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

- $BV_{CEO}$ > -100V
- $I_C$ = -3A Continuous Collector Current
- $I_{CM}$ = -8A Peak Pulse Current
- $R_{CE(SAT)}$ = 110mΩ (typ)
- Rated to +175°C—Ideal for High Ambient Temperature Environments
- Complementary Part DXTN3C100PS
- Meets Requirements of Automotive Applications
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

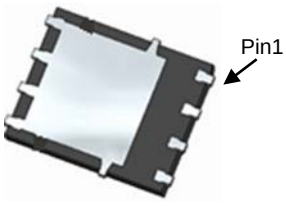
- Case: Power®DI5060-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Finish—Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.097 grams (Approximate)

## Applications

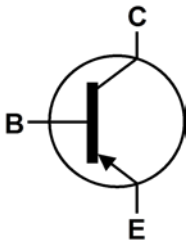
- Power Management
- Load Switch
- Linear Mode Voltage Regulator
- Backlighting Applications

PowerDI5060-8

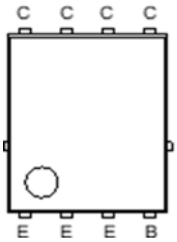
Top View




Bottom View




Internal Schematic




Top View
Pin Configuration

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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -100 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -100 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -7 | V |
| Base Current | $I_B$ | -0.5 | A |
| Continuous Collector Current | $I_C$ | -3 | A |
| Peak Pulse Collector Current | $I_{CM}$ | -8 | A |

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

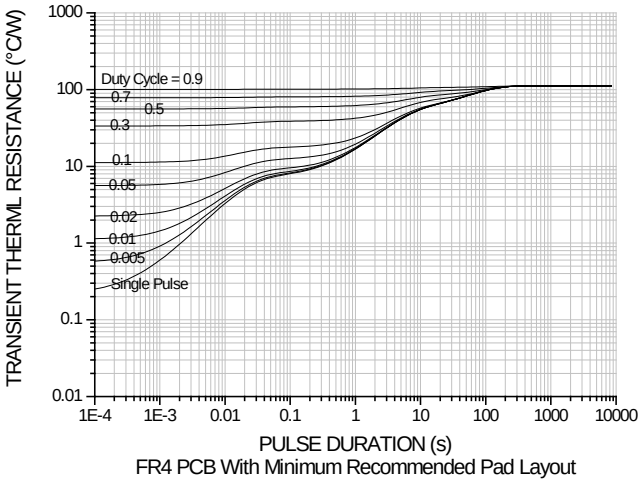
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 5 | W |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\Theta JA}$ | 40 | °C/W |
| | (Note 6) | | 120 | |
| Thermal Resistance, Junction to Case | (Note 5, 7) | $R_{\Theta JC}$ | 2 | °C/W |
| | (Note 6, 7) | | 12 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +175 | °C |

## ESD Ratings (Note 8)

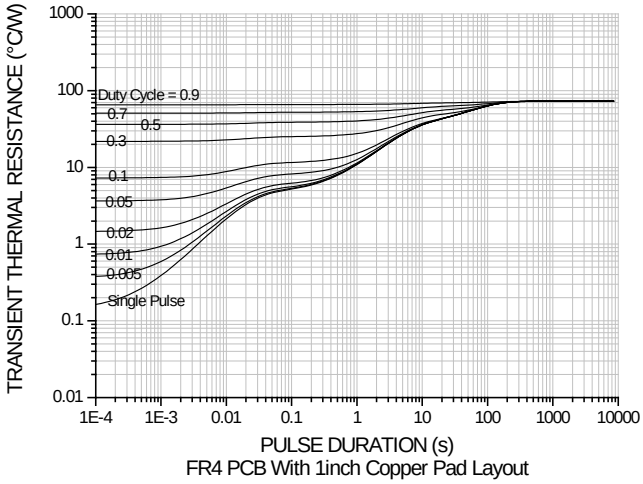
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge—Human Body Model | ESD HBM | 8000V | V | 3A |
| Electrostatic Discharge—Machine Model | ESD MM | 400V | V | C |

