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

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企业微信二维码

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## 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 VCE(sat) < -200mV @ -1A
- Complementary NPN Type: NK-DXTN07025BFG
- Rated to +175°C – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection

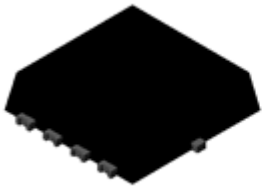
## Mechanical Data

- 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)

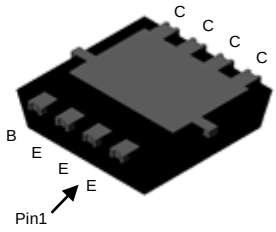
## Applications

- High-Side Switch
- Low Drop Out Regulator
- MOSFET or IGBT Gate Driving

PowerDI3333-8 (SWP) (Type UX)

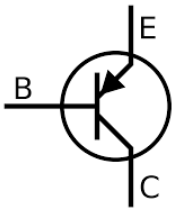


Top View




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.)

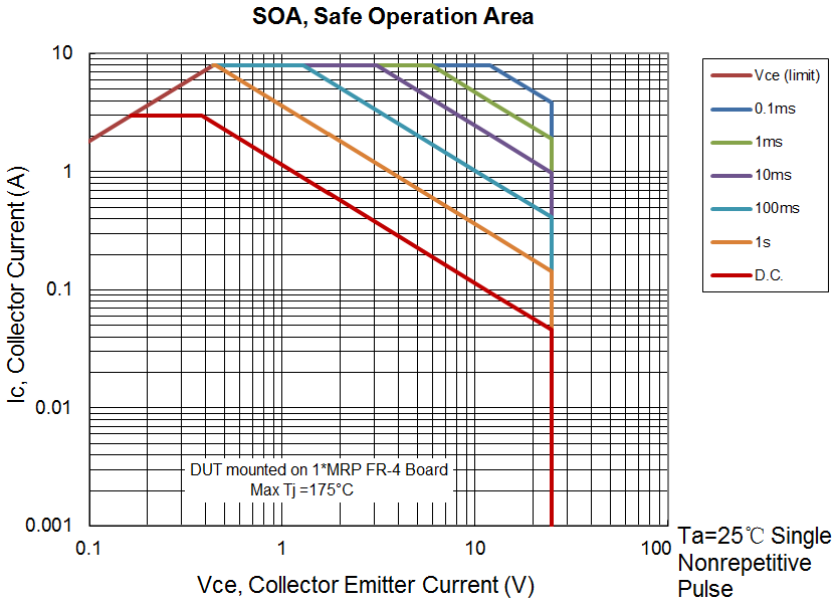
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 0.9 | W |
| | (Note 6) | | 2.1 | W |
| | (Note 7) | | 3.1 | W |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\Theta JA}$ | 140 | °C/W |
| | (Note 6) | | 65 | °C/W |
| | (Note 7) | | 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 |

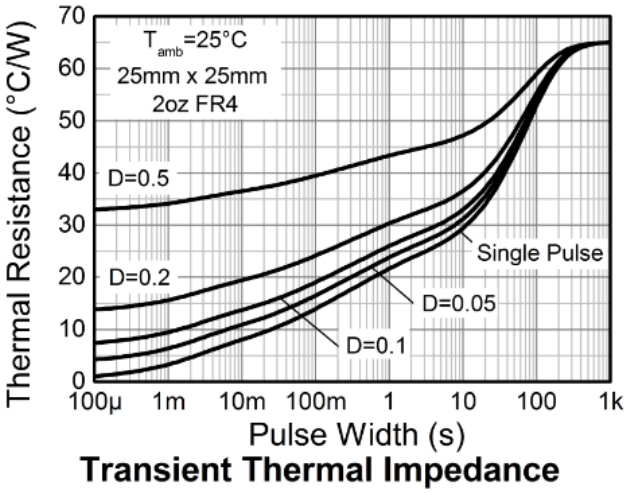
## ESD Ratings (Note 9)

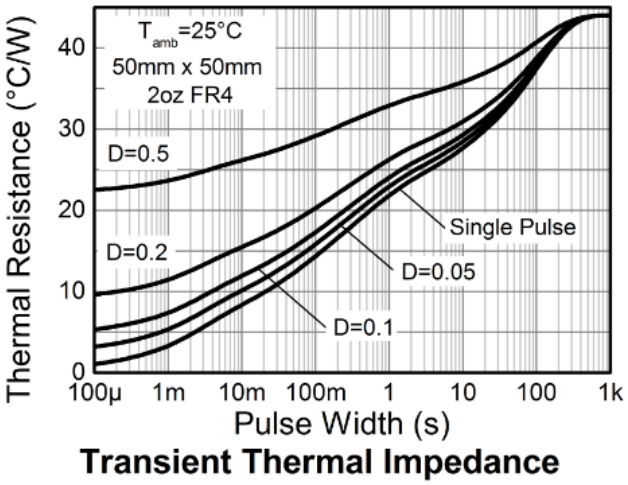
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge—Human Body Model | ESD HBM | 4000 | V | 3A |
| Electrostatic Discharge—Machine Model | ESD MM | 400 | V | C |

