优尚

YOUSHANG SEMICONDUCTOR

# 设计研发新型功率器件

## 各类小信号开关

## 中低压及高压大电流等场效应管

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码

企业QQ二维码

## Features

- $BV_{CEO}$ > 25V
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- $I_C$ = 3A High Continuous Current
- $I_{CM}$ = 8A Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)}$ < 200mV @ 1A
- Complementary PNP Type: NK-DXTP07025BFG
- Rated to +175°C – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection

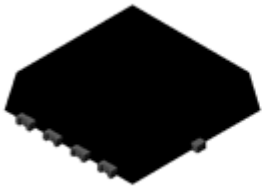
## Mechanical Data

- Case: PowerDI®3333-8
- Case Material: Molded Plastic. “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.03 grams (Approximate)

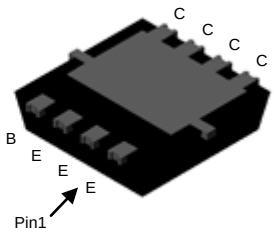
## Applications

- Load Switch
- Linear Regulator

PowerDI3333-8 (SWP) (Type UX)

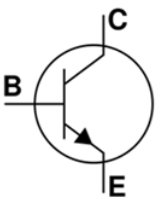


Top View




Bottom View

Equivalent Circuit




Device Symbol

## Absolute Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 35 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 25 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 7 | V |
| Continuous Collector Current | $I_C$ | 3 | A |
| Peak Pulse Current | $I_{CM}$ | 8 | A |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

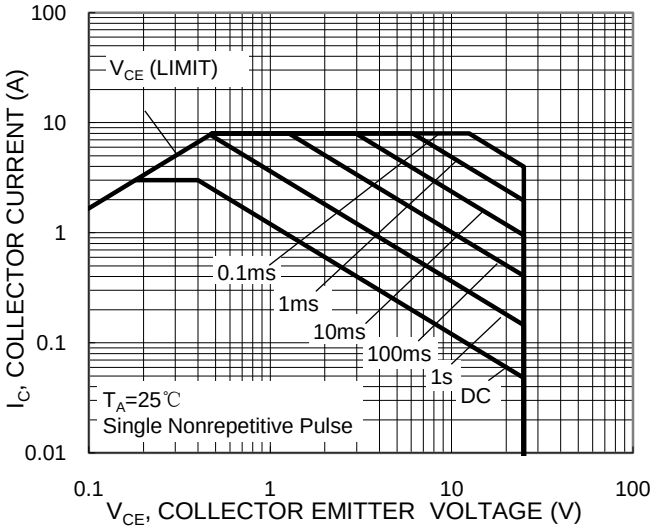
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 0.9 | W |
| | (Note 6) | | 2.1 | W |
| | (Note 7) | | 3.1 | W |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 140 | °C/W |
| | (Note 6) | | 65 | °C/W |
| | (Note 7) | | 44 | °C/W |
| Thermal Resistance, Junction to Leads (Note 8) | | $R_{\theta JL}$ | 8.5 | °C/W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +175 | °C |

## ESD Ratings (Note 9)

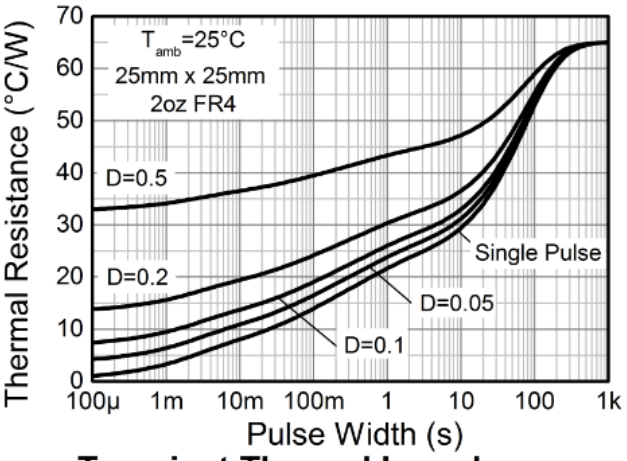
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