Notes:
5. For a device mounted with the collector lead on 25mm × 25mm 2oz copper, on a single-sided 1.6mm FR4 PCB; the device is measured under still air conditions while operating in a steady state.
6. Same as Note 5 except mounted on minimum recommended pad layout.
7. Thermal resistance from junction to the top of the case.
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

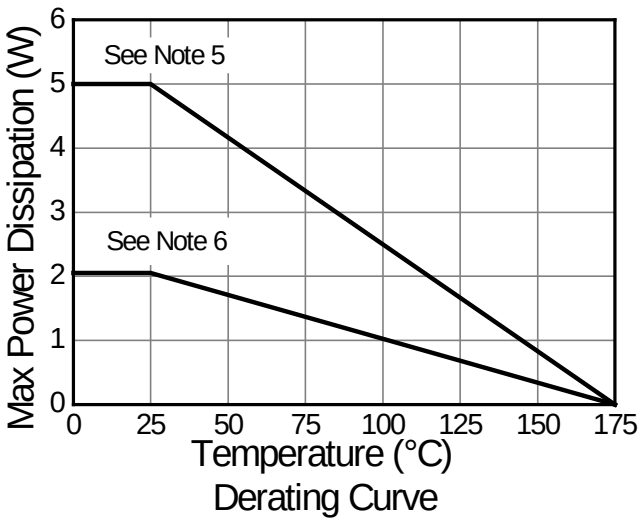
## Typical Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



FR4 PCB With Minimum Recommended Pad Layout



FR4 PCB With 1inch Copper Pad Layout



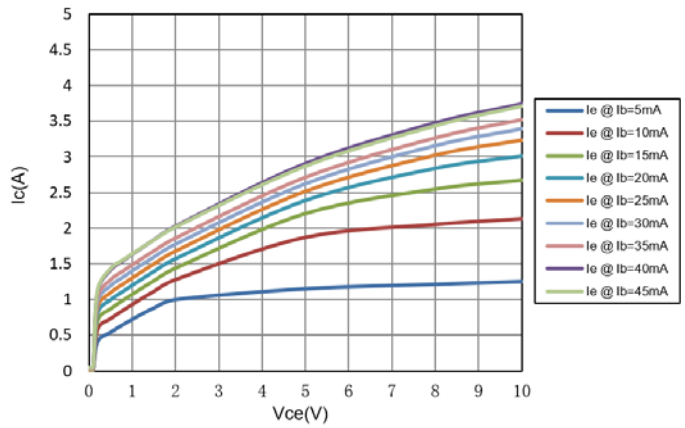
Derating Curve

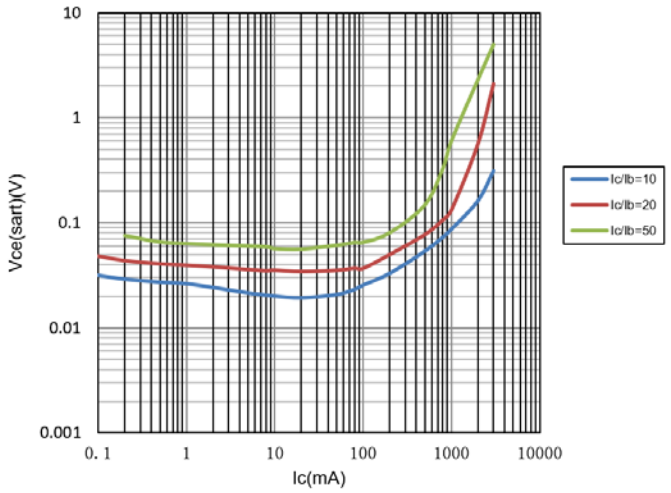
## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

