



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



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Features

- $BV_{CEO} > -100V$
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- $I_C = -5A$ Continuous Collector Current
- $I_{CM} = -10A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -90mV @ -1A$
- $R_{SAT} = 56m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified up to $-10A$ for a High Gain Hold-Up
- Complementary NPN Type: NK-DXTN03100BFG
- Rated to $+175^\circ C$ – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection

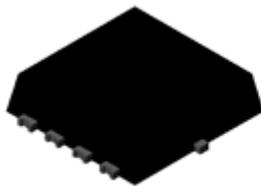
Mechanical Data

- 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 Plated Leads Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.03 grams (Approximate)

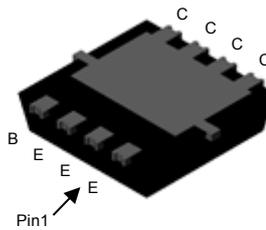
Applications

- Motor Driving
- Line Switching
- High Side Switches

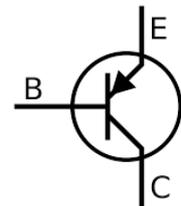
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-140	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-5	A
Peak Pulse Current	I_{CM}	-10	A

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

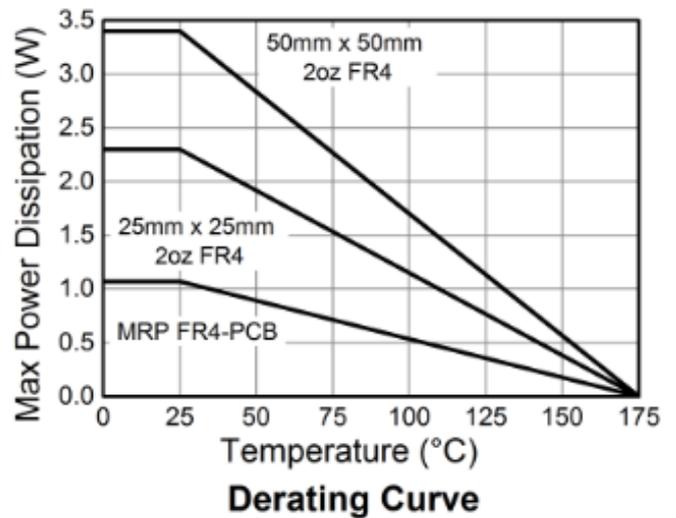
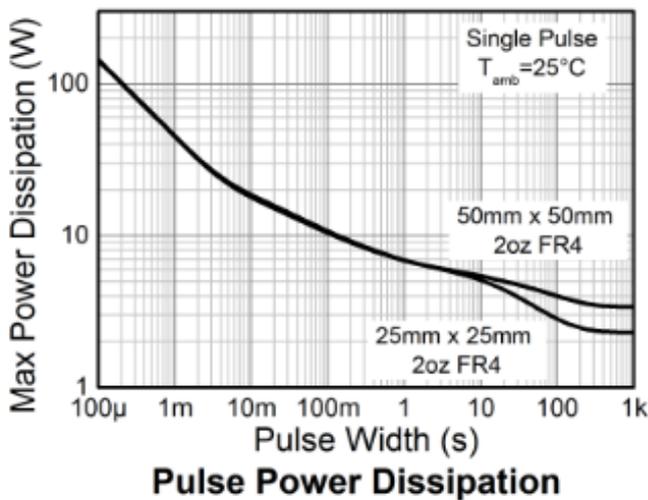
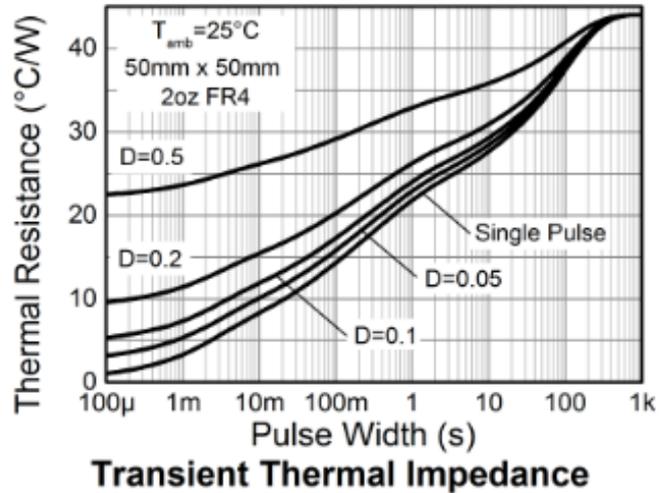
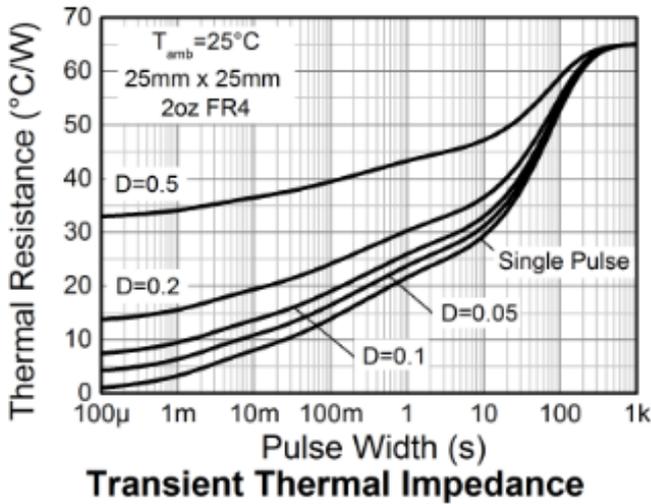
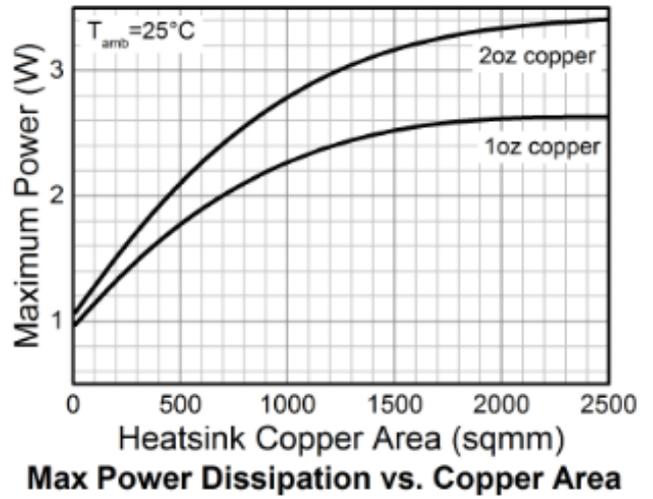
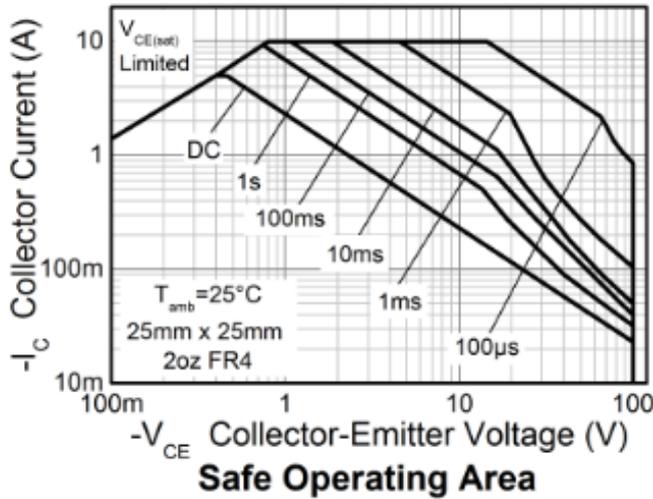
Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	1.07	W
		2.3	W
		3.4	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	140	$^\circ\text{C/W}$
		65	$^\circ\text{C/W}$
		44	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	6	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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:
5. 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.
 6. Same as Note 5, except the device is mounted on 25mm × 25mm 2oz copper.
 7. Same as Note 5, except the device is mounted on 50mm × 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