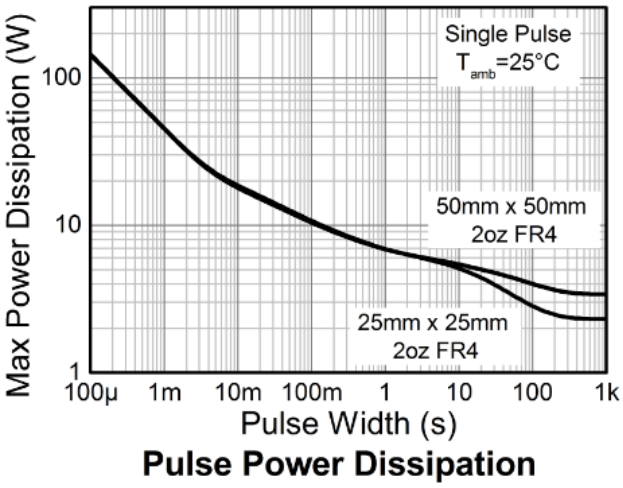
Notes:
1. For a device mounted with the collector tab on MRP FR4-PCB; device is measured under still air conditions whilst operating in a steady-state.
2. Same as Note 5, except the device is mounted on 25mm × 25mm 2oz copper.
3. Same as Note 5, except the device is mounted on 50mm × 50mm 2oz copper.
4. Thermal resistance from junction to solder-point (at the collector tab).
5. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

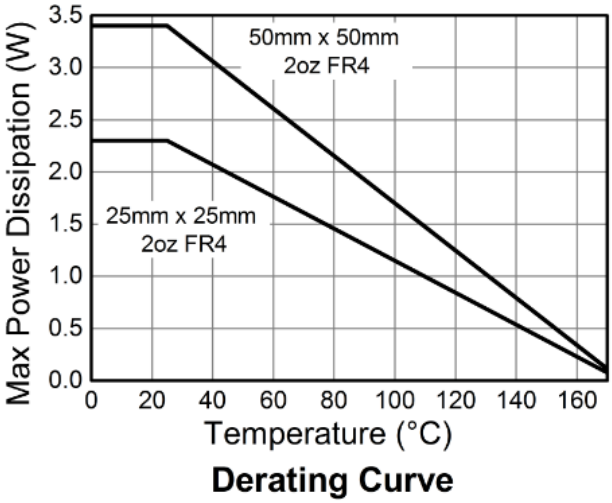
## Thermal Characteristics and Derating Information



