

## Features

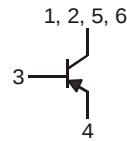
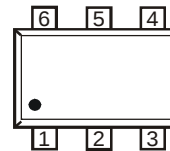
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Ultra Small Surface Mount Package
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free "Green" Device (Note 2)**
- **ESD rating: 400V-MM, 8KV-HBM**

## Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe.  
Solderable per MIL-STD-202, Method 208
- Weight: 0.006 grams (approximate)



Top View

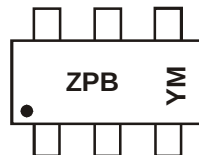

 Top View  
Device Schematic

 Top View  
Pin Out Configuration

## Ordering Information

| Part Number | Case    | Packaging        |
|-------------|---------|------------------|
| DSL12AW-7   | SOT-363 | 3000/Tape & Reel |

Notes: 1. No purposefully added lead.  
2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>

## Marking Information



ZPB = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: V = 2008)  
M = Month (ex: 9 = September)

### Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|
| Code | V    | W    | X    | Y    | Z    | A    | B    | C    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                 | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Base Voltage         | $V_{CBO}$ | -12   | V    |
| Collector-Emitter Voltage      | $V_{CEO}$ | -12   | V    |
| Emitter-Base Voltage           | $V_{EBO}$ | -5    | V    |
| Collector Current - Continuous | $I_C$     | -2    | A    |
| Peak Pulse Collector Current   | $I_{CM}$  | -3    | A    |

**Thermal Characteristics**

| Characteristic                                                              | Symbol          | Value       | Unit               |
|-----------------------------------------------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$                       | $P_D$           | 450         | mW                 |
| Thermal Resistance, Junction to Ambient (Note 3) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 275         | $^\circ\text{C/W}$ |
| Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$                       | $P_D$           | 650         | mW                 |
| Thermal Resistance, Junction to Ambient (Note 3) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 192         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range                                     | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

Notes: 3. Device mounted on FR-4 PCB, with minimum recommended pad layout.  
 4. Device mounted on FR-4 PCB, mounted on 25mmx25mm square pad 1oz coverage of copper