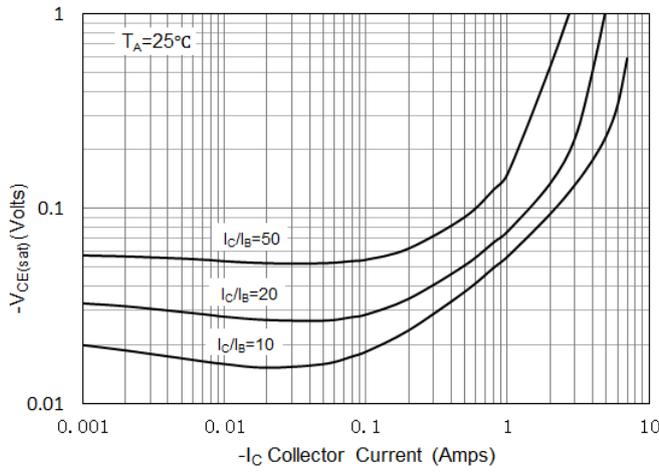


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

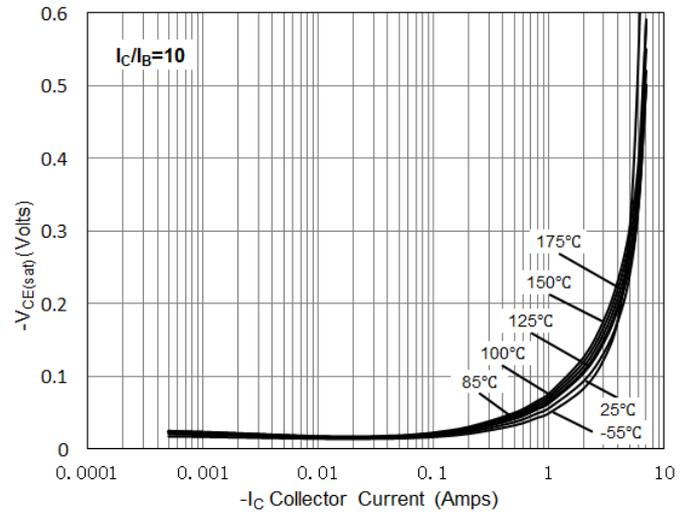
Characteristic	Symbol	Min	Typ	Max	Unit	Test
Collector-Base Breakdown Voltage	BV_{CBO}	-140	-169	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CER}	-140	-167	—	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	-100	-125	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.4	—	V	$I_E = -100\mu\text{A}$
Collector-Base Cut-Off Current	I_{CBO}	—	-2	-50	nA	$V_{CB} = -100\text{V}$
		—	-0.1	-10	μA	$V_{CB} = -100\text{V}$, $T_A = +125^\circ\text{C}$
Collector-Emitter Cut-Off Current	I_{CER} $R \leq 1\text{k}\Omega$	—	-2	-50	nA	$V_{CB} = -100\text{V}$
		—	-0.3	-10	μA	$V_{CB} = -100\text{V}$, $T_A = +125^\circ\text{C}$
Emitter Cut-Off Current	I_{EBO}	—	1	-20	nA	$V_{EB} = -6\text{V}$
Static Forward Current Transfer Ratio (Note 10)	h_{FE}	100	172	—	—	$I_C = -10\text{mA}$, $V_{CE} = -2\text{V}$
		100	151	300	—	$I_C = -1\text{A}$, $V_{CE} = -2\text{V}$
		25	43	—	—	$I_C = -3\text{A}$, $V_{CE} = -2\text{V}$
		15	27	—	—	$I_C = -4\text{A}$, $V_{CE} = -2\text{V}$
		5	7.3	—	—	$I_C = -10\text{A}$, $V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	-18	-30	mV	$I_C = -100\text{mA}$, $I_B = -10\text{mA}$
		—	-56	-90	mV	$I_C = -1\text{A}$, $I_B = -100\text{mA}$
		—	-94	-150	mV	$I_C = -2\text{A}$, $I_B = -200\text{mA}$
		—	-177	-340	mV	$I_C = -4\text{A}$, $I_B = -400\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	-967	-1100	mV	$I_C = -4\text{A}$, $I_B = -400\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	-869	-950	mV	$I_C = -4\text{A}$, $V_{CE} = -2\text{V}$
Output Capacitance	C_{obo}	—	42	—	pF	$V_{CB} = -10\text{V}$, $f = 1\text{MHz}$
Transition Frequency	f_T	—	125	—	MHz	$V_{CE} = -10\text{V}$, $I_C = -100\text{mA}$ $f = 50\text{MHz}$
Switching Characteristics	t_{delay}	—	10.1	—	ns	$V_{CC} = -10\text{V}$, $I_C = -1\text{A}$ $I_{B1} = I_{B2} = -100\text{mA}$
	t_{rise}	—	181	—	ns	
	$t_{storage}$	—	1340	—	ns	
	t_{fall}	—	127	—	ns	

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

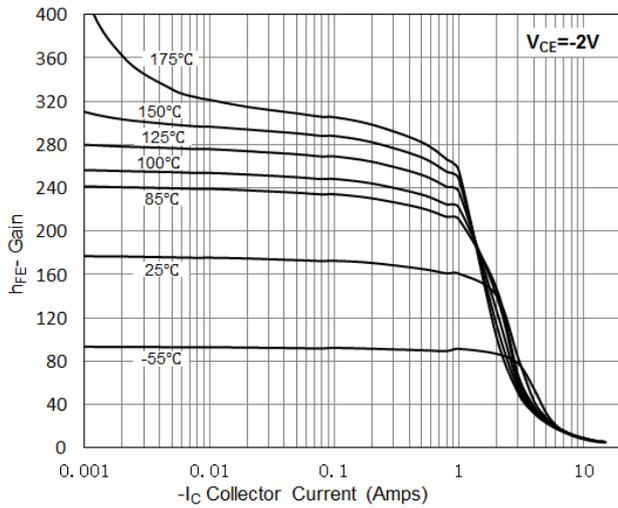
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



