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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Features

- BV_{CEO} > -60V
- Small Form Factor Thermally Efficient Package-Enables Higher Density End Products
- I_C = -5.5A Continuous Collector Current
- I_{CM} = -15A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < -70mV @ -1A
- R_{SAT} = 39mΩ for a Low Equivalent On-Resistance
- h_{FE} Specified Up to -10A for a High Gain Hold Up
- Complementary NPN Type: NK-DXTN03060BFG
- Rated to +175°C – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection

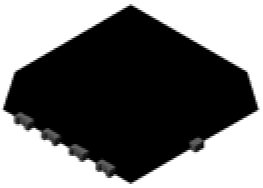
Mechanical Data

- 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 Plated Leads Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.03 grams (Approximate)

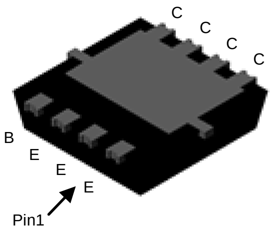
Applications

- Motor Driving
- Line Switching
- High Side Switches

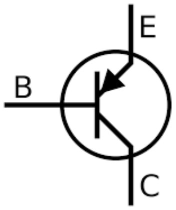
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-100	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-5.5	A
Peak Pulse Current	I_{CM}	-15	A

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

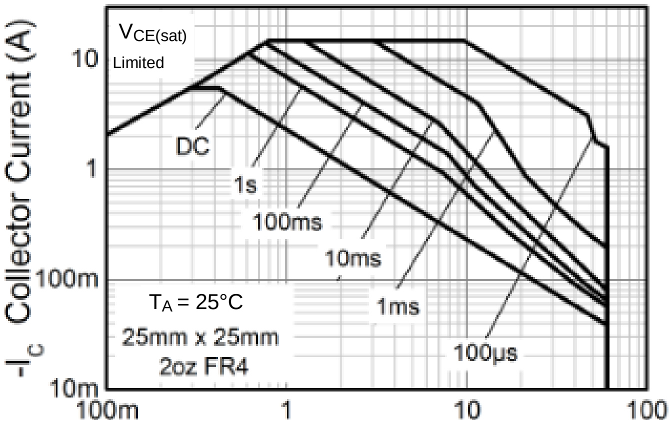
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1.07	W
	(Note 6)		2.3	W
	(Note 7)		3.4	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	140	°C/W
	(Note 6)		65	°C/W
	(Note 7)		44	°C/W
Thermal Resistance, Junction to Leads (Note 8)		$R_{\theta JL}$	6	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°C

ESD Ratings (Note 9)

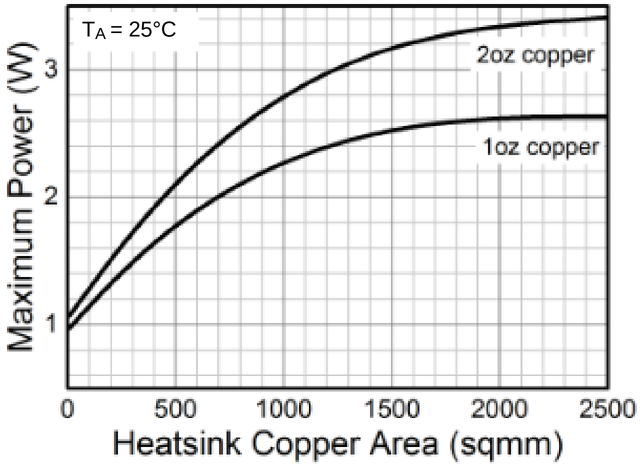
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

Notes:
5. For a device mounted with the collector tab on MRP FR-4 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 x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm x 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.

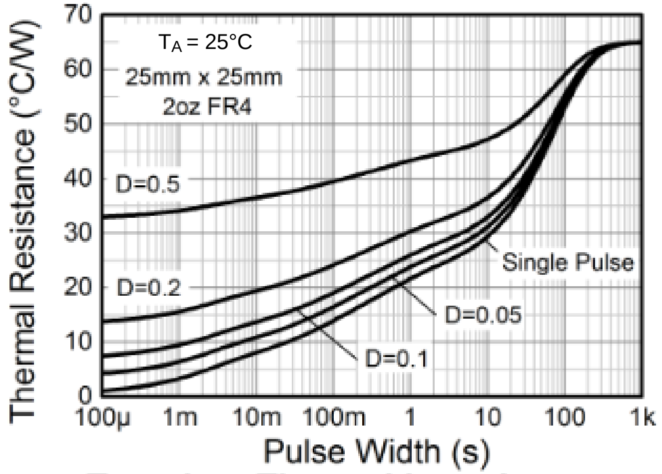
Thermal Characteristics and Derating Information



