




**THE DATASHEET OF
ECQ-E6683KF**



Features

- $BV_{CEO} > -40V$
- Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
- $I_C = -3A$ High Continuous Current
- $I_{CM} = -6A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -400mV @ -1A$
- Minimum $h_{FE} 200 @ I_C = -1A$
- Rated to $+175^\circ C$ —Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

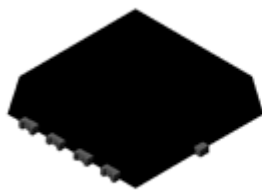
Mechanical Data

- 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 
- Weight: 0.03 grams (Approximate)

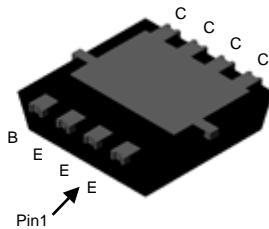
Applications

- High-Side Switch
- Low Drop Out Regulator
- MOSFET or IGBT Gate Driving

PowerDI3333-8 (SWP) (Type UX)

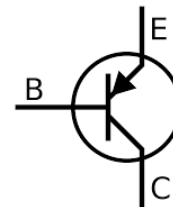


Top View



Bottom View

Equivalent Circuit



Device Symbol

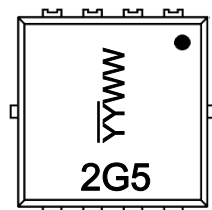
Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DXTP07040CFGQ-7	Automotive	2G5	7	12	2000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen and Antimony free, "Green" and Lead-Free.
 3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

PowerDI3333-8 (SWP) (Type UX)



2G5= Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 18 = 2018)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-3	A
Peak Pulse Current	I _{CM}	-6	A

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

Characteristic	Symbol	Value	Unit	
Power Dissipation	P _D	(Note 6)	0.9	W
		(Note 7)	2.1	W
		(Note 8)	3.1	W
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 6)	140	°C/W
		(Note 7)	65	°C/W
		(Note 8)	44	°C/W
Thermal Resistance, Junction to Leads (Note 9)	R _{θJL}	8.5	°C/W	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C	

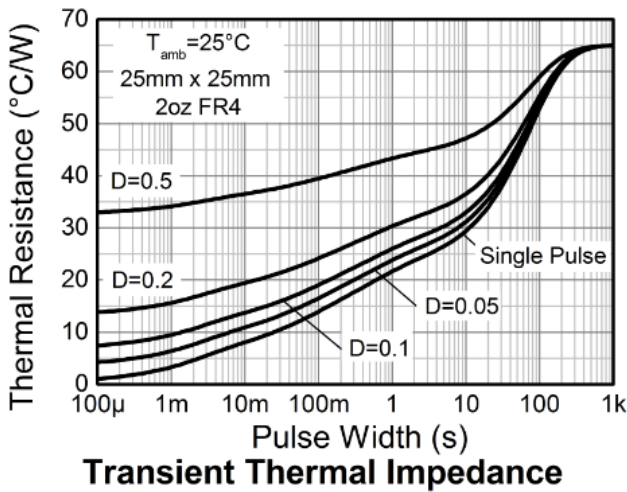
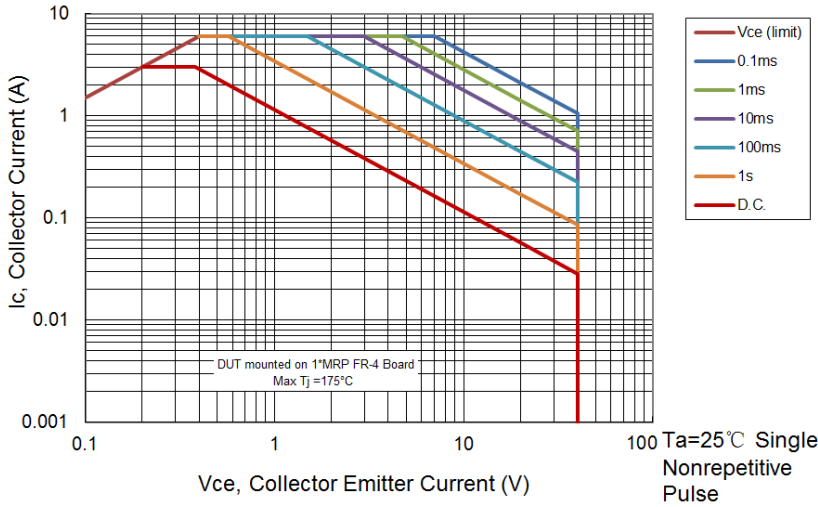
ESD Ratings (Note 10)