Notes:
5. For a device mounted with the collector tab on MRP FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
8. Thermal resistance from junction to solder-point (at the collector tab).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

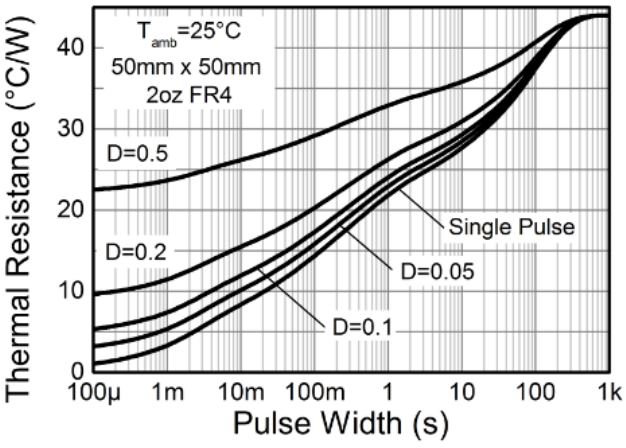
## Thermal Characteristics and Derating Information



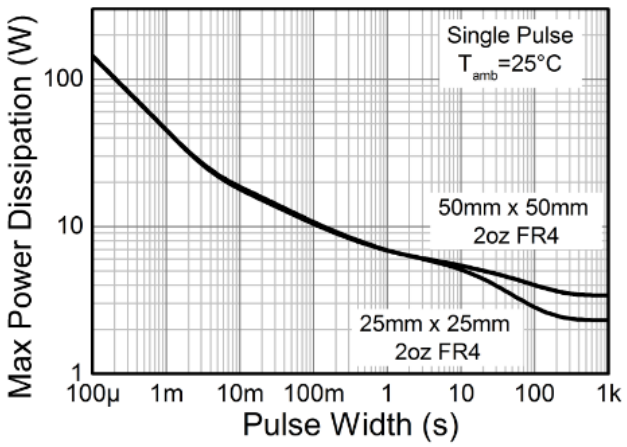

**SOA, Safe Operation Area**



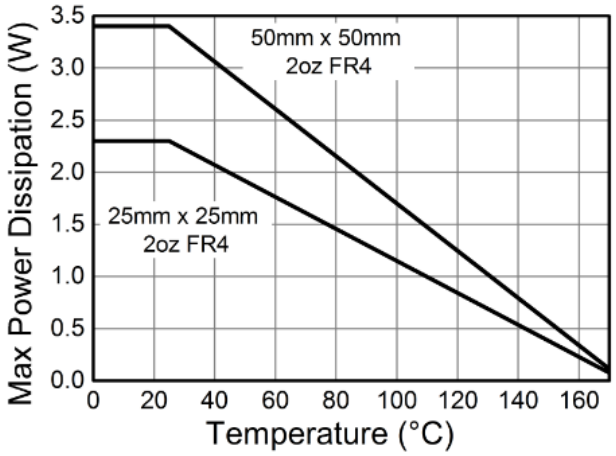

**Transient Thermal Impedance**




**Transient Thermal Impedance**




**Pulse Power Dissipation**



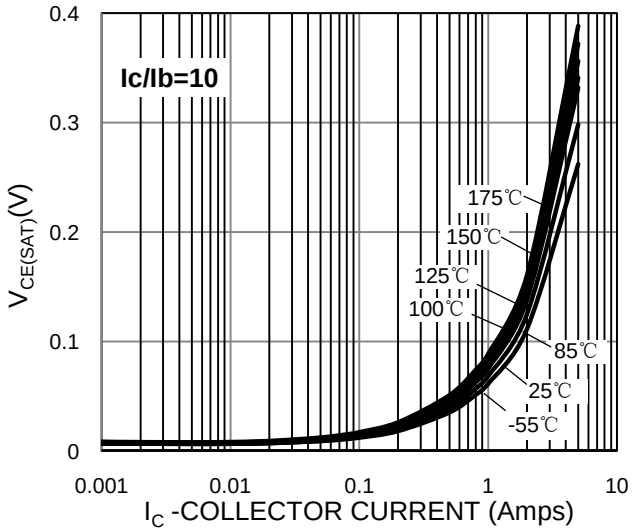

**Derating Curve**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

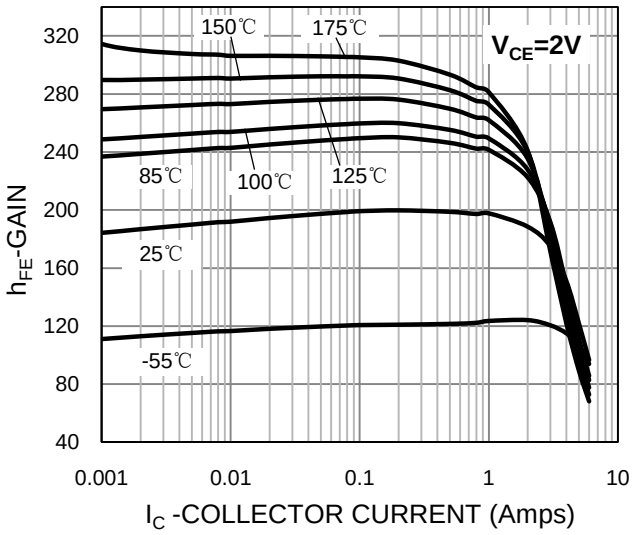
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 35 | 136 | — | V | $I_C$ = 100μA |
| Collector-Emitter Breakdown Voltage (Note 10) | $BV_{CEO}$ | 25 | 47 | — | V | $I_C$ = 10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 7 | 8.4 | — | V | $I_E$ = 100μA |
| Collector Cut-Off Current | $I_{CBO}$ | — | — | 20 | nA | $V_{CB}$ = 30V |