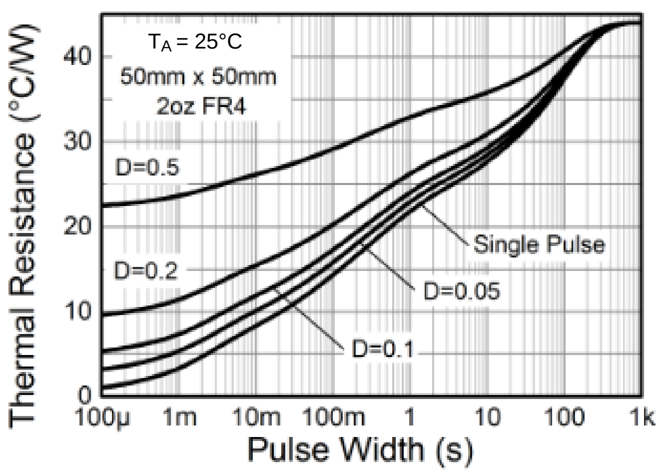
Safe Operating Area



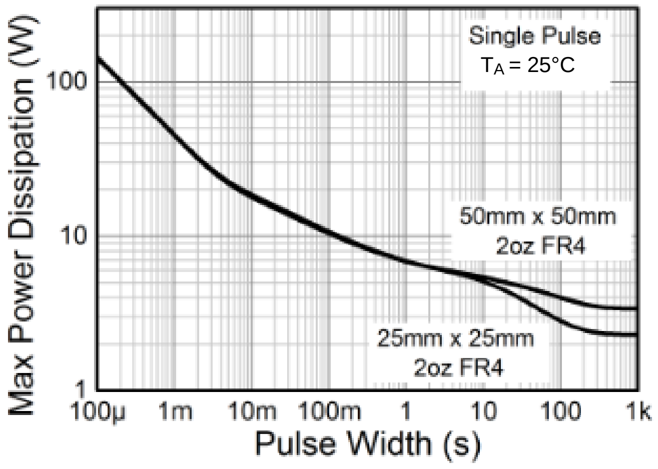
Max Power Dissipation vs. Copper Area



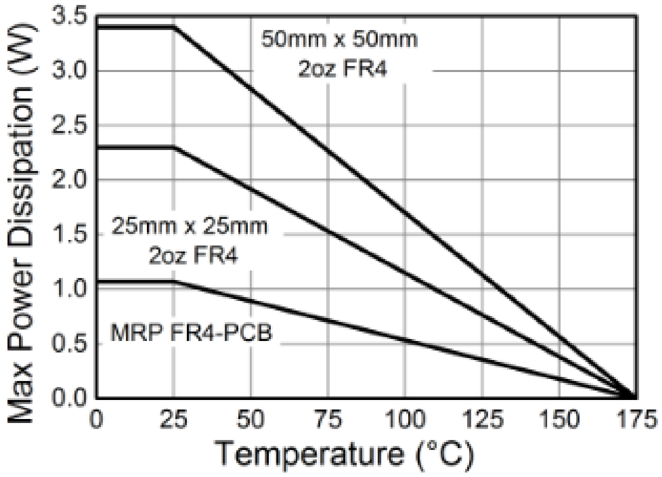
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