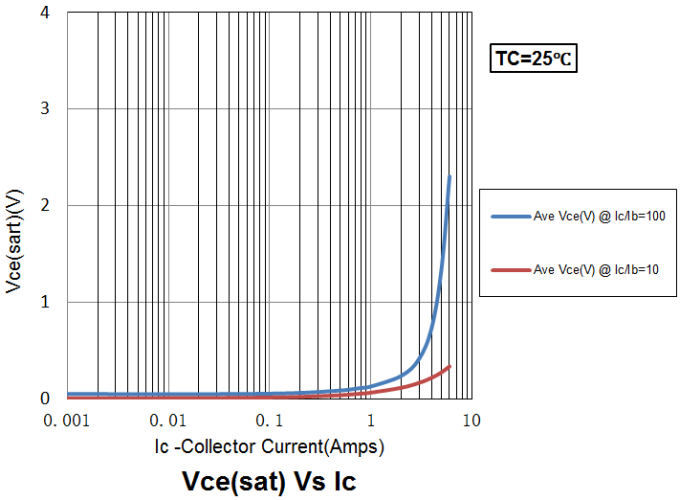



## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

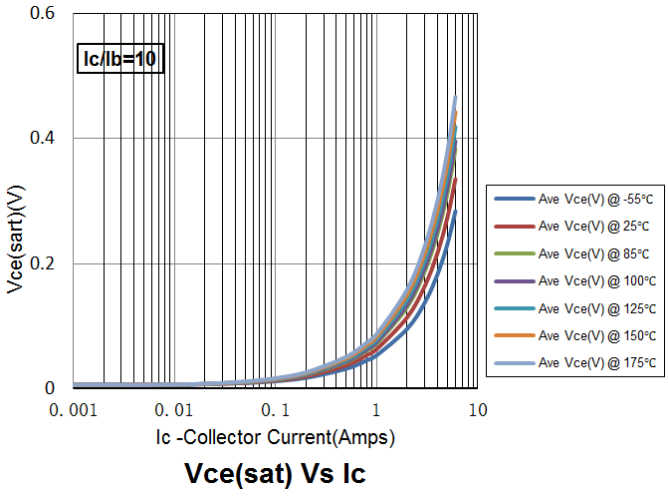
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -35 | -71 | — | V | $I_C$ = -100μA |
| Collector-Emitter Breakdown Voltage (Note 10) | $BV_{CEO}$ | -25 | -42 | — | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -7 | -8.3 | — | 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) | $V_{CE(SAT)}$ | — | -64 | -200 | mV | $I_C$ = -1A, $I_B$ = -100mA |
| | | — | -164 | -400 | mV | $I_C$ = -3A, $I_B$ = -300mA |
| Base-Emitter Saturation Voltage (Note 10) | $V_{CE(SAT)}$ | — | -0.86 | -1 | V | $I_C$ = -1A, $I_B$ = -100mA |
| Base-Emitter Turn-On Voltage (Note 10) | $V_{BE(ON)}$ | — | -0.77 | -0.9 | V | $I_C$ = -1A, $V_{CE}$ = -2V |
| DC Current Gain (Note 10) | $h_{FE}$ | 70 | 196 | — | — | $I_C$ = -50mA, $V_{CE}$ = -2V |
| | | 100 | 174 | 300 | — | $I_C$ = -1A, $V_{CE}$ = -2V |
| | | 75 | 153 | — | — | $I_C$ = -2A, $V_{CE}$ = -2V |
| | | 40 | 94 | — | — | $I_C$ = -6A, $V_{CE}$ = -2V |
| Current Gain-Bandwidth Product | $f_T$ | 100 | 160 | — | MHz | $V_{CE}$ = -5V, $I_C$ = -100mA f = 100MHz |
| Turn-On Time | $t_{on}$ | — | 40 | — | ns | $V_{CC}$ = -10V, $I_C$ = -500mA |
| Turn-Off Time | $t_{off}$ | — | 450 | — | ns | $I_{B1}$ = -$I_{B2}$ = -50mA |
| Output Capacitance | $C_{obo}$ | — | 55 | 100 | pF | $V_{CB}$ = -10V, f = 1MHz |

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

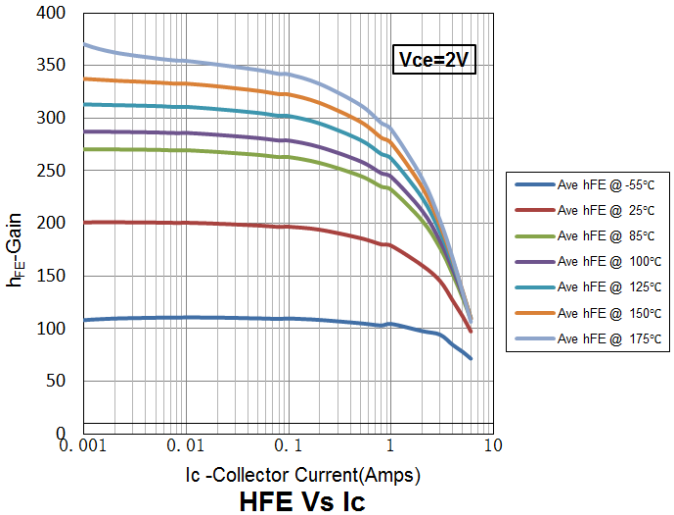
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