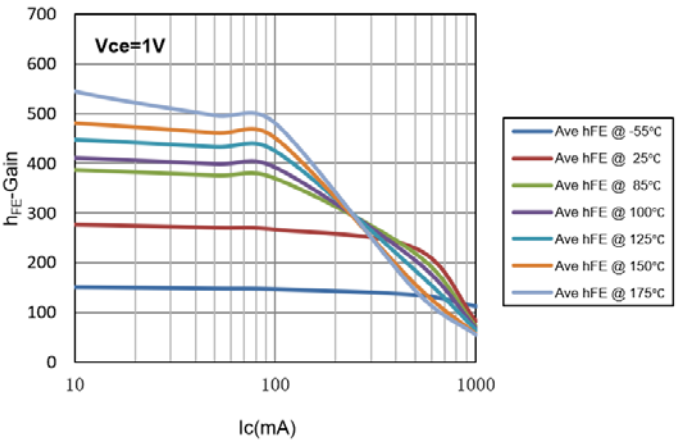
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -100 | — | — | V | $I_C$ = -100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | $BV_{CEO}$ | -100 | — | — | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -7 | — | — | V | $I_E$ = -100μA |
| Collector-Base Cutoff Current | $I_{CBO}$ | — | — | -100 | nA | $V_{CB}$ = -80V |
| | | — | — | -50 | μA | $V_{CB}$ = -80V @Tj = 150°C |
| Emitter Cutoff Current | $I_{EBO}$ | — | — | -100 | nA | $V_{EB}$ = -7V |
| Collector-Emitter Cutoff Current | $I_{CES}$ | — | — | -100 | nA | $V_{CES}$ = -80V |
| **ON CHARACTERISTICS** (Note 9) | | | | | | |
| DC Current Gain | $h_{FE}$ | 170 | 305 | — | — | $I_C$ = -500mA, $V_{CE}$ = -10V |
| | | 160 | 275 | — | | $I_C$ = -1A, $V_{CE}$ = -10V |
| | | 45 | 90 | — | | $I_C$ = -2A, $V_{CE}$ = -10V |
| | | 10 | 20 | — | | $I_C$ = -3A, $V_{CE}$ = -10V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | -70 | -110 | mV | $I_C$ = -0.5A, $I_B$ = -50mA |
| | | — | -220 | -360 | | $I_C$ = -2A, $I_B$ = -200mA |
| Collector-Emitter Saturation Resistance | $R_{CE(sat)}$ | — | 110 | 180 | mΩ | $I_C$ = -2A, $I_B$ = -200mA |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | — | -0.91 | -1 | V | $I_C$ = -1A, $I_B$ = -50mA |
| | | — | -1.02 | -1.2 | | $I_C$ = -2A, $I_B$ = -200mA |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | — | -0.68 | -0.9 | V | $I_C$ = -0.1A, $V_{CE}$ = -2V |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | | |
| Current Gain-Bandwidth Product | $f_T$ | — | 125 | — | MHz | $V_{CE}$ = -10V, $I_C$ = -100mA, f = 100MHz |
| Output Capacitance | $C_{obo}$ | — | 30 | — | pF | $V_{CB}$ = -10V, f = -1MHz |
| Delay Time | $t_d$ | — | 20 | — | ns | $V_{CC}$ = -12.5V, $I_C$ = -1A<br>$I_{B1}$ = -$I_{B2}$ = 50mA |
| Rise Time | $t_r$ | — | 180 | — | ns | |
| Turn-On Time | $t_{(on)}$ | — | 200 | — | ns | |
| Storage Time | $t_s$ | — | 350 | — | ns | |
| Fall Time | $t_f$ | — | 220 | — | ns | |
| Turn-Off Time | $t_{(off)}$ | — | 570 | — | ns | |