| | | — | — | 10 | μA | $V_{CB}$ = 30V, $T_A$ = +125°C |
| Emitter Cut-Off Current | $I_{EBO}$ | — | — | 20 | nA | $V_{EB}$ = 6V |
| Collector-Emitter Saturation Voltage (Note 10) | $V_{CE(SAT)}$ | — | 69 | 200 | mV | $I_C$ = 1A, $I_B$ = 100mA |
| | | — | 180 | 400 | mV | $I_C$ = 3A, $I_B$ = 300mA |
| Base-Emitter Saturation Voltage (Note 10) | $V_{BE(SAT)}$ | — | 0.86 | 1.1 | V | $I_C$ = 1A, $I_B$ = 100mA |
| Base-Emitter Turn-On Voltage (Note 10) | $V_{BE(ON)}$ | — | 0.78 | 1 | V | $I_C$ = 1A, $V_{CE}$ = 2V |
| DC Current Gain (Note 10) | $h_{FE}$ | 70 | 198 | — | — | $I_C$ = 50mA, $V_{CE}$ = 2V |
| | | 100 | 191 | 300 | — | $I_C$ = 1A, $V_{CE}$ = 2V |
| | | 75 | 180 | — | — | $I_C$ = 2A, $V_{CE}$ = 2V |
| | | 15 | 98 | — | — | $I_C$ = 6A, $V_{CE}$ = 2V |
| Current Gain-Bandwidth Product | $f_T$ | 150 | 240 | — | MHz | $V_{CE}$ = 5V, $I_C$ = 100mA, f = 100MHz |
| Switching Times | $t_{ON}$ | — | 55 | — | ns | $I_C$ = 500mA, $V_{CC}$ = 10V, $I_{B1}$ = -$I_{B2}$ = 50mA |
| | $t_{OFF}$ | — | 300 | — | ns | |
| Output Capacitance | $C_{OBO}$ | — | 25 | 50 | pF | $V_{CB}$ = 10V, f = 1MHz |