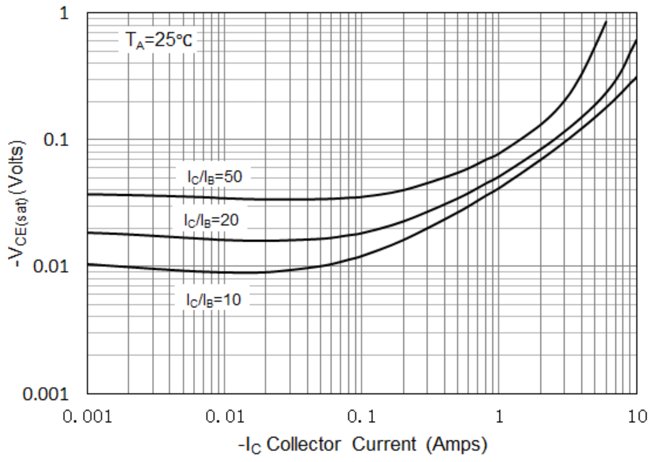
Derating Curve

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

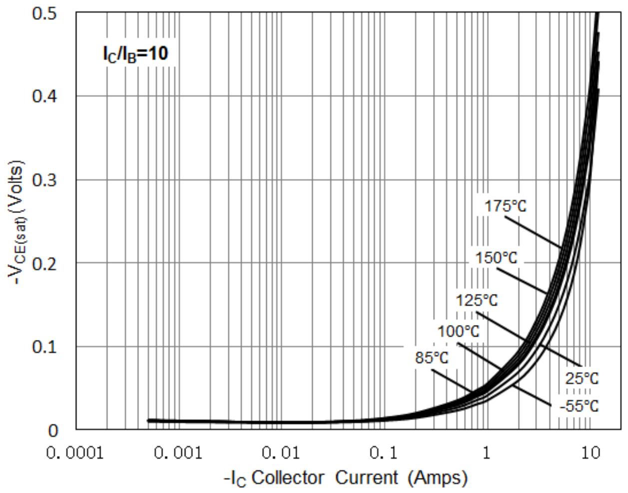
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage	BV_{CER}	-100	-113	—	V	I_C = -1µA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	-60	-77	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.5	—	V	I_E = -100µA
Collector-Base Cutoff Current	I_{CBO}	—	-2	-20	nA	V_{CB} = -80V
		—	—	-100	µA	V_{CB} = -80V, T_A = +125°C
Collector-Emitter Cutoff Current (R ≤ 1kΩ)	I_{CER}	—	-2	-50	nA	V_{CB} = -80V
		—	—	-100	µA	V_{CB} = -80V, T_A = +125°C
Emitter Cutoff Current	I_{EBO}	—	-1	-20	nA	V_{EB} = -6V
Static Forward Current Transfer Ratio (Note 10)	h_{FE}	100	207	—	—	I_C = -10mA, V_{CE} = -2V
		100	161	300	—	I_C = -2A, V_{CE} = -2V
		45	77	—	—	I_C = -5A, V_{CE} = -2V
		10	25	—	—	I_C = -10A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	-12	-25	mV	I_C = -100mA, I_B = -10mA
		—	-41	-70	mV	I_C = -1A, I_B = -100mA
		—	-70	-120	mV	I_C = -2A, I_B = -200mA
		—	-150	-250	mV	I_C = -5A, I_B = -500mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	-1000	-1150	mV	I_C = -5A, I_B = -500mV
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	-880	-1020	mV	I_C = -5A, V_{CE} = -1V
Output Capacitance	C_{obo}	—	48	—	pF	V_{CB} = -10V. f = 1MHz
Transition Frequency	f_T	—	120	—	MHz	V_{CE} = -10V, I_C = -100mA f = 50MHz
Switching Time	t_{delay}	—	9	—	ns	V_{CC} = -10V, I_C = -1A I_{B1} = -I_{B2} = -100mA
	t_{rise}	—	260	—	ns	
	$t_{storage}$	—	1205	—	ns	
	t_{fall}	—	181	—	ns	

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

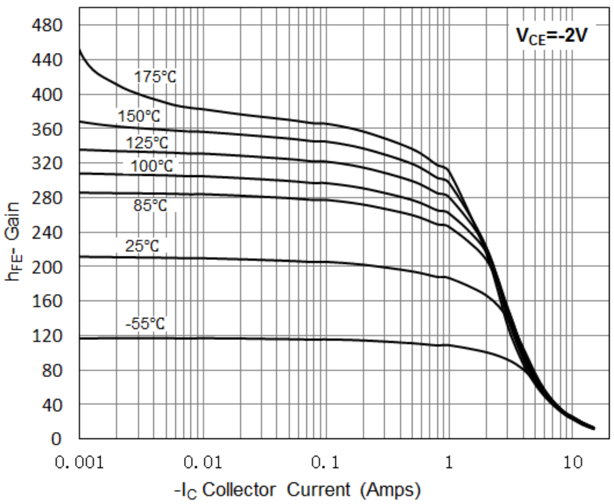
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