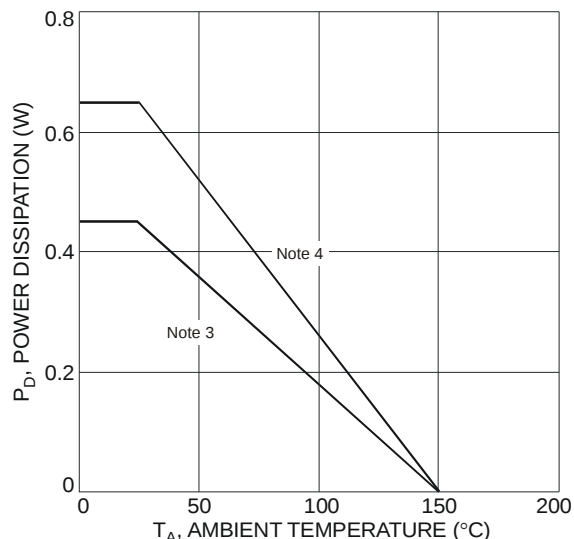


Fig. 1 Power Dissipation vs. Ambient Temperature

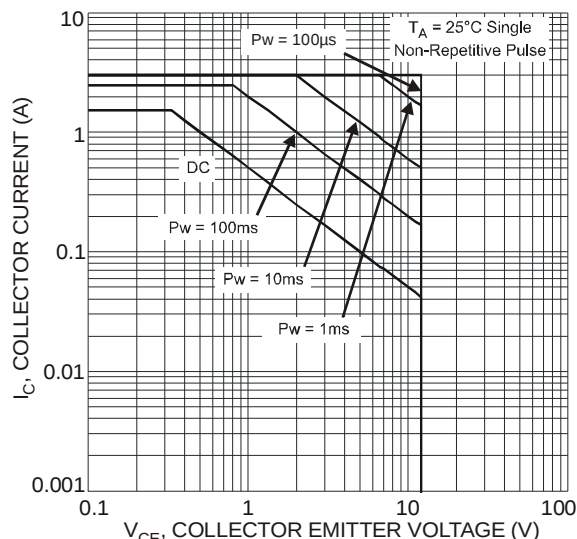


Fig. 2 Safe Operating Area

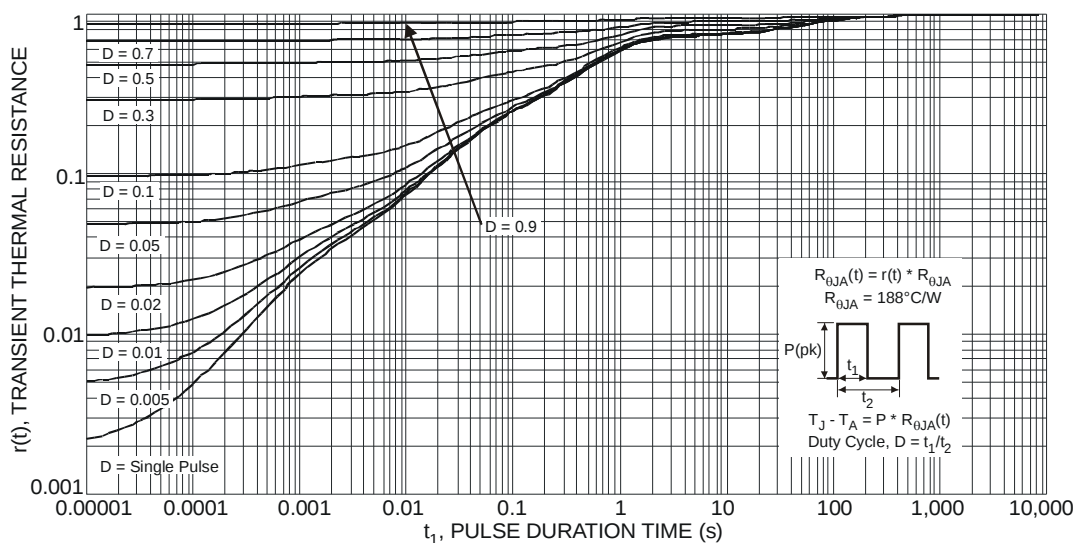


Fig. 3 Transient Thermal Response

# Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                | Symbol               | Min               | Typ                | Max                  | Unit | Test Condition                                                                                                                                      |
|-----------------------------------------------|----------------------|-------------------|--------------------|----------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b>                    |                      |                   |                    |                      |      |                                                                                                                                                     |
| Collector-Base Breakdown Voltage              | BV <sub>CBO</sub>    | -12               | -35                | —                    | V    | I <sub>C</sub> = -100μA, I <sub>E</sub> = 0                                                                                                         |
| Collector-Emitter Breakdown Voltage (Note 5)  | BV <sub>CEO</sub>    | -12               | -20                | —                    | V    | I <sub>C</sub> = -10mA, I <sub>B</sub> = 0                                                                                                          |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | -5                | -8.3               | —                    | V    | I <sub>E</sub> = -100μA, I <sub>C</sub> = 0                                                                                                         |
| Collector Cutoff Current                      | I <sub>CBO</sub>     | —                 | -1                 | -100                 | nA   | V <sub>CB</sub> = -12V, I <sub>E</sub> = 0                                                                                                          |
| Collector Cutoff Current                      | I <sub>CES</sub>     | —                 | -1                 | -100                 | nA   | V <sub>CE</sub> = -12V, V <sub>BE</sub> = 0                                                                                                         |
