



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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## Features

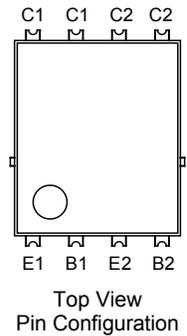
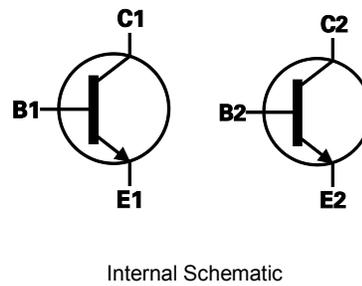
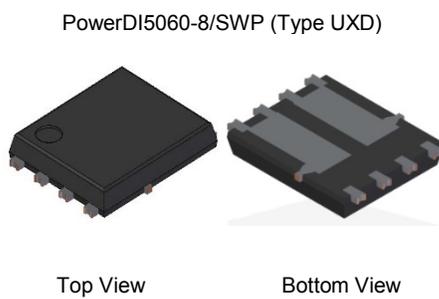
- $BV_{CEO} > 100V$
- $I_C = 3A$  Continuous Collector Current
- $I_{CM} = 8A$  Peak Pulse Current
- $R_{CE(sat)} = 90m\Omega$  (Typ)
- Complementary Part DXTP3C100PD
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: POWERDI5060-8/SWP (Type UXD)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Lead-Frame; Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.097 grams (Approximate)

## Applications

- Power Management
- Motor Drive
- Linear Mode Voltage Regulators
- Backlighting Applications