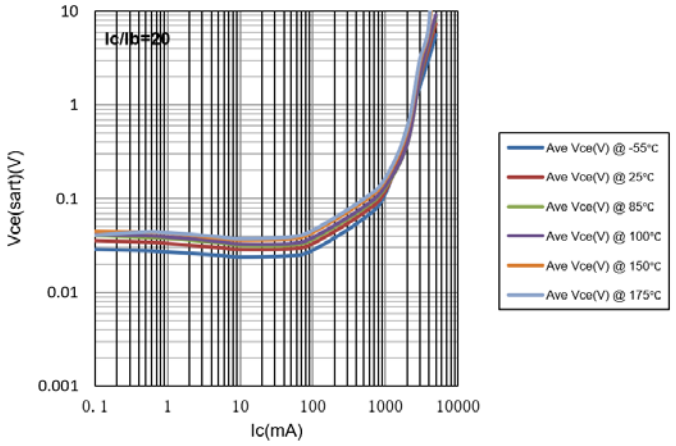
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

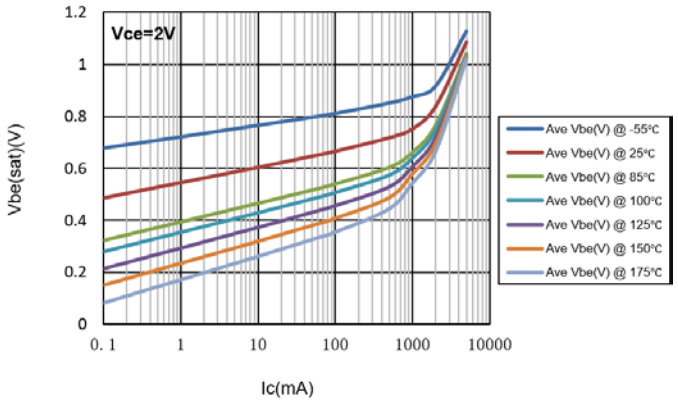
## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