| Emitter Cutoff Current                        | I <sub>EBO</sub>     | —                 | -1                 | -100                 | nA   | V <sub>EB</sub> = -5V, I <sub>C</sub> = 0                                                                                                           |
| <b>ON CHARACTERISTICS</b>                     |                      |                   |                    |                      |      |                                                                                                                                                     |
| DC Current Gain (Note 5)                      | h <sub>FE</sub>      | 100<br>100<br>100 | 175<br>165<br>160  | —<br>300<br>—        | V    | V <sub>CE</sub> = -1.5V, I <sub>C</sub> = -0.5A<br>V <sub>CE</sub> = -1.5V, I <sub>C</sub> = -0.8A<br>V <sub>CE</sub> = -1.5V, I <sub>C</sub> = -1A |
| Collector-Emitter Saturation Voltage (Note 5) | V <sub>CE(sat)</sub> | —<br>—<br>—       | -70<br>-95<br>-115 | -160<br>-235<br>-290 | mV   | I <sub>C</sub> = -0.5A, I <sub>B</sub> = -10mA<br>I <sub>C</sub> = -0.8A, I <sub>B</sub> = -16mA<br>I <sub>C</sub> = -1A, I <sub>B</sub> = -20mA    |
| Collector-Emitter Saturation Resistance       | R <sub>CE(sat)</sub> | —                 | —                  | 290                  | mΩ   | I <sub>C</sub> = -1A, I <sub>B</sub> = -20mA                                                                                                        |
| Base-Emitter Saturation Voltage               | V <sub>BE(sat)</sub> | —                 | —                  | -0.95                | V    | I <sub>C</sub> = -1A, I <sub>B</sub> = -20mA                                                                                                        |
| Base-Emitter Turn On Voltage                  | V <sub>BE(on)</sub>  | —                 | —                  | -0.95                | V    | V <sub>CE</sub> = -1.5V, I <sub>C</sub> = -1A                                                                                                       |
| Output Capacitance                            | C <sub>obo</sub>     | —                 | —                  | 65                   | pF   | V <sub>CB</sub> = -1.5V, f = 1.0MHz                                                                                                                 |
| Current Gain-Bandwidth Product                | f <sub>T</sub>       | —                 | 180                | —                    | MHz  | V <sub>CE</sub> = -5V, I <sub>C</sub> = -100mA, f = 100MHz                                                                                          |