**Absolute Maximum Ratings** (@  $T_A = +25^{\circ}\text{C}$ , 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	$I_B$	500	mA
Continuous Collector Current	$I_C$	3	A
Peak Pulse Collector Current	$I_{CM}$	8	A

**Thermal Characteristics** (@  $T_A = +25^{\circ}\text{C}$ , unless otherwise specified.)

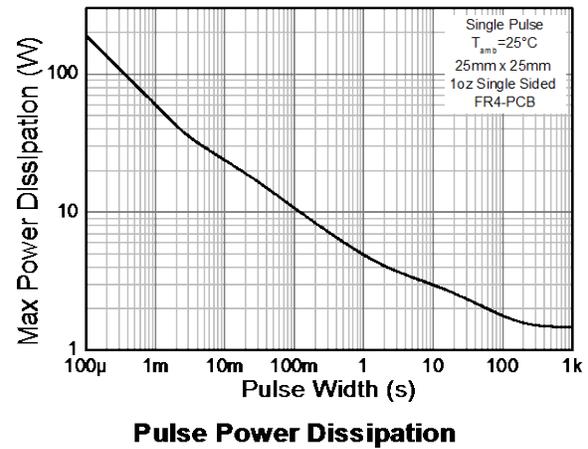
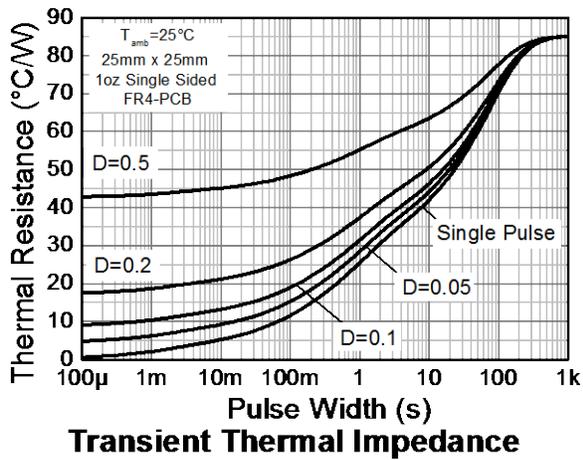
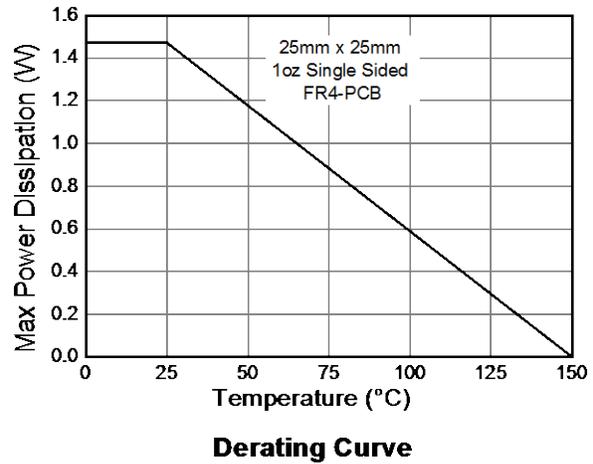
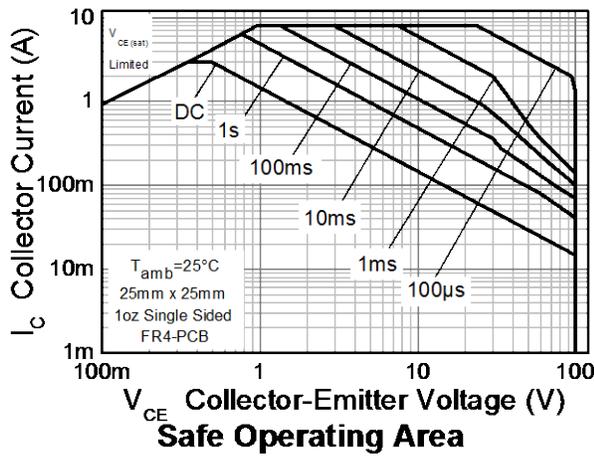
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	1.47	W
Linear Derating Factor		11.76	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	85	$^{\circ}\text{C/W}$
		37	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	5.7	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	