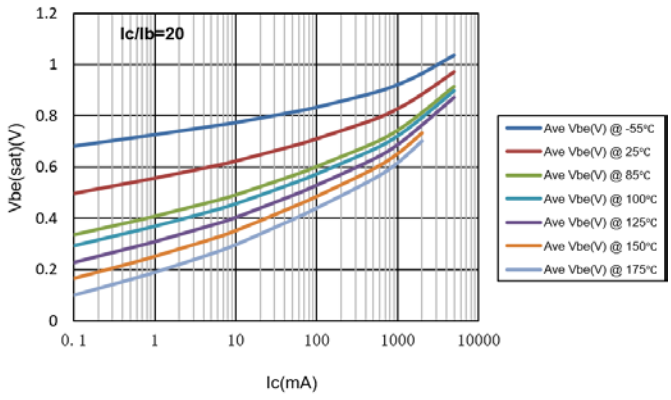


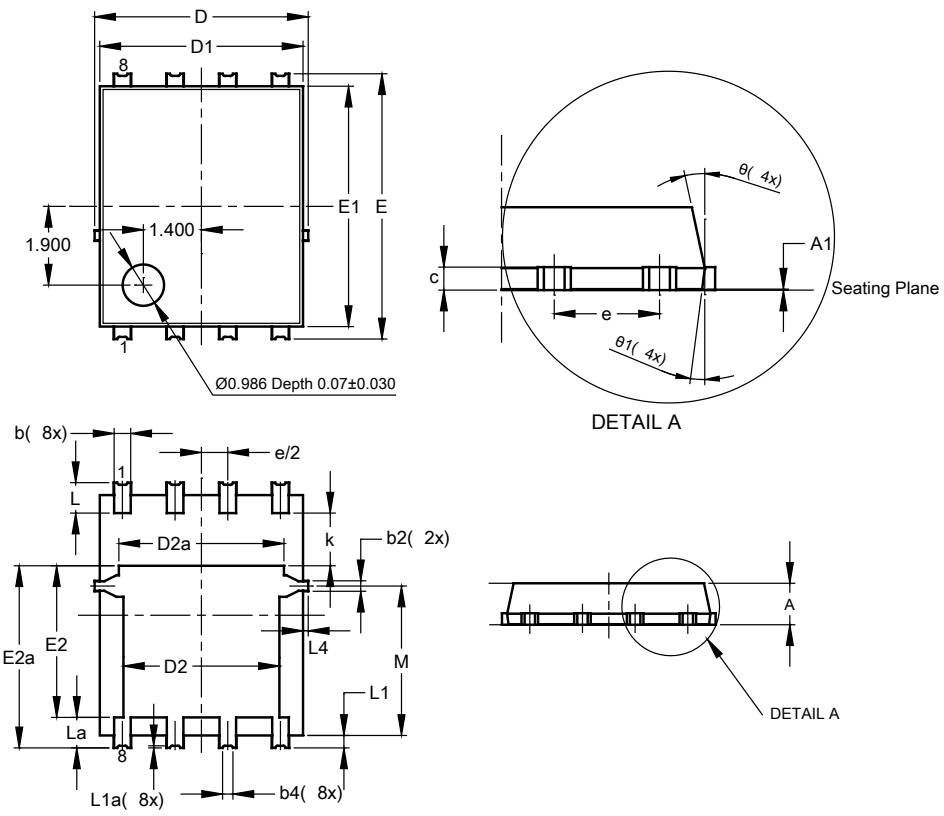



## Package Outline Dimensions

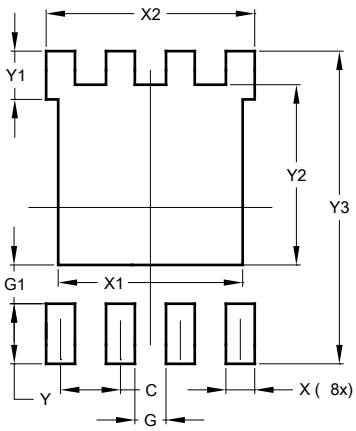
**PowerDI5060-8 (SWP) (Type Q)**




| PowerDI5060-8 (SWP) (Type Q) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.90 | 1.10 | 1.00 |
| **A1** | 0 | 0.05 | — |
| **b** | 0.30 | 0.50 | 0.41 |
| **b2** | 0.20 | 0.35 | 0.25 |
| **b4** | 0.25REF | | |
| **c** | 0.230 | 0.330 | 0.277 |
| **D** | 5.15 BSC | | |
| **D1** | 4.70 | 5.10 | 4.90 |
| **D2** | 3.56 | 3.96 | 3.76 |
| **D2a** | 3.78 | 4.18 | 3.98 |
| **E** | 6.40 BSC | | |
| **E1** | 5.60 | 6.00 | 5.80 |
| **E2** | 3.46 | 3.86 | 3.66 |
| **E2a** | 4.195 | 4.595 | 4.395 |
| **e** | 1.27BSC | | |
| **k** | 1.05 | — | — |
| **L** | 0.635 | 0.835 | 0.735 |
| **La** | 0.635 | 0.835 | 0.735 |
| **L1** | 0.200 | 0.400 | 0.300 |
| **L1a** | 0.050REF | | |
| **L4** | 0.025 | 0.225 | 0.125 |
| **M** | 3.205 | 4.005 | 3.605 |
| **θ** | 10° | 12° | 11° |
| **θ1** | 6° | 8° | 7° |
| **All Dimensions in mm** | | | |

## Suggested PadLayout

**PowerDI5060-8 (SWP) (Type Q)**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 1.270 |
| **G** | 0.660 |
| **G1** | 0.820 |
| **X** | 0.610 |
| **X1** | 4.100 |
| **X2** | 4.420 |
| **Y** | 1.270 |
| **Y1** | 1.020 |
| **Y2** | 3.810 |
| **Y3** | 6.610 |