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

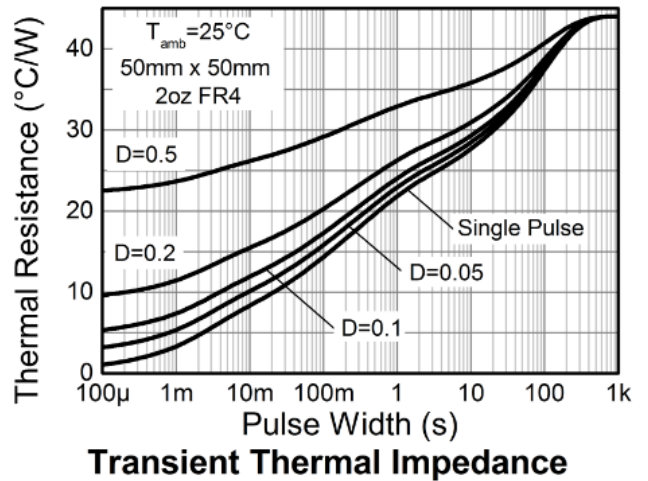
- Notes:
6. For a device mounted with the collector tab on MRP FR4-PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Same as Note 5, except the device is mounted on 25mm × 25mm 2oz copper.
 8. Same as Note 5, except the device is mounted on 50mm × 50mm 2oz copper.
 9. Thermal resistance from junction to solder-point (at the collector tab).
 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

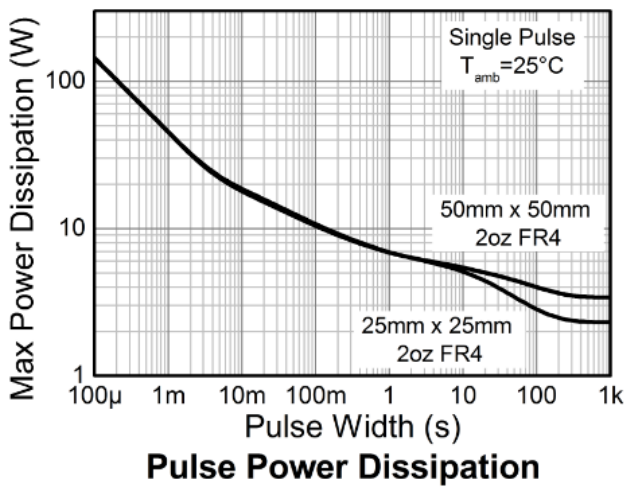
SOA, Safe Operation Area



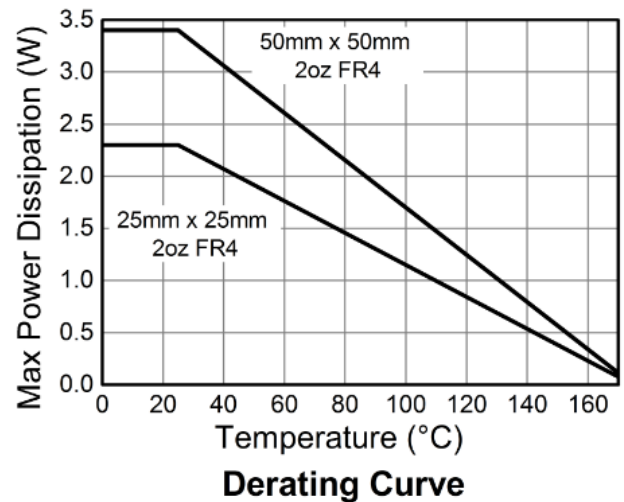
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