**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:
5. For a device mounted with the collector lead on 25mm x 25mm 1oz copper that is on single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as Note 5, except the device is measured at  $t \leq 5$  sec.
  7. For a dual device with one active die.
  8. Thermal resistance from junction to solder-point (at the end of the collector lead).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

### Thermal Characteristics and Derating Information

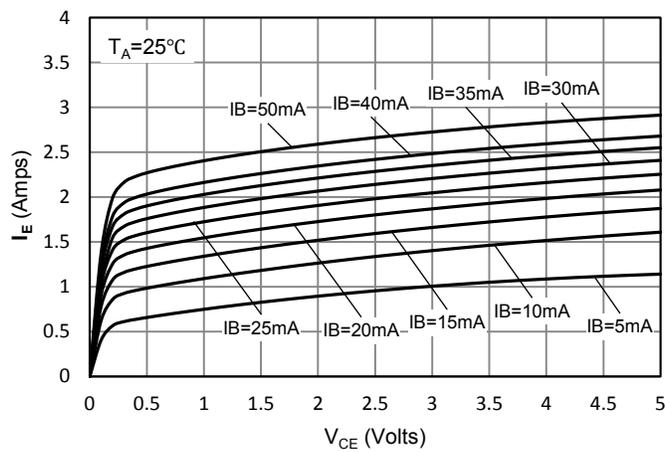


**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

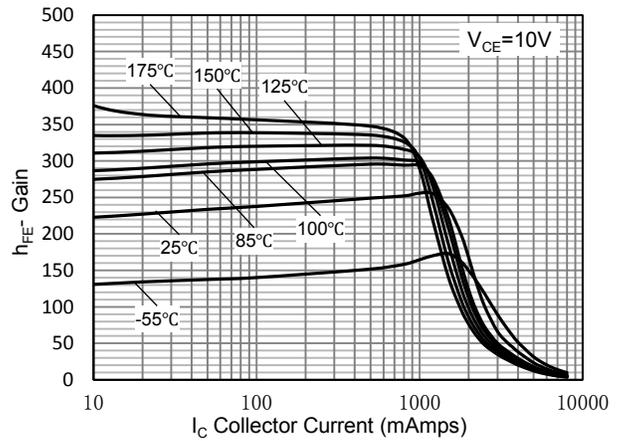
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	100	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	$BV_{CEO}$	100	—	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	—	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cutoff Current	$I_{CBO}$	—	—	100	nA	$V_{CB} = 80\text{V}$
		—	—	50	$\mu\text{A}$	$V_{CB} = 80\text{V} @ T_j = 150^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	—	—	100	nA	$V_{EB} = 7\text{V}$
Collector-Emitter Cutoff Current	$I_{CES}$	—	—	100	nA	$V_{CES} = 80\text{V}$
<b>ON CHARACTERISTICS (Note 10)</b>						
DC Current Gain	$h_{FE}$	150	250	—	—	$I_C = 500\text{mA}, V_{CE} = 10\text{V}$
		80	250	—		$I_C = 1\text{A}, V_{CE} = 10\text{V}$
		20	100	—		$I_C = 2\text{A}, V_{CE} = 10\text{V}$
		10	40	—		$I_C = 3\text{A}, V_{CE} = 10\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	90	150	mV	$I_C = 1\text{A}, I_B = 50\text{mA}$
		—	225	330	mV	$I_C = 3\text{A}, I_B = 300\text{mA}$
Collector-Emitter Saturation Resistance	$R_{CE(sat)}$	—	90	150	m $\Omega$	$I_C = 1\text{A}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	0.86	1.0	V	$I_C = 1\text{A}, I_B = 50\text{mA}$
		—	1.0	1.2		$I_C = 2\text{A}, I_B = 200\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	0.67	0.85	V	$I_C = 0.1\text{A}, V_{CE} = 2\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Current Gain-Bandwidth Product	$f_T$	—	130	—	MHz	$V_{CE} = 10\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	11	—	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Delay Time	$t_d$	—	40	—	ns	$V_{CC} = 12.5\text{V}, I_C = 1\text{A}$ $I_{B1} = -I_{B2} = 0.05\text{A}$
Rise Time	$t_r$	—	20	—	ns	
Turn-On Time	$t_{(on)}$	—	60	—	ns	
Storage Time	$t_s$	—	620	—	ns	
Fall Time	$t_f$	—	40	—	ns	
Turn-Off Time	$t_{off}$	—	660	—	ns	

 Note: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

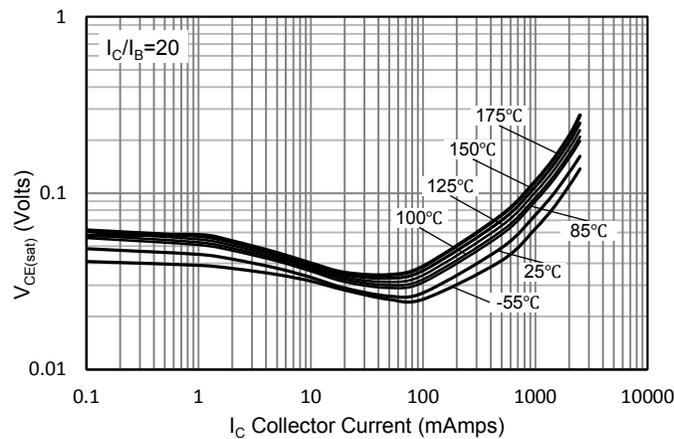
**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



