dimensions | Y1 (mm)/(inch) | Y2 (mm)/(inch) | Y3 (mm)/(inch) | E (mm)/(inch) |
| Value | 3.830/0.151 | 8.560/0.337 | 3.000/0.118 | 5.080/0.200 |

OBSOLETE - PART DISCONTINUED

Suggested Pad Layout (Cont.)

(3) Package Type: TO252-2 (3)

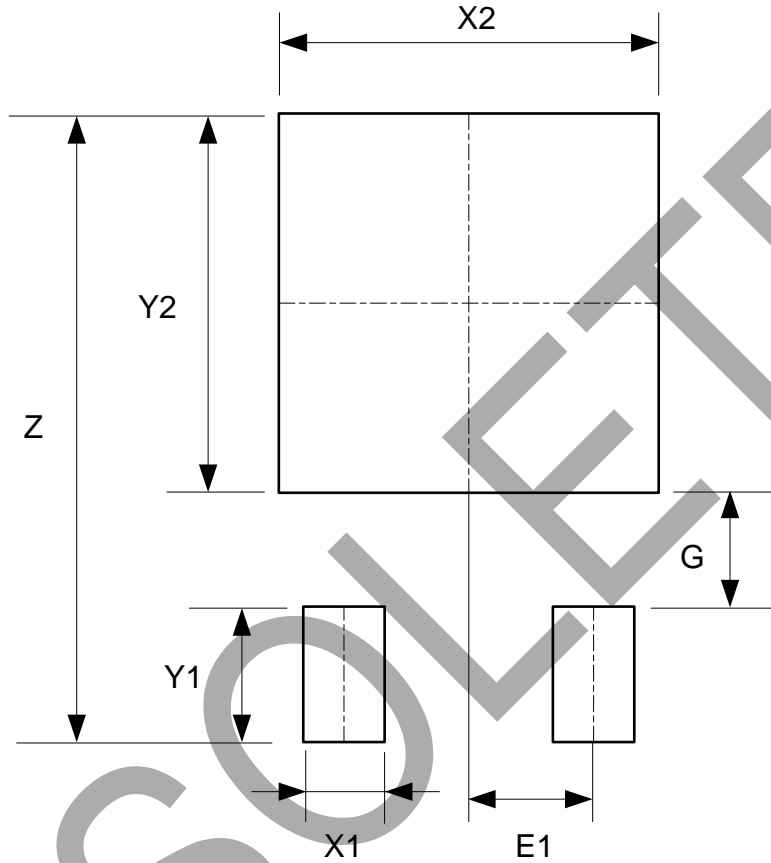


| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2=Y2 (mm)/(inch) | Y1 (mm)/(inch) | G (mm)/(inch) | E1 (mm)/(inch) |
|------------|------------------|-------------------|----------------------|-------------------|------------------|-------------------|
| Value | 11.600/0.457 | 1.500/0.059 | 7.000/0.276 | 2.500/0.098 | 2.100/0.083 | 2.300/0.091 |

OBSOLETE - PART DISCONTINUED

Suggested Pad Layout (Cont.)

(4) Package Type: TO252-2 (4)

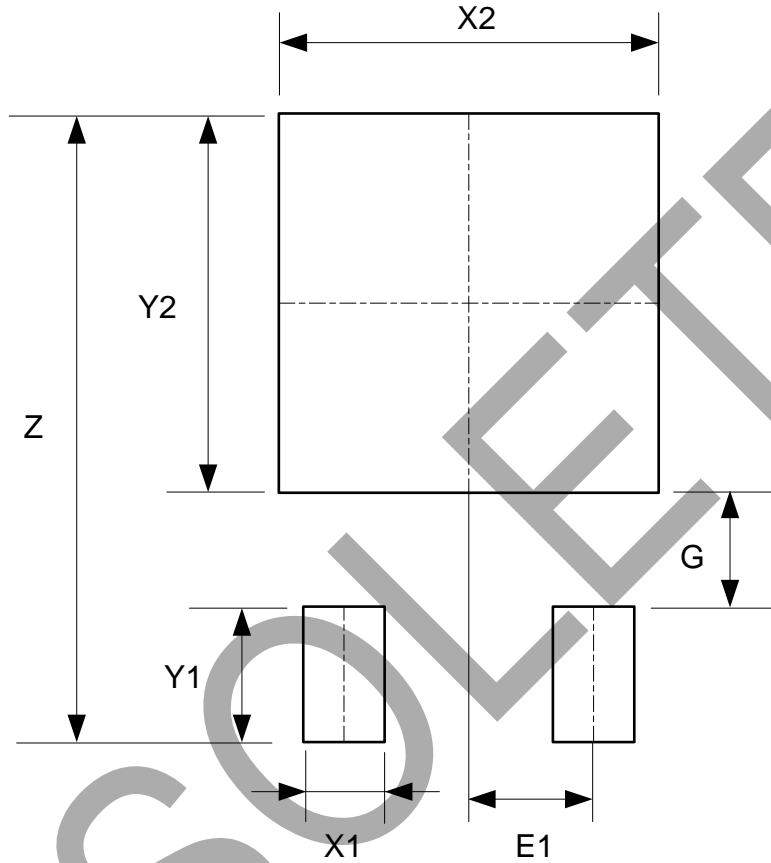


| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2=Y2 (mm)/(inch) | Y1 (mm)/(inch) | G (mm)/(inch) | E1 (mm)/(inch) |
|------------|------------------|-------------------|----------------------|-------------------|------------------|-------------------|
| Value | 11.600/0.457 | 1.500/0.059 | 7.000/0.276 | 2.500/0.098 | 2.100/0.083 | 2.300/0.091 |

OBSOLETE - PART DISCONTINUED

Suggested Pad Layout (Cont.)

(5) Package Type: TO252-2 (5)



| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2=Y2 (mm)/(inch) | Y1 (mm)/(inch) | G (mm)/(inch) | E1 (mm)/(inch) |
|------------|------------------|-------------------|----------------------|-------------------|------------------|-------------------|
| Value | 11.600/0.457 | 1.500/0.059 | 7.000/0.276 | 2.500/0.098 | 2.100/0.083 | 2.300/0.091 |

OBSOLETE - PART DISCONTINUED

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