# 12V LOW $V_{CE(sat)}$ PNP SURFACE MOUNT TRANSISTOR

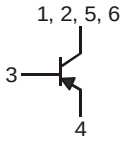
## Features

- 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**

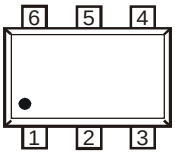
## Mechanical Data

- 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



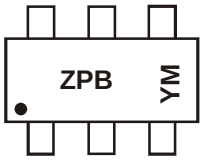

Top View
Pin Out Configuration

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

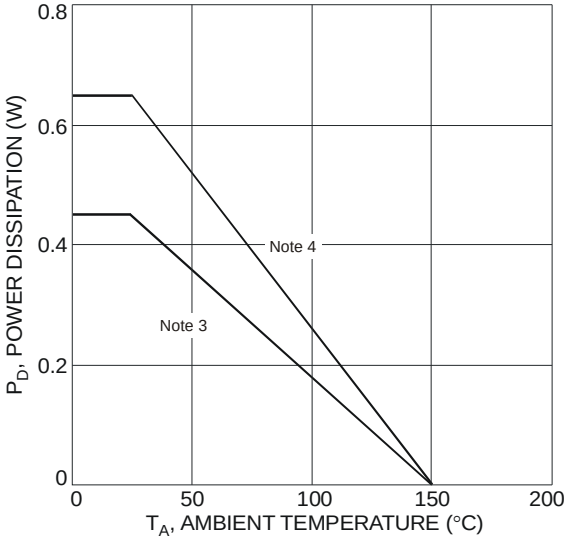



Fig. 1 Power Dissipation vs. Ambient Temperature

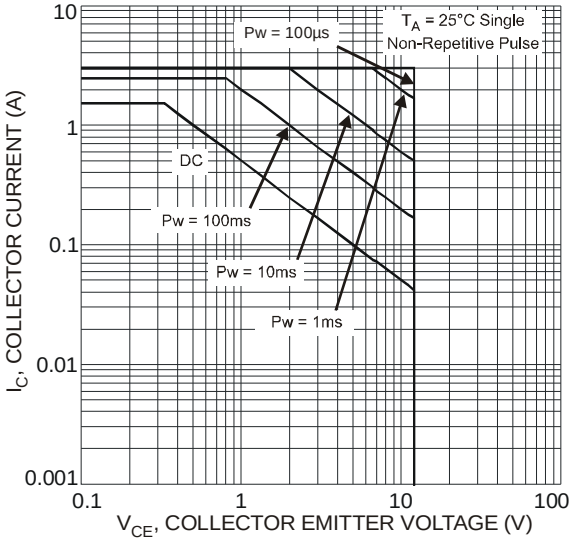



Fig. 2 Safe Operating Area

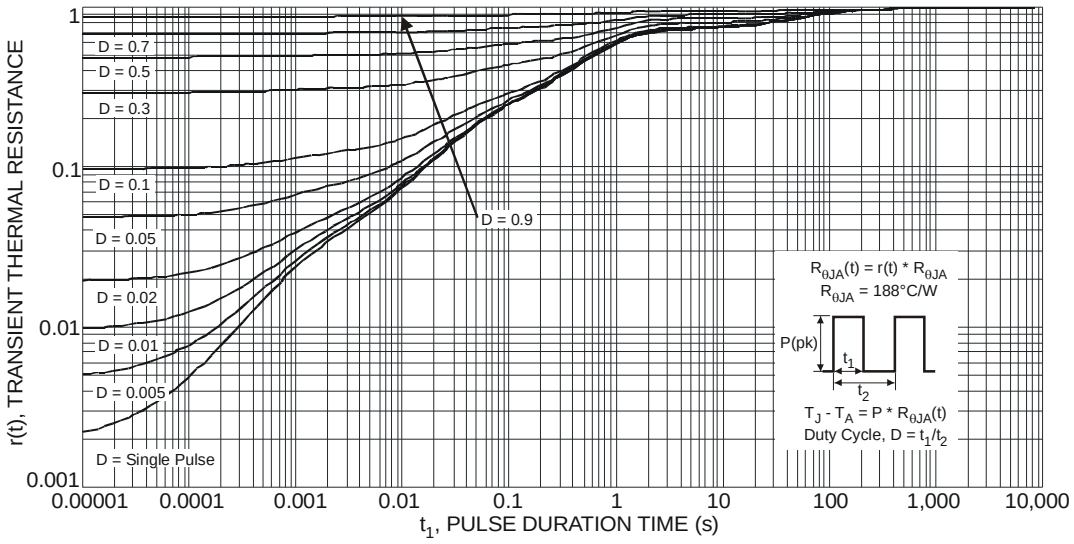



Fig. 3 Transient Thermal Response

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -12 | -35 | — | V | $I_C$ = -100μA, $I_E$ = 0 |
| Collector-Emitter Breakdown Voltage (Note 5) | $BV_{CEO}$ | -12 | -20 | — | V | $I_C$ = -10mA, $I_B$ = 0 |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -5 | -8.3 | — | V | $I_E$ = -100μA, $I_C$ = 0 |
| Collector Cutoff Current | $I_{CBO}$ | — | -1 | -100 | nA | $V_{CB}$ = -12V, $I_E$ = 0 |
