



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

- $BV_{CEO} > -140V$
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- $I_C = -4A$ Continuous Collector Current
- $I_{CM} = -10A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -120mV @ I_C = -1A$
- $R_{SAT} = 72m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified up to $-10A$ for a High Gain Hold-Up
- Rated to $+175^\circ C$ – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection

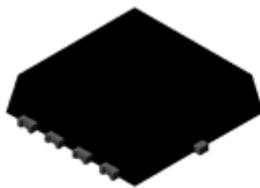
Mechanical Data

- 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)

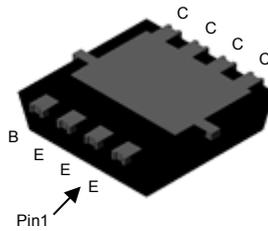
Applications

- Motor Driving
- Line Switching
- High-Side Switches

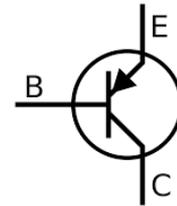
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-180	V
Collector-Emitter Voltage	V _{CEO}	-140	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-4	A
Peak Pulse Current	I _{CM}	-10	A

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

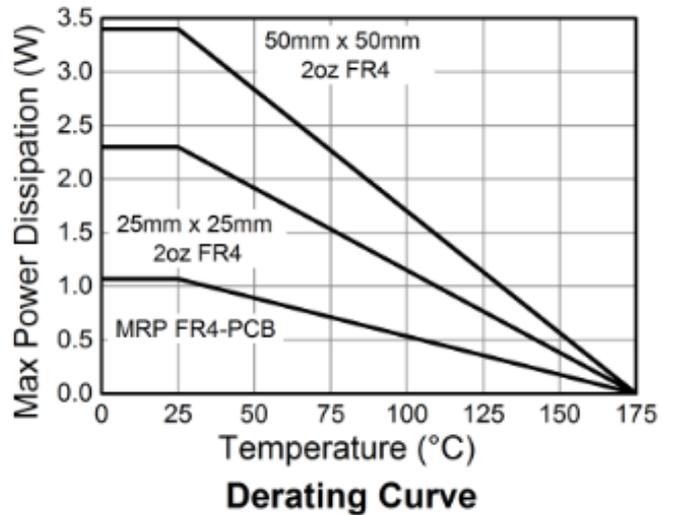
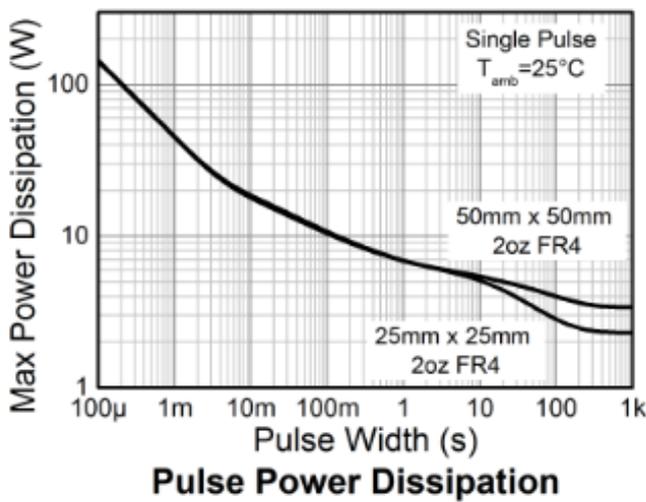
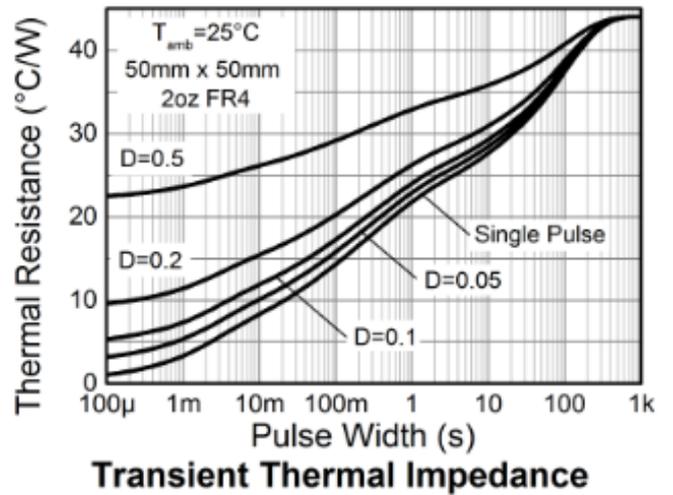
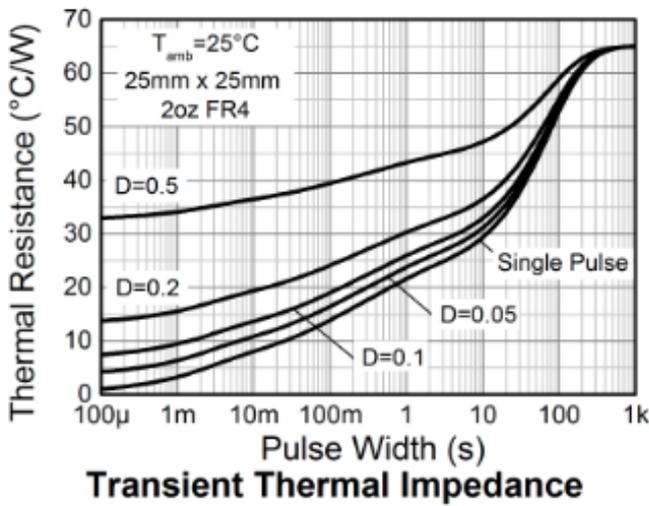
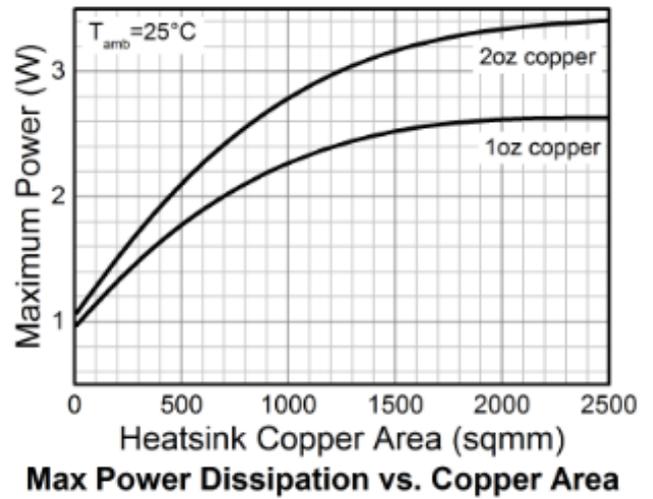
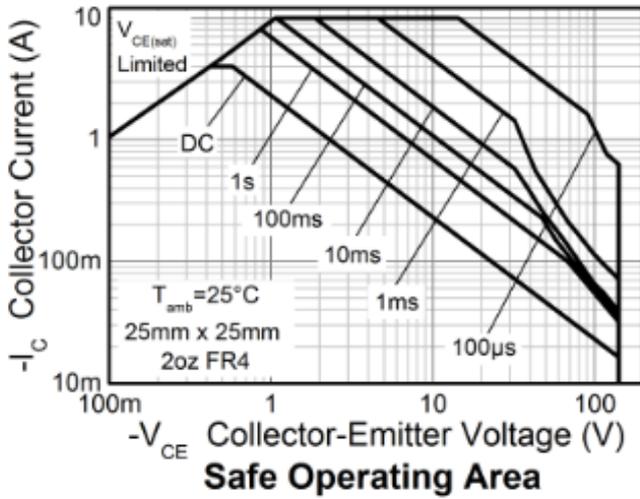
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	1.07	W
		2.3	W
		3.4	W
Thermal Resistance, Junction to Ambient	R _{θJA}	140	°C/W
		65	°C/W
		44	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R _{θJL}	6	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