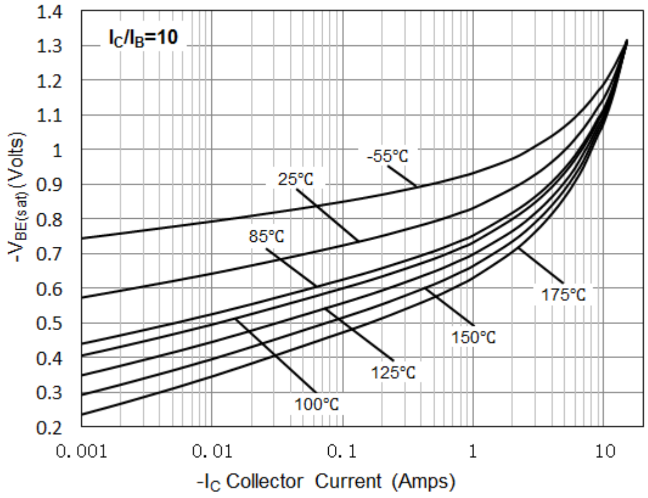
$V_{CE(sat)}$ vs I_C



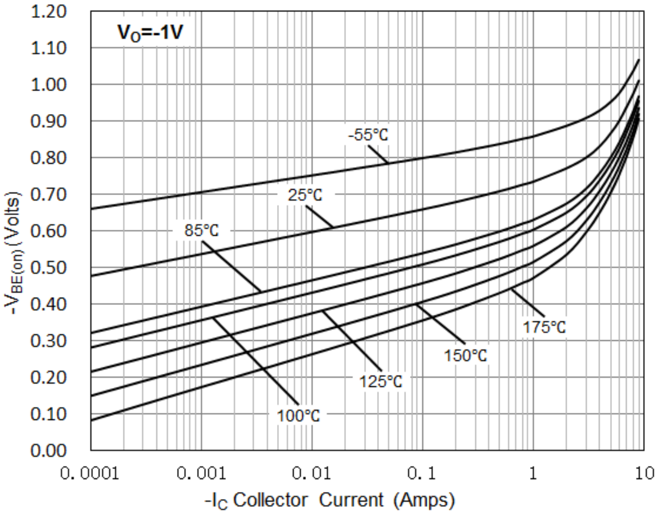
$V_{CE(sat)}$ vs I_C



h_{FE} vs I_C



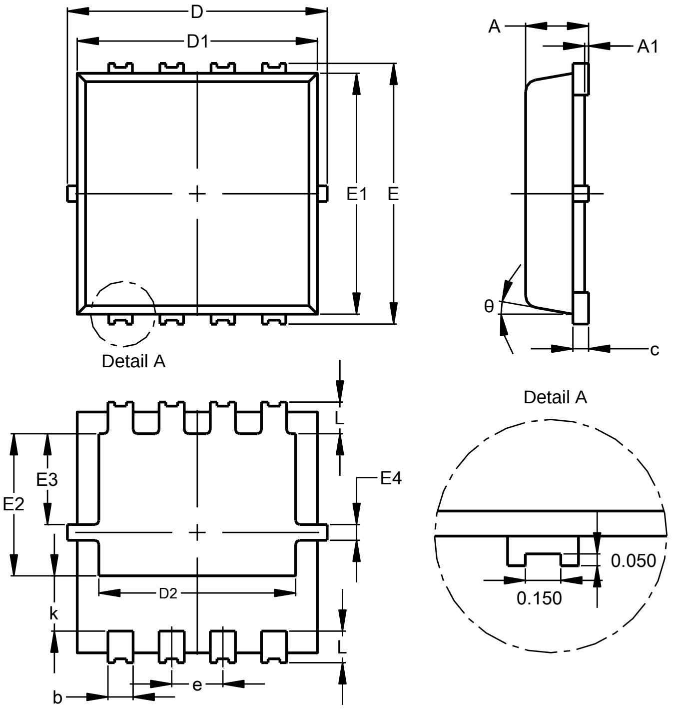
$V_{BE(sat)}$ vs I_C



$V_{BE(on)}$ vs I_C

Package Outline Dimensions

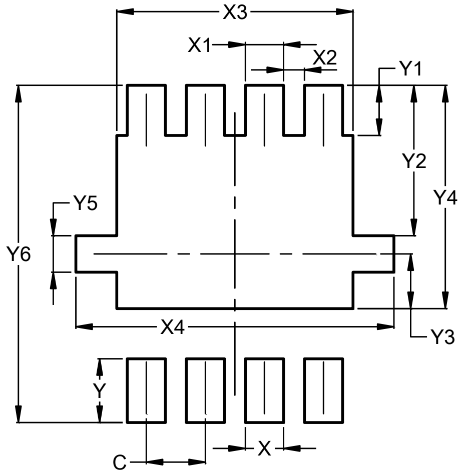
PowerDI3333-8 (SWP) (Type UX)



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

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.