| Collector Cutoff Current | $I_{CES}$ | — | -1 | -100 | nA | $V_{CE}$ = -12V, $V_{BE}$ = 0 |
| Emitter Cutoff Current | $I_{EBO}$ | — | -1 | -100 | nA | $V_{EB}$ = -5V, $I_C$ = 0 |
| **ON CHARACTERISTICS** | | | | | | |
| DC Current Gain (Note 5) | $h_{FE}$ | 100<br>100<br>100 | 175<br>165<br>160 | —<br>300<br>— | V | $V_{CE}$ = -1.5V, $I_C$ = -0.5A<br>$V_{CE}$ = -1.5V, $I_C$ = -0.8A<br>$V_{CE}$ = -1.5V, $I_C$ = -1A |
| Collector-Emitter Saturation Voltage (Note 5) | $V_{CE(sat)}$ | —<br>—<br>— | -70<br>-95<br>-115 | -160<br>-235<br>-290 | mV | $I_C$ = -0.5A, $I_B$ = -10mA<br>$I_C$ = -0.8A, $I_B$ = -16mA<br>$I_C$ = -1A, $I_B$ = -20mA |
| Collector-Emitter Saturation Resistance | $R_{CE(sat)}$ | — | — | 290 | mΩ | $I_C$ = -1A, $I_B$ = -20mA |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | — | — | -0.95 | V | $I_C$ = -1A, $I_B$ = -20mA |
| Base-Emitter Turn On Voltage | $V_{BE(on)}$ | — | — | -0.95 | V | $V_{CE}$ = -1.5V, $I_C$ = -1A |
| Output Capacitance | $C_{obo}$ | — | — | 65 | pF | $V_{CB}$ = -1.5V, f = 1.0MHz |
| Current Gain-Bandwidth Product | $f_T$ | — | 180 | — | MHz | $V_{CE}$ = -5V, $I_C$ = -100mA, f = 100MHz |