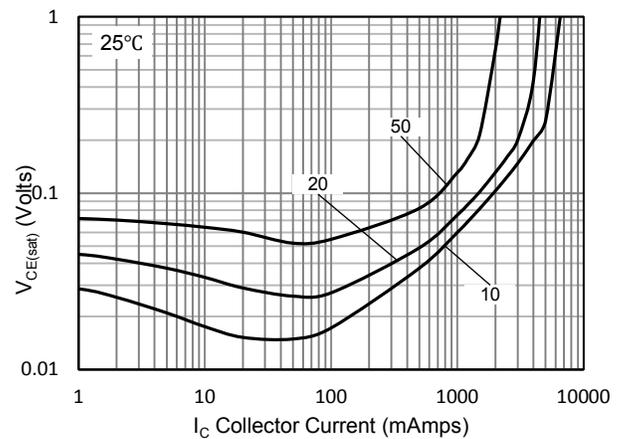
**$V_{CE}$  vs  $I_E$**



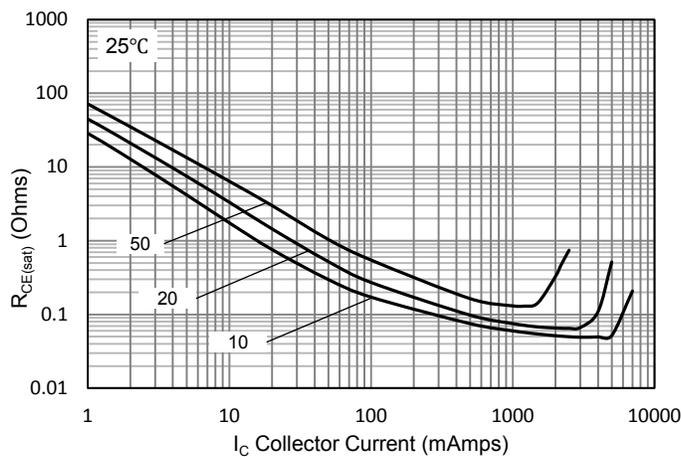
**$h_{FE}$  vs  $I_C$**



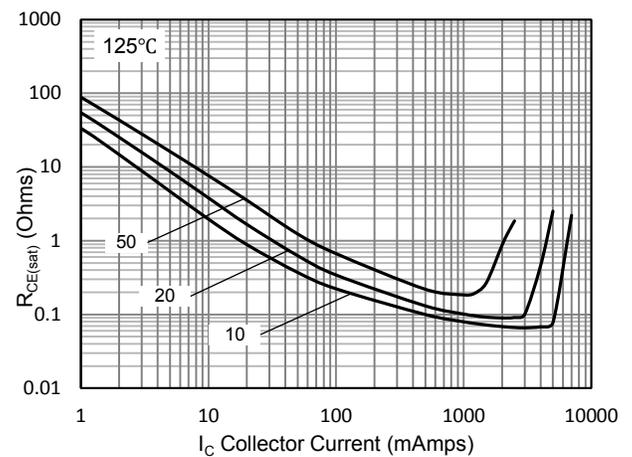
**$V_{CE(sat)}$  vs  $I_C$**



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

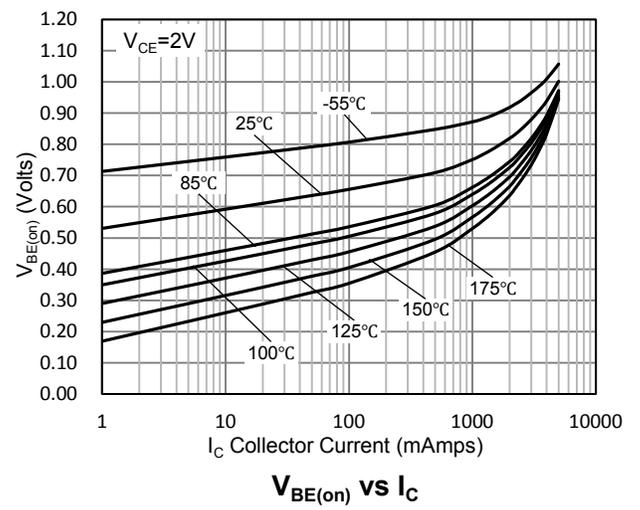
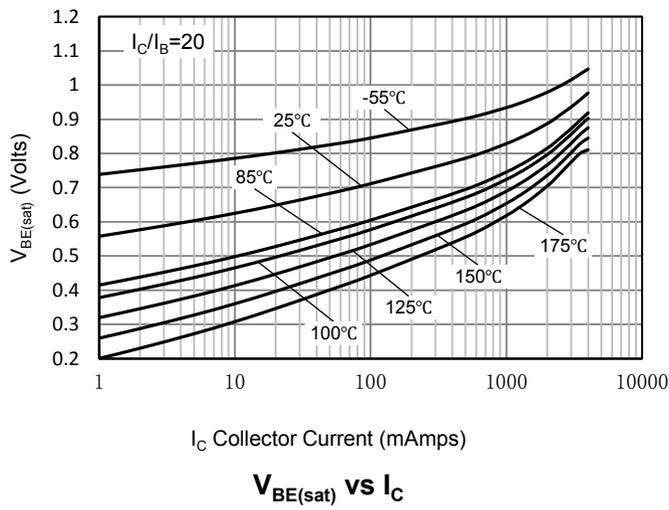