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:
- 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

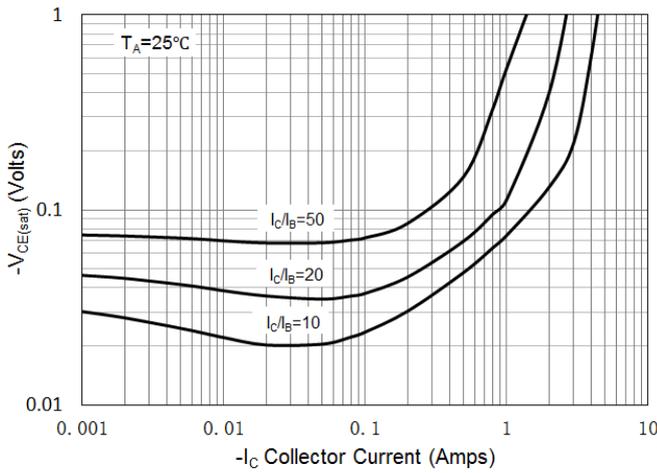


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

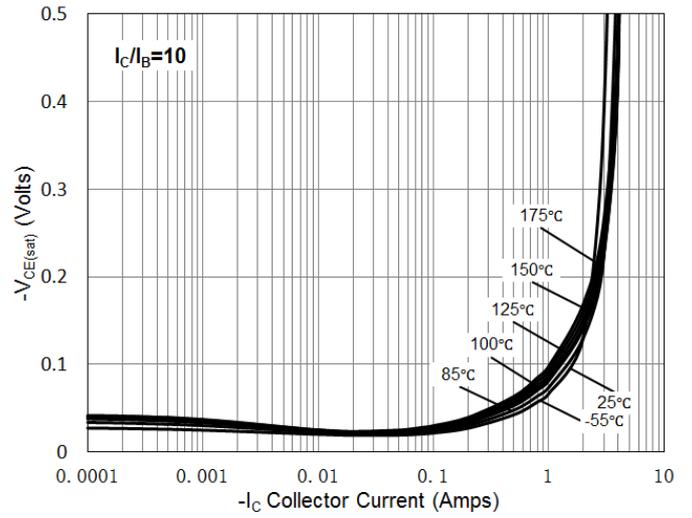
Characteristic	Symbol	Min	Typ.	Max	Unit	Test
Collector-Base Breakdown Voltage	BV_{CBO}	-180	-216	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CER}	-180	—	—	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	-140	-164	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.3	—	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	-1	-20	nA	$V_{CB} = -150\text{V}$
		—	-0.1	-10	μA	$V_{CB} = -150\text{V}$, $T_A = +125^\circ\text{C}$
Collector Cut-Off Current	I_{CER} $R \leq 1\text{k}\Omega$	—	-2	-20	nA	$V_{CB} = -150\text{V}$
		—	-0.3	-10	μA	$V_{CB} = -150\text{V}$, $T_A = +125^\circ\text{C}$
Emitter Cut-Off Current	I_{EBO}	—	-1	-10	nA	$V_{EB} = -6\text{V}$
DC Current Transfer Static Ratio (Note 10)	h_{FE}	100	165	—	—	$I_C = -10\text{mA}$, $V_{CE} = -5\text{V}$
		100	154	300	—	$I_C = -1\text{A}$, $V_{CE} = -5\text{V}$
		45	65	—	—	$I_C = -3\text{A}$, $V_{CE} = -5\text{V}$
		—	5	—	—	$I_C = -10\text{A}$, $V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	-37	-60	mV	$I_C = -100\text{mA}$, $I_B = -5\text{mA}$
		—	-47	-80	mV	$I_C = -0.5\text{A}$, $I_B = -50\text{mA}$
		—	-72	-120	mV	$I_C = -1\text{A}$, $I_B = -100\text{mA}$
		—	-200	-360	mV	$I_C = -3\text{A}$, $I_B = -300\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	-918	-1040	mV	$I_C = -3\text{A}$, $I_B = -300\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	-802	-930	mV	$I_C = -3\text{A}$, $V_{CE} = -5\text{V}$
Transitional Frequency	f_T	—	120	—	MHz	$I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$, $f = 50\text{MHz}$
Output Capacitance	C_{obo}	—	33	—	pF	$V_{CB} = -10\text{V}$, $f = 1\text{MHz}$
Switching Characteristics	t_{delay}	—	9.7	—	ns	$V_{CC} = -50\text{V}$, $I_C = -1\text{A}$, $I_{B1} = -I_{B2} = -100\text{mA}$
	t_{rise}	—	200	—	ns	
	$t_{storage}$	—	1500	—	ns	
	t_{fall}	—	137	—	ns	

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

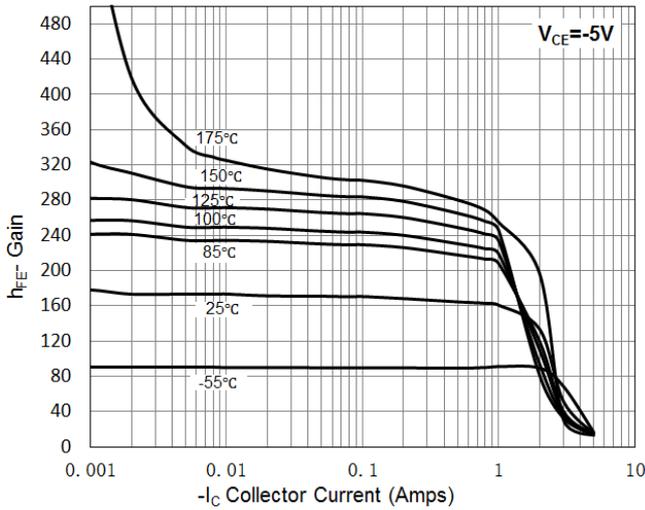
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