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

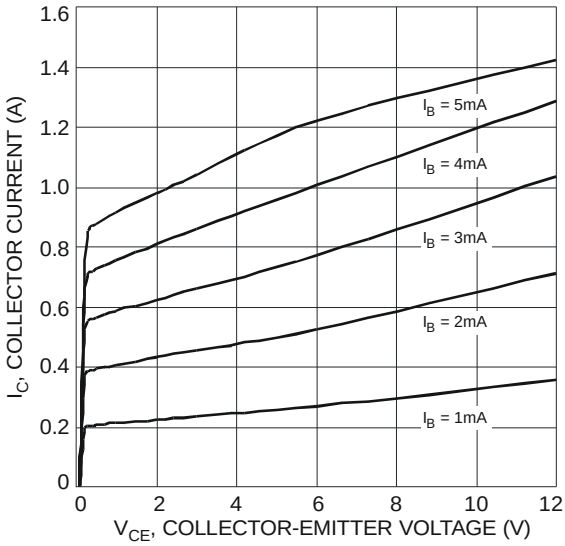



Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

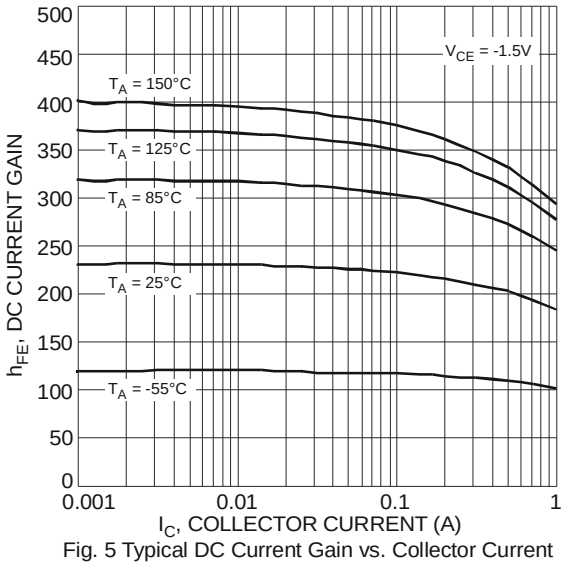



Fig. 5 Typical DC Current Gain vs. Collector Current

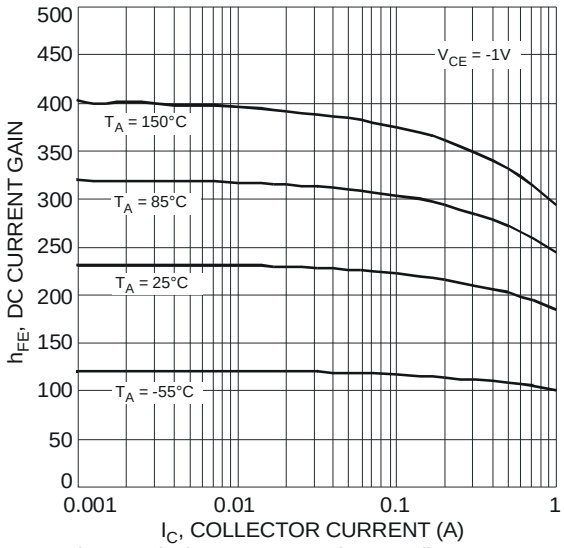



Fig. 6 Typical DC Current Gain vs. Collector Current

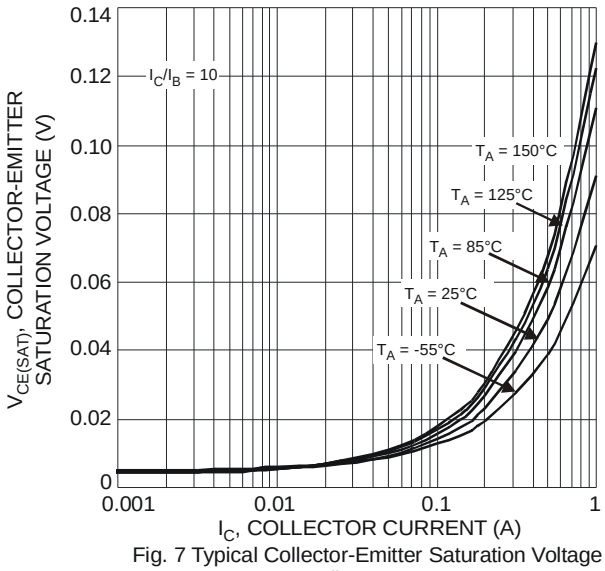



Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

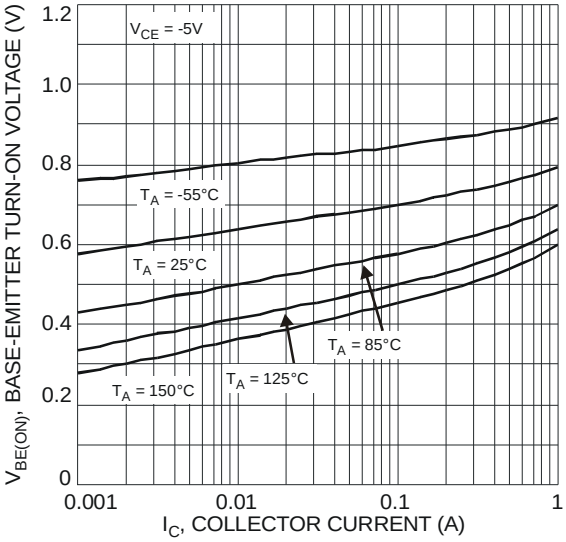



Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

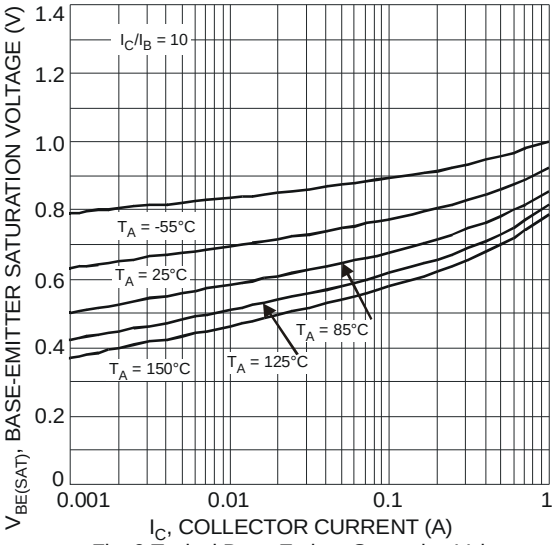



Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

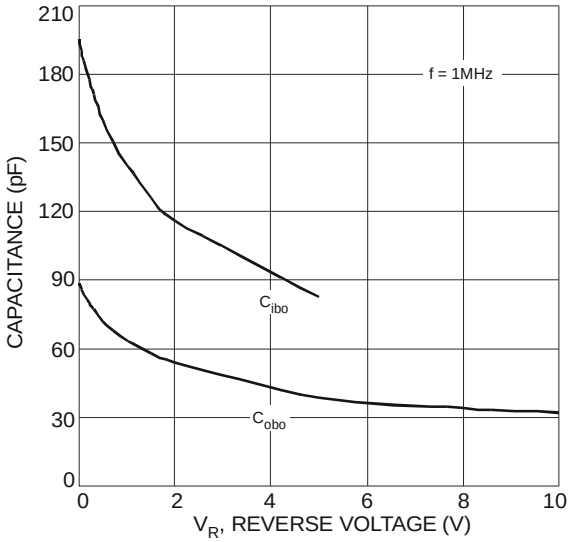
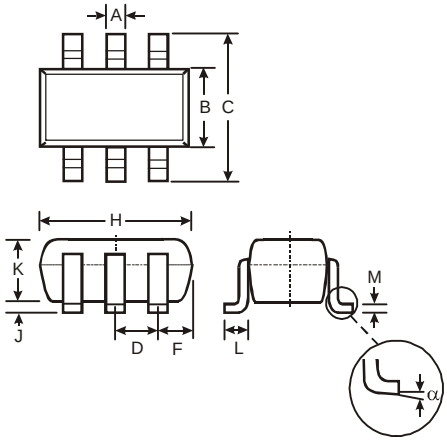


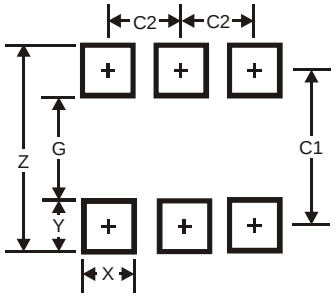

Fig. 10 Typical Capacitance Characteristics

## 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 |
| **α** | 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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