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

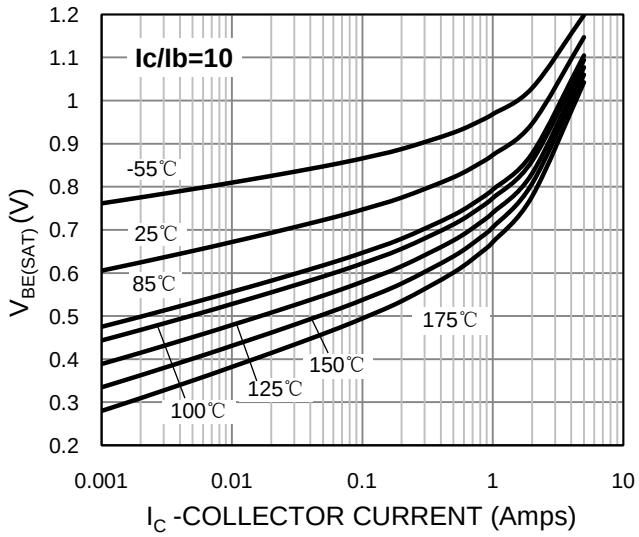
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



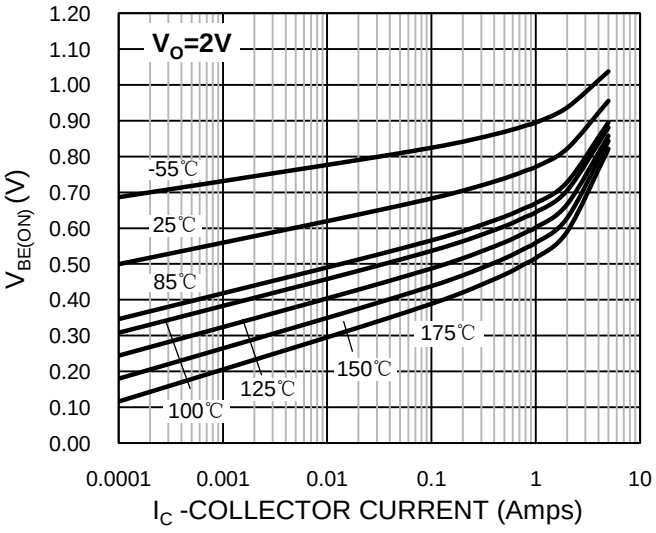

**$V_{CE(SAT)}$ vs $I_C$**



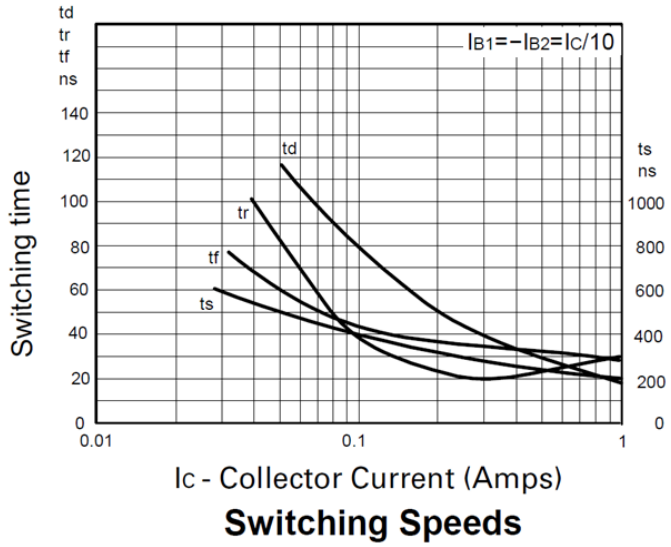

**$h_{FE}$ vs $I_C$**




**$V_{BE(SAT)}$ vs $I_C$**



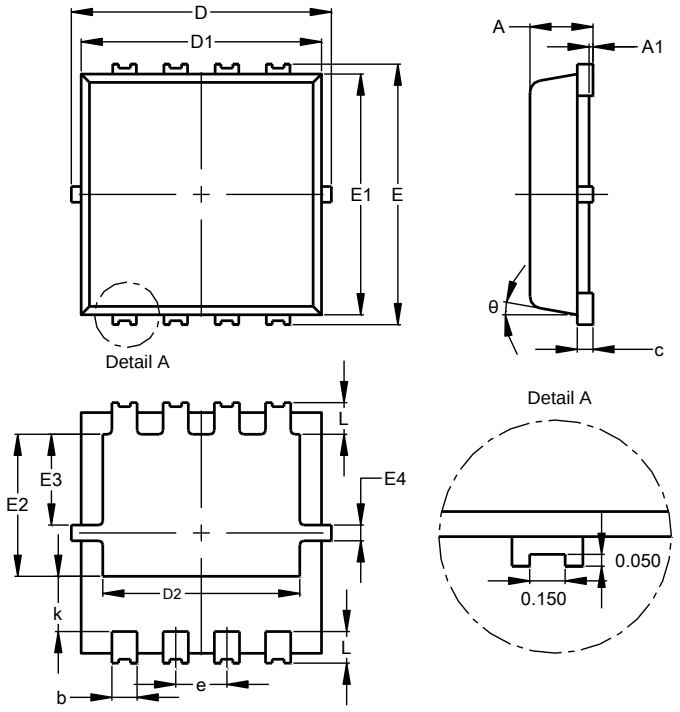

**$V_{BE(ON)}$ vs $I_C$**




**Switching Speeds**

## Package Outline Dimensions

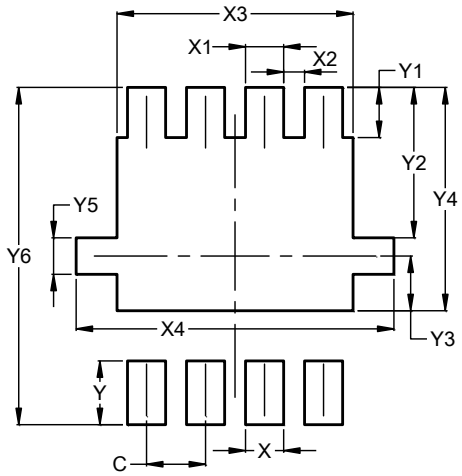
**PowerDI3333-8 (SWP) (Type UX)**




| PowerDI3333-8 (SWP) (Type UX) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.75 | 0.85 | 0.80 |
| **A1** | 0.00 | 0.05 | -- |
| **b** | 0.25 | 0.40 | 0.32 |
| **c** | 0.10 | 0.25 | 0.15 |
| **D** | 3.20 | 3.40 | 3.30 |
| **D1** | 2.95 | 3.15 | 3.05 |
| **D2** | 2.30 | 2.70 | 2.50 |
| **E** | 3.20 | 3.40 | 3.30 |
| **E1** | 2.95 | 3.15 | 3.05 |
| **E2** | 1.60 | 2.00 | 1.80 |
| **E3** | 0.95 | 1.35 | 1.15 |
| **E4** | 0.10 | 0.30 | 0.20 |
| **e** | – | – | 0.65 |
| **k** | 0.50 | 0.90 | 0.70 |
| **L** | 0.30 | 0.50 | 0.40 |
| **θ** | 0° | 12° | 10° |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

**PowerDI3333-8 (SWP) (Type UX)**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 0.650 |
| **X** | 0.420 |
| **X1** | 0.420 |
| **X2** | 0.230 |
| **X3** | 2.600 |
| **X4** | 3.500 |
| **Y** | 0.700 |
| **Y1** | 0.550 |
| **Y2** | 1.650 |
| **Y3** | 0.600 |
| **Y4** | 2.450 |
| **Y5** | 0.400 |
| **Y6** | 3.700 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.