**$R_{CE(sat)}$  vs  $I_C$**

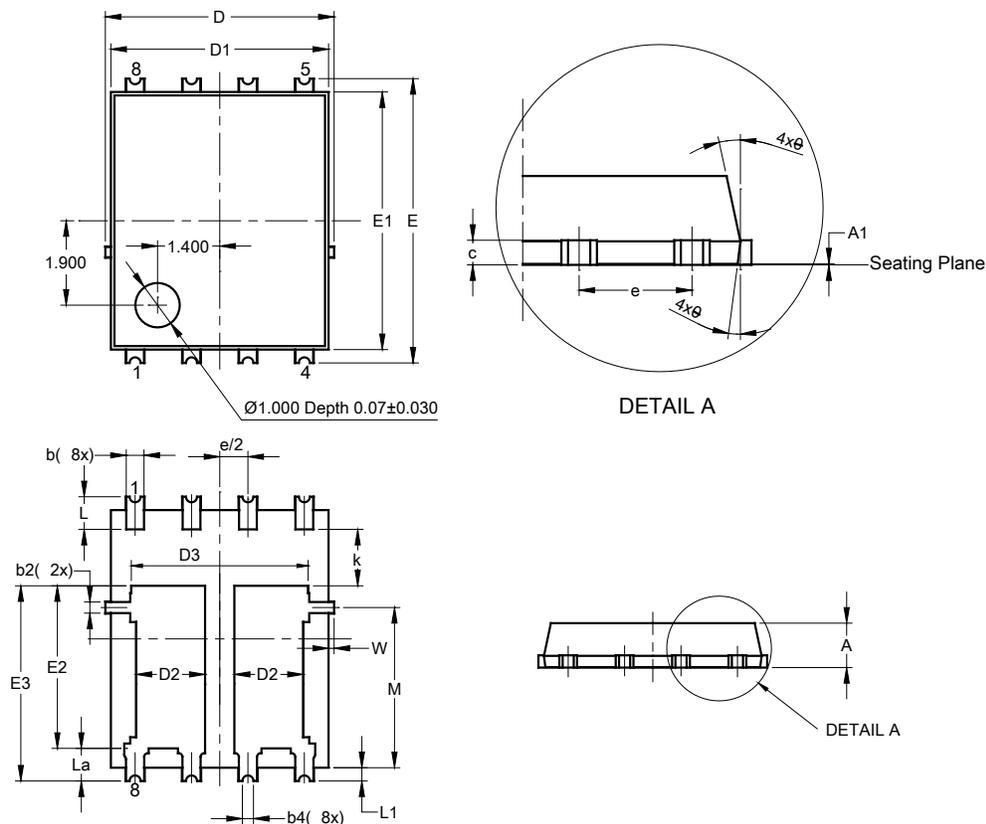


**$R_{CE(sat)}$  vs  $I_C$**

**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.) (continued)

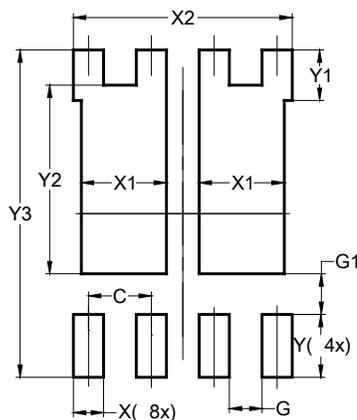


## Package Outline Dimensions

**PowerDI5060-8/SWP (Type UXD)**


PowerDI5060-8/SWP (Type UXD)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	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	1.46	1.66	1.55
D3	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
M	3.205	4.005	3.605
W	0.025	0.225	0.125
θ	10°	12°	11°
θ1	6°	8°	7°
All Dimensions in mm			

## Suggested Pad Layout

**PowerDI5060-8/SWP (Type UXD)**


Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	1.720
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610