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} > 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 $V_{CE(sat)}$ < 35mV
- h_{FE} Specified Up to 10A for a High Gain Hold Up
- Complementary PNP Type: NK-DXTP03100BFG
- Wettable Flank for Improved Optical Inspection

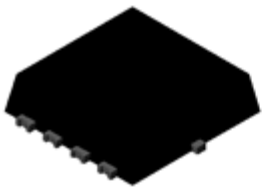
Mechanical Data

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

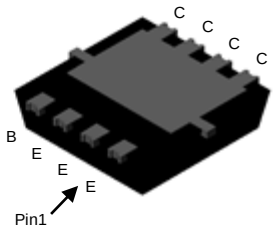
Applications

- Motor Driving
- Line Switching
- High Side Switches

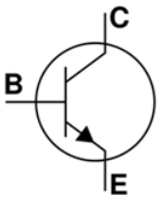
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	120	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°C, unless otherwise specified.)

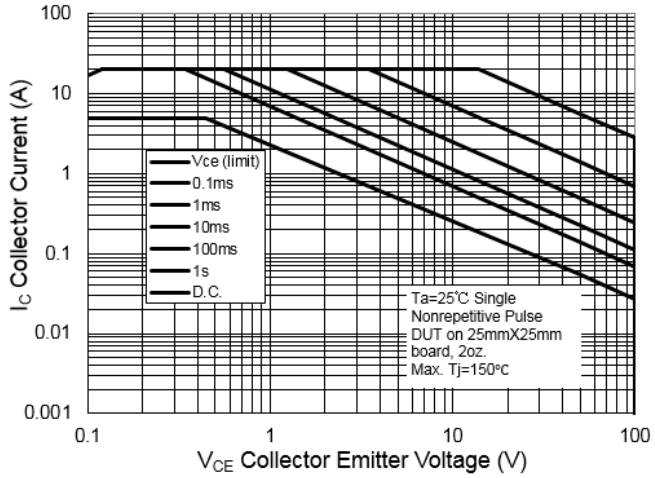
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1.2	W
	(Note 6)		2.7	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	107	°C/W
	(Note 6)		48	°C/W
Thermal Resistance, Junction to Leads (Note 7)		$R_{\theta JL}$	8.5	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

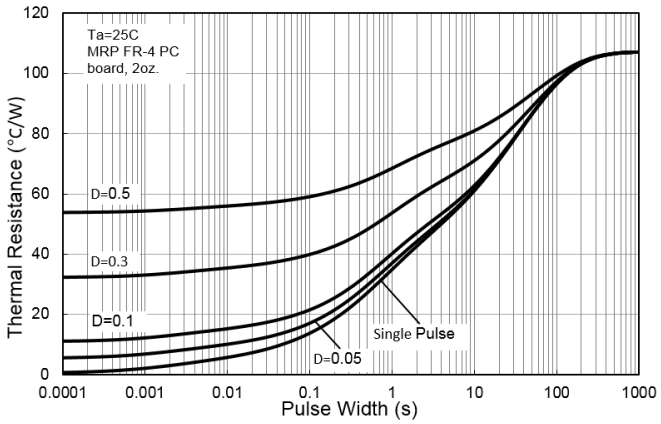
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector tab on MRP 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 x 25mm 2oz copper.
7. Thermal resistance from junction to solder-point (at the collector tab).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

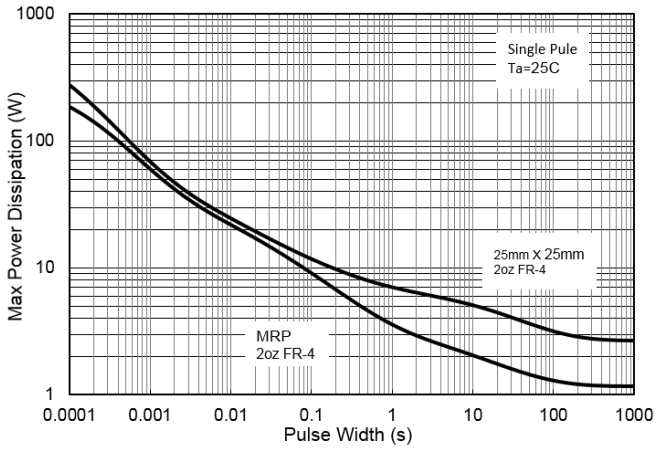
Thermal Characteristics and Derating Information