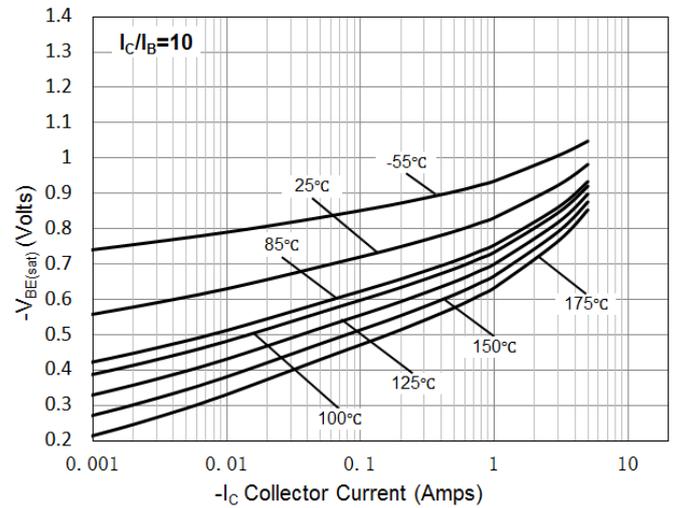
$V_{CE(sat)}$ vs I_C



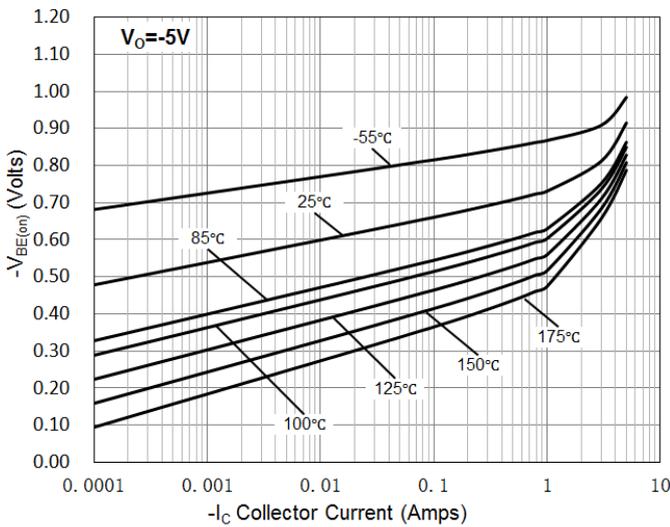
$V_{CE(sat)}$ vs I_C



h_{FE} vs I_C



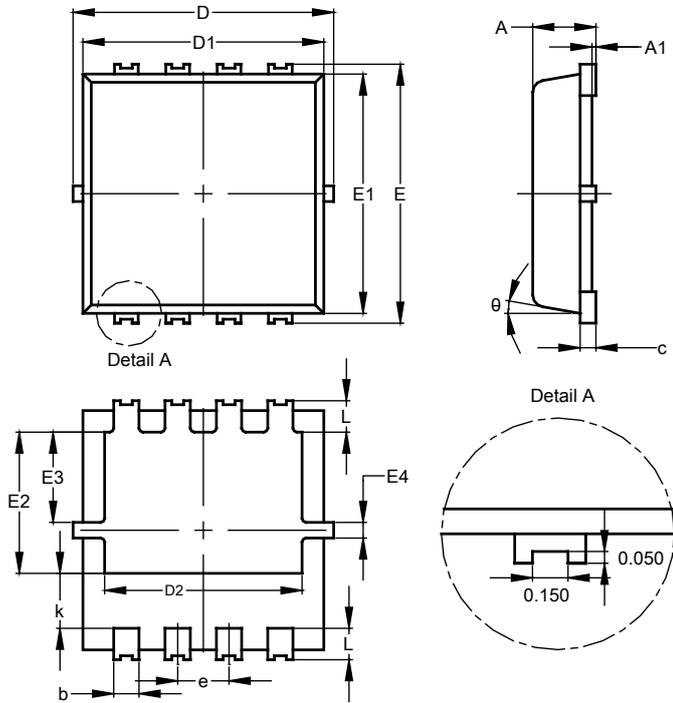
$V_{BE(sat)}$ vs I_C



$V_{BE(on)}$ vs I_C

Package Outline Dimensions

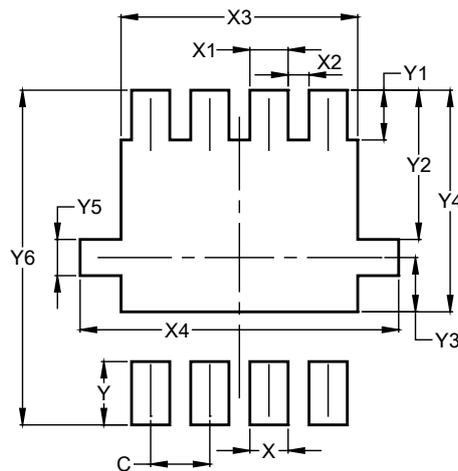
PowerDI3333-8 (SWP) (Type UX)



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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.