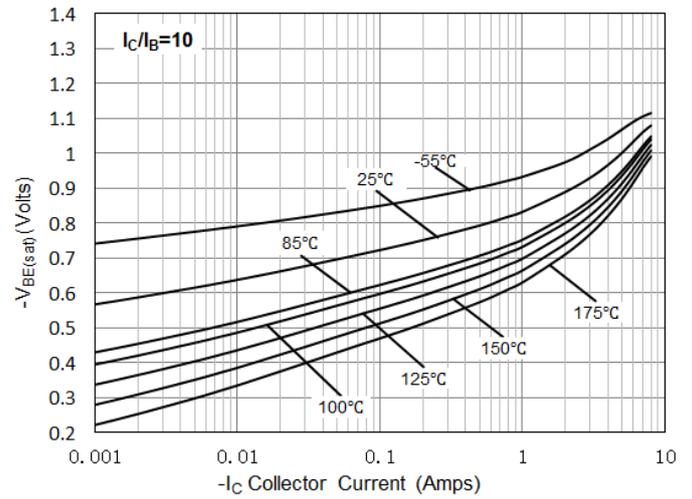
$V_{CE(sat)}$ vs I_C



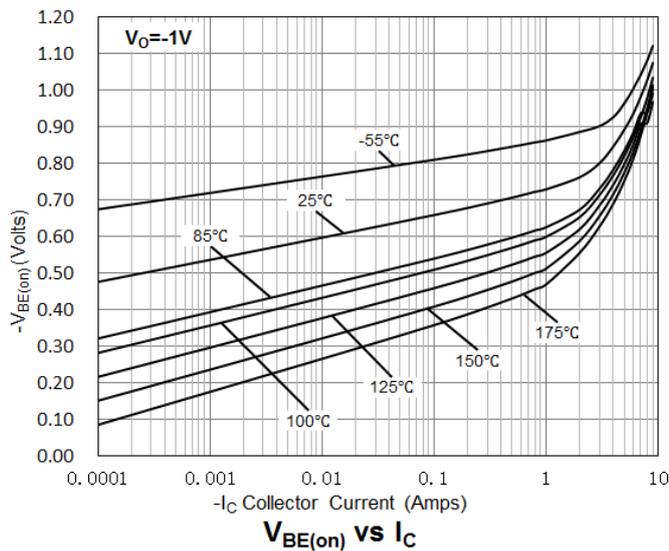
$V_{CE(sat)}$ vs I_C



h_{FE} vs I_C

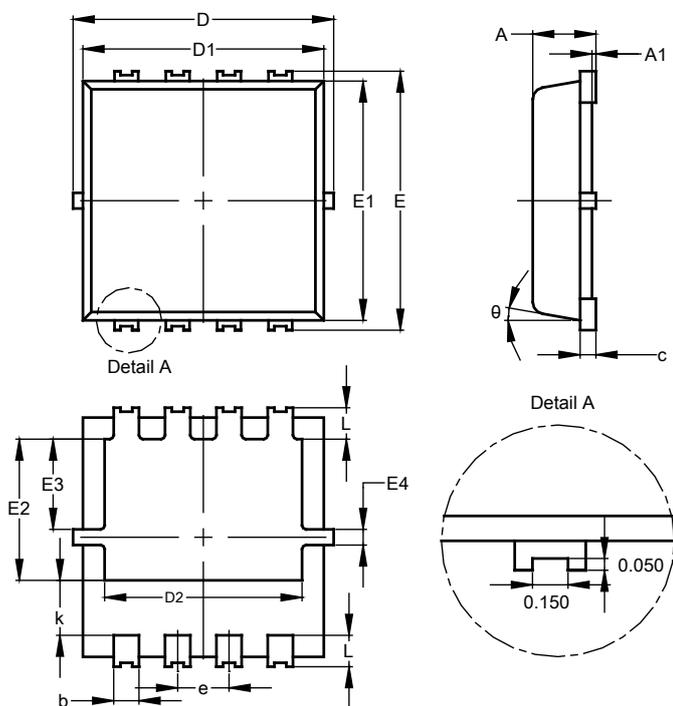


$V_{BE(sat)}$ vs I_C



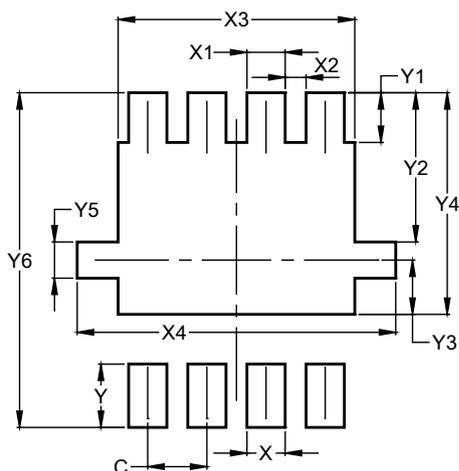
$V_{BE(on)}$ vs I_C

Package Outline Dimensions

PowerDI3333-8 (SWP) (Type UX)


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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.