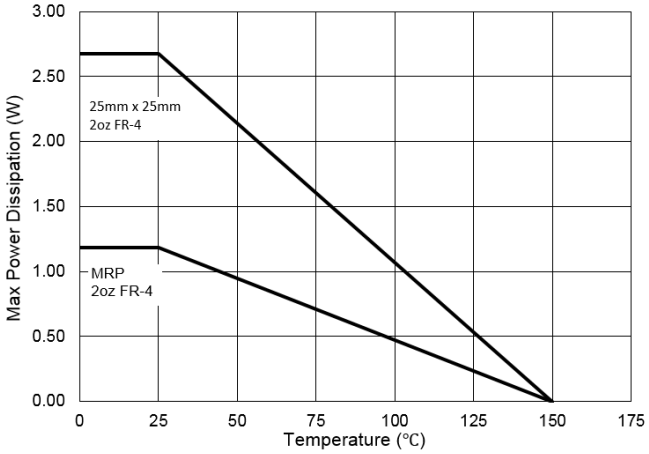
SOA Safe Operation Area



Transient Thermal Resistance



Pulse Power Dissipation



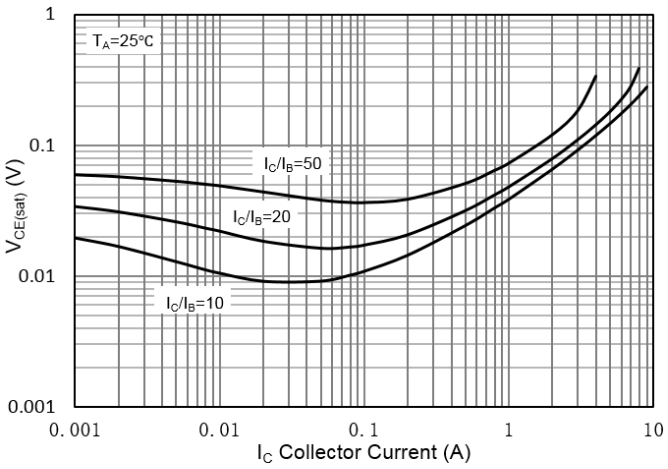
Derating Curve

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

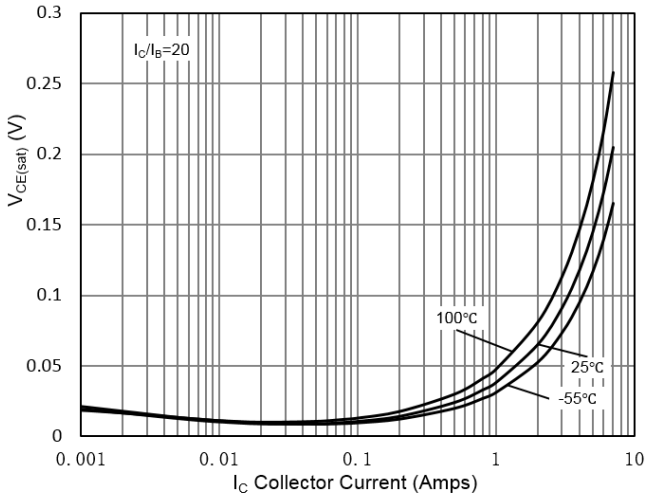
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	120	252	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	100	117	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	I_E = 100μA
Collector-Base Cut-Off Current	I_{CBO}	—	2	100	nA	V_{CB} = 120V
		—	0.07	10	μA	V_{CB} = 120V, T_A = +125°C
Collector-Emitter Cut-Off Current	I_{CER} R ≤ 1kΩ	—	2	50	nA	V_{CB} = 100V
		—	0.03	10	μA	V_{CB} = 100V, T_A = +125°C
Emitter Cut-Off Current	I_{EBO}	—	2	20	nA	V_{EB} = 6V
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	100	263	—	—	I_C = 10mA, V_{CE} = 2V
		100	261	—	—	I_C = 1A, V_{CE} = 2V
		100	160	300	—	I_C = 2A, V_{CE} = 2V
		30	57	—	—	I_C = 5A, V_{CE} = 2V
		—	19	—	—	I_C = 10A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	17	35	mV	I_C = 100mA, I_B = 5mA
		—	39	65	mV	I_C = 1A, I_B = 100mA
		—	79	125	mV	I_C = 2A, I_B = 100mA
		—	146	220	mV	I_C = 5A, I_B = 500mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	992	1100	mV	I_C = 5A, I_B = 500mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	891	1000	mV	I_C = 5A, V_{CE} = 2V
Input Capacitance	C_{ibo}	—	517	—	pF	V_{EB} = 0.5V. f = 1MHz
Output Capacitance	C_{obo}	—	18	—	pF	V_{CB} = 10V. f = 1MHz
Transition Frequency	f_T	—	140	—	MHz	V_{CE} = 10V, I_C = 100mA f = 50MHz
Switching Time	t_{delay}	—	16.6	—	ns	V_{CC} = 10V, I_C = 1A I_{B1} = -I_{B2} = 100mA
	t_{rise}	—	5.1	—	ns	
	$t_{storage}$	—	1457	—	ns	
	t_{fall}	—	87	—	ns	