Notes: 5. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

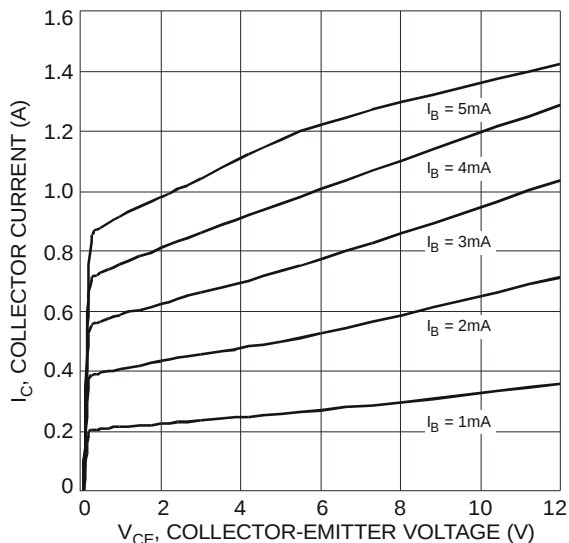


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

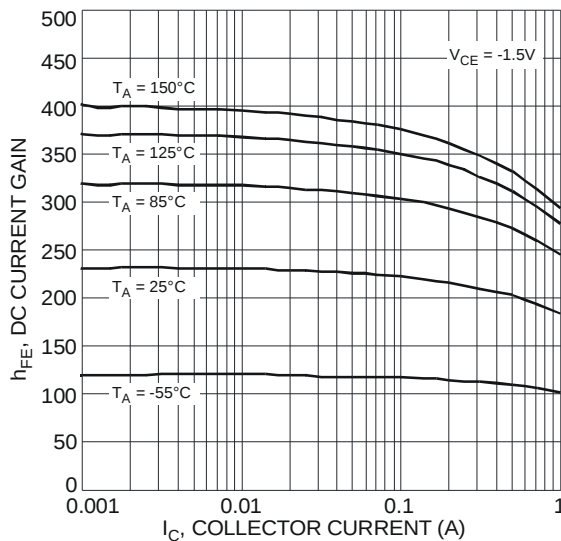


Fig. 5 Typical DC Current Gain vs. Collector Current

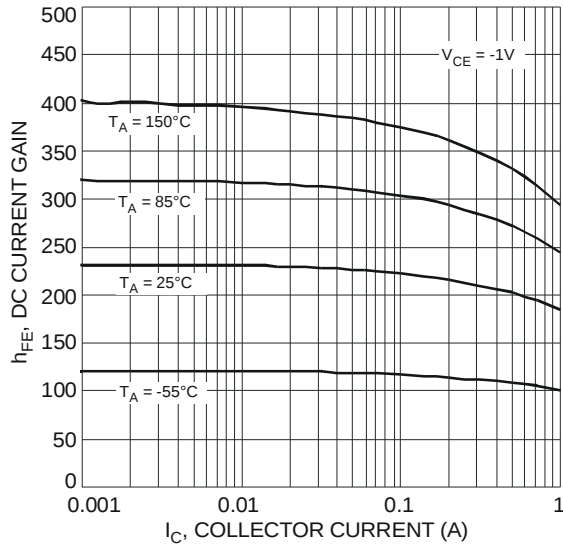


Fig. 6 Typical DC Current Gain vs. Collector Current

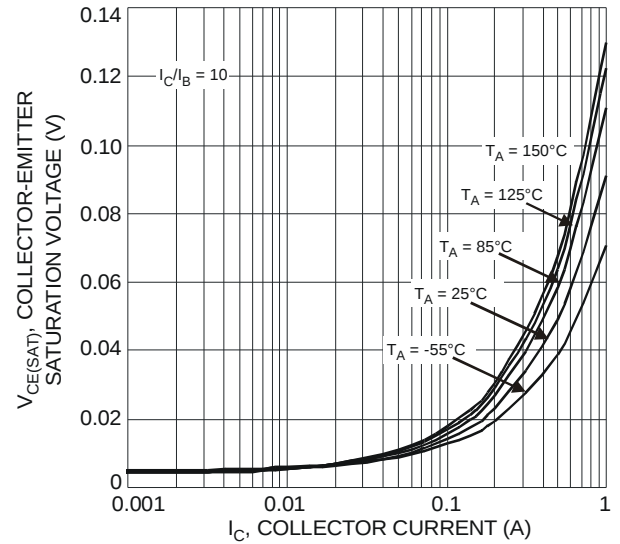


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

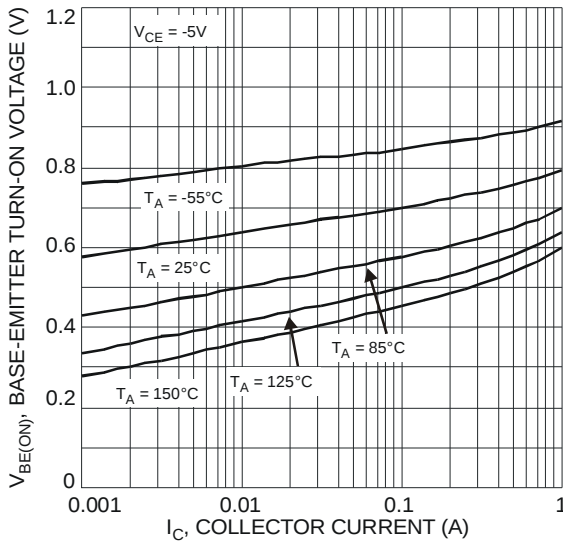


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

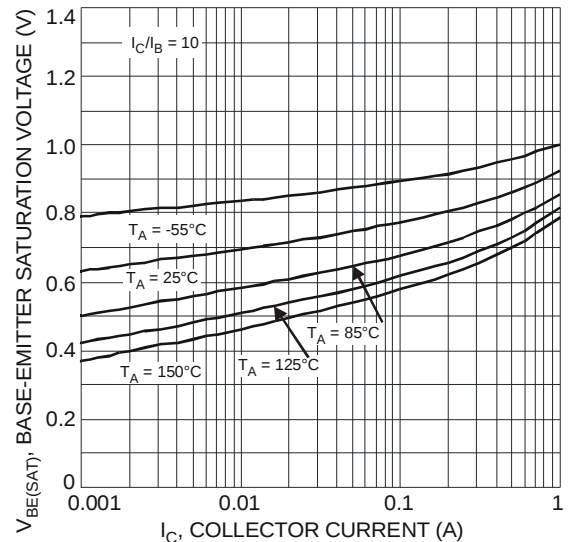


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

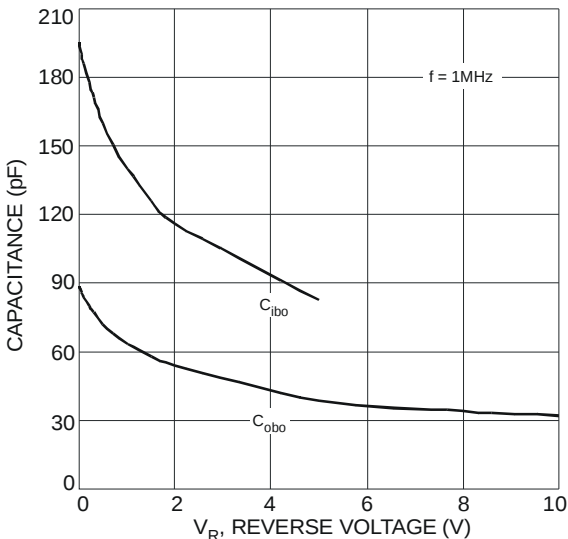
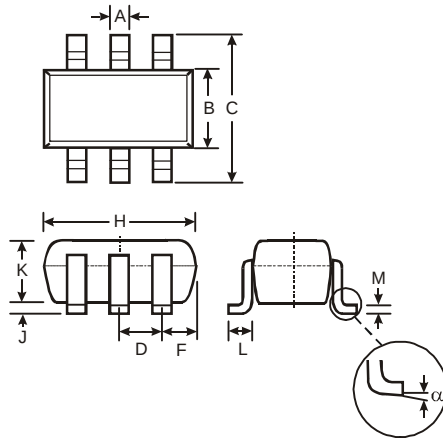


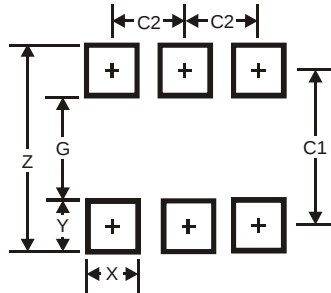
Fig. 10 Typical Capacitance Characteristics

## Package Outline Dimensions



| SOT-363              |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 0.10     | 0.30 |
| B                    | 1.15     | 1.35 |
| C                    | 2.00     | 2.20 |
| D                    | 0.65 Typ |      |
| F                    | 0.40     | 0.45 |
| H                    | 1.80     | 2.20 |
| J                    | 0        | 0.10 |
| K                    | 0.90     | 1.00 |
| L                    | 0.25     | 0.40 |
| M                    | 0.10     | 0.22 |
| $\alpha$             | 0°       | 8°   |
| All Dimensions in mm |          |      |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C1         | 1.9           |
| C2         | 0.65          |

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