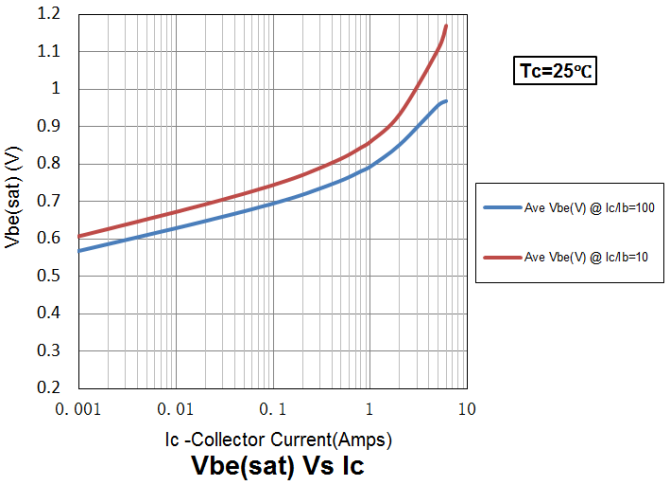
Vce(sat) Vs Ic



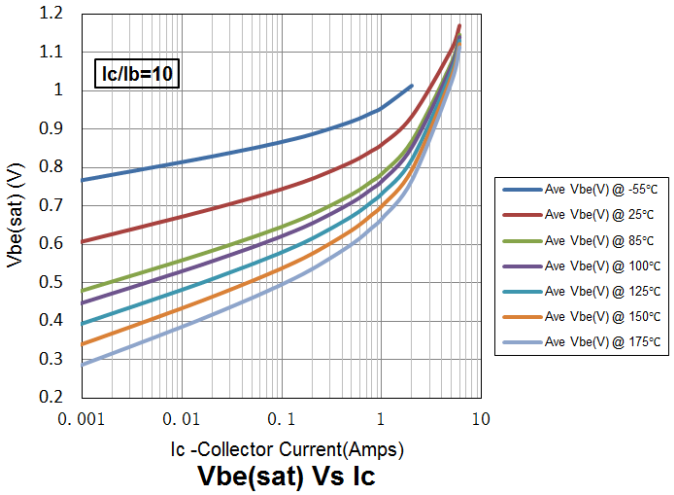
Vce(sat) Vs Ic



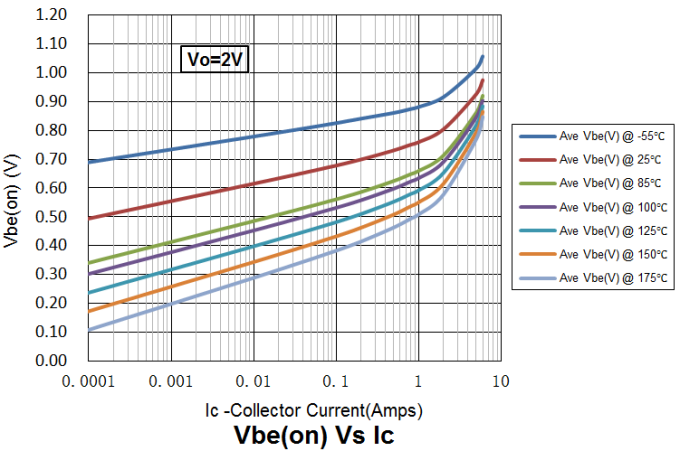
HFE Vs Ic



Vbe(sat) Vs Ic



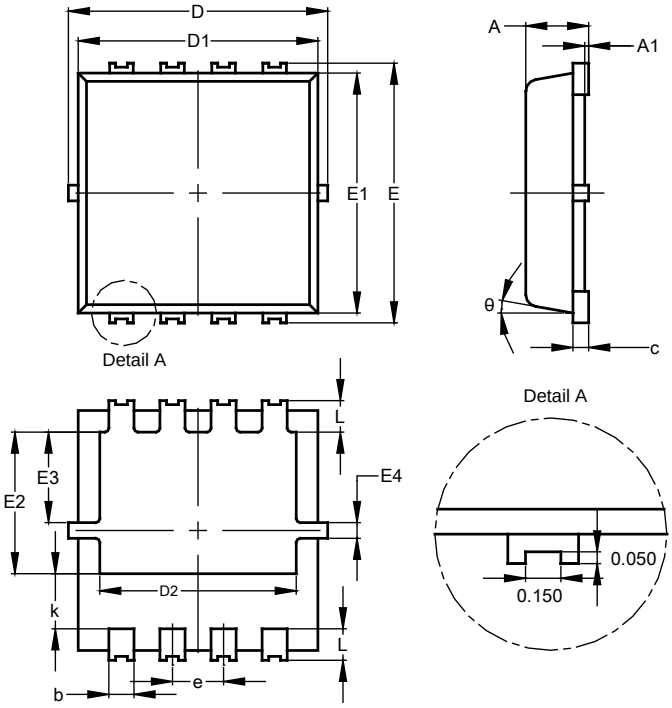
Vbe(sat) Vs Ic



Vbe(on) Vs Ic

## Package Outline Dimensions

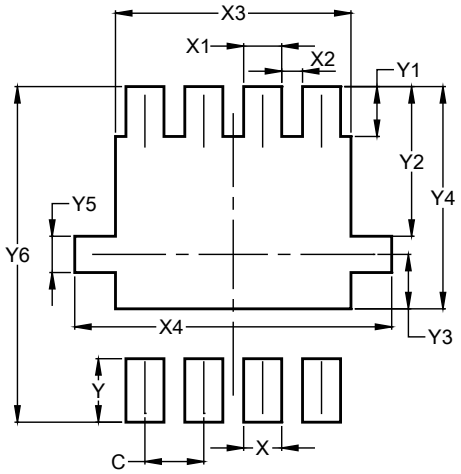
**PowerDI3333-8 (SWP) (Type UX)**




| 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 |