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

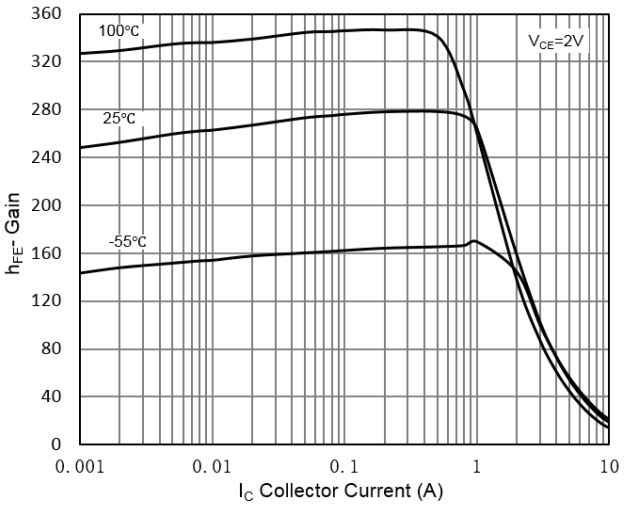
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



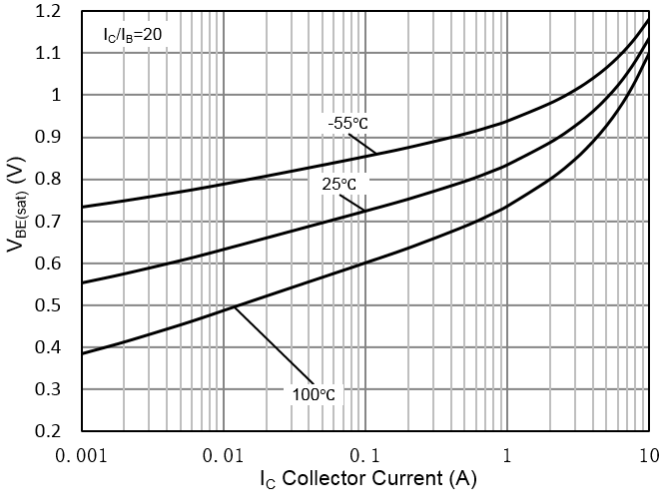
$V_{CE(sat)}$ vs I_C



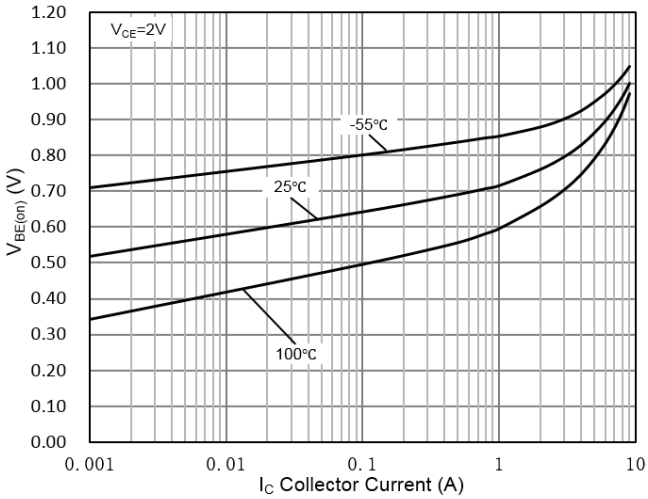
$V_{CE(sat)}$ vs I_C



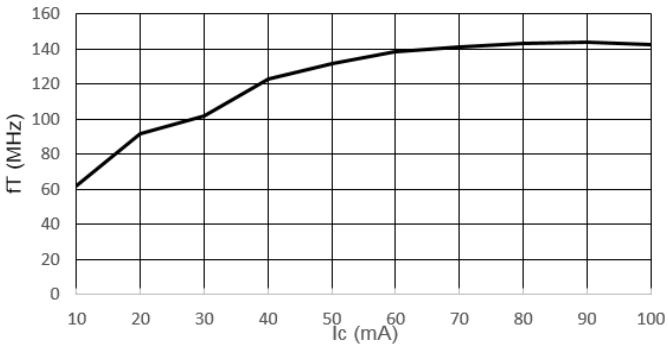
h_{FE} vs I_C



$V_{BE(sat)}$ vs I_C



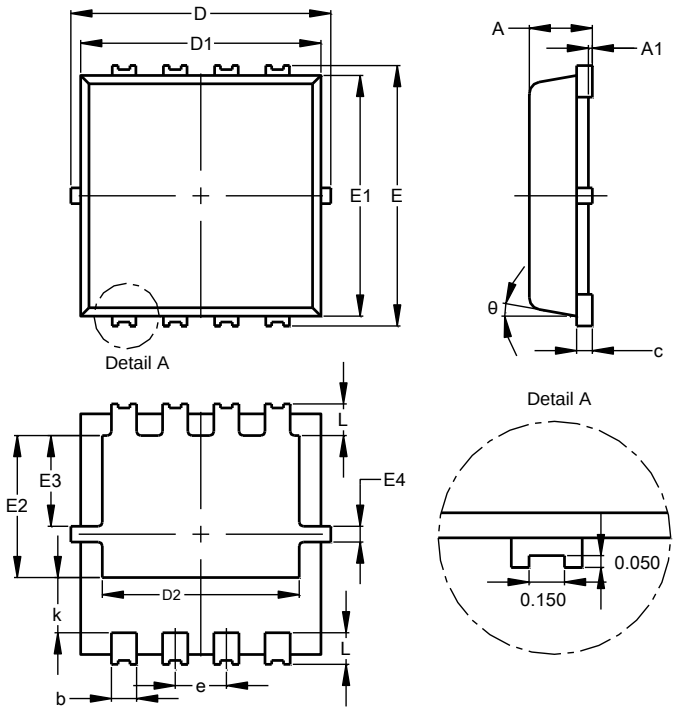
$V_{BE(on)}$ vs I_C



fT vs Ic

Package Outline Dimensions

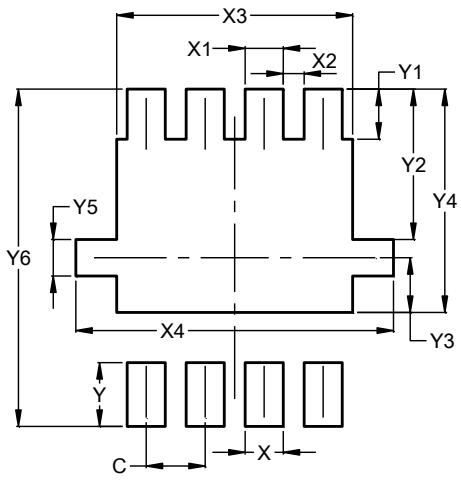
PowerDI3333-8 (SWP) (Type UX)



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.