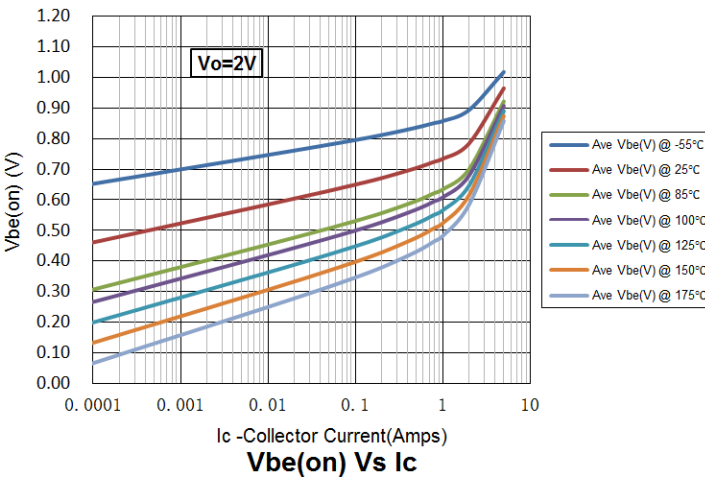
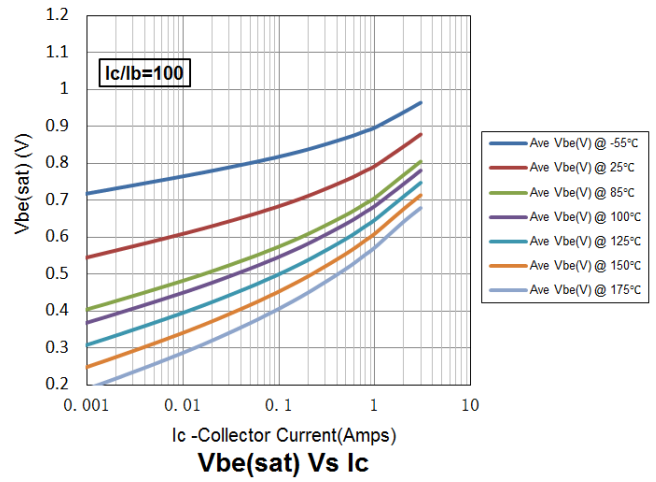
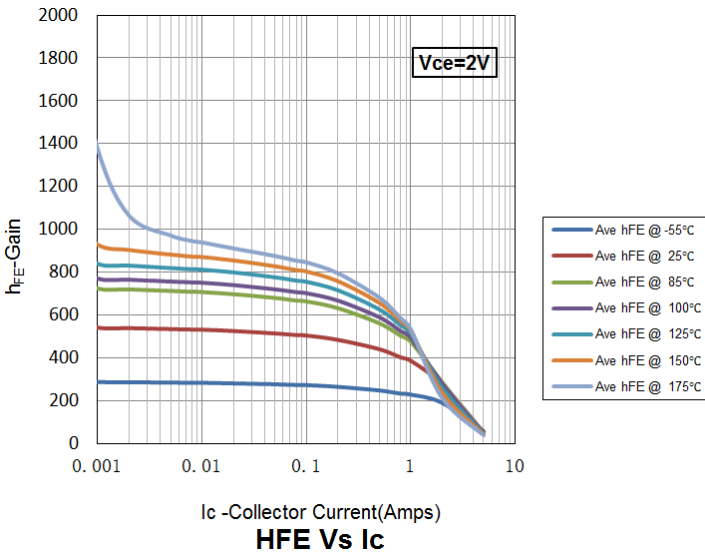
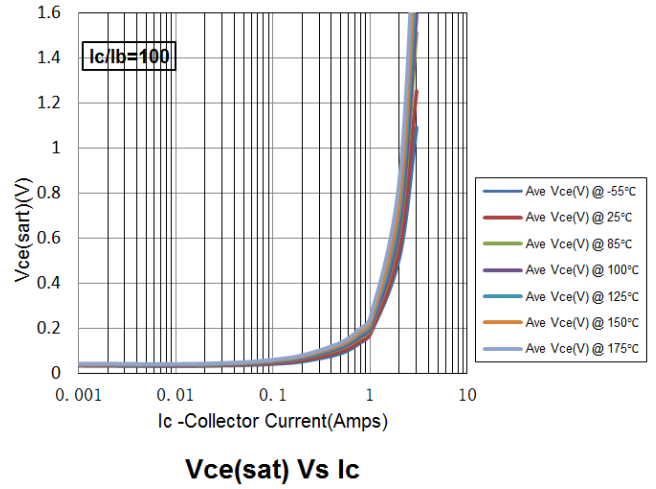
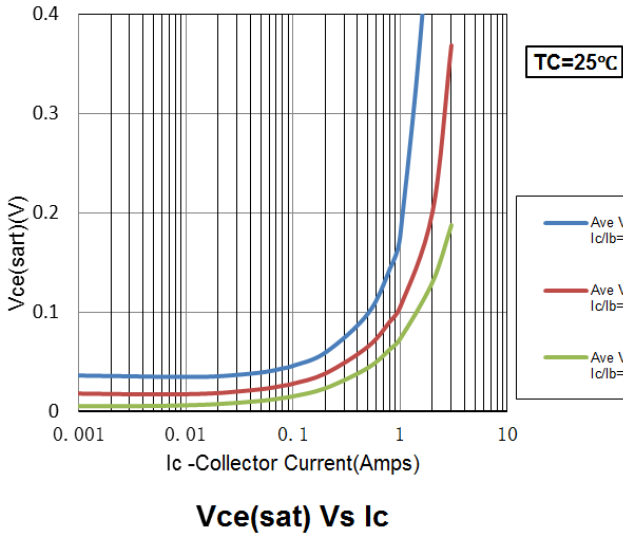
Derating Curve

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

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	-65	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	-40	-57	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.8	—	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	—	-20	nA	$V_{CB} = -40\text{V}$
		—	—	-10	μA	$V_{CB} = -40\text{V}, T_A = +125^\circ\text{C}$
Emitter Cut-Off Current	I_{EBO}	—	—	-20	nA	$V_{EB} = -6\text{V}$
DC Current Transfer Static Ratio (Note 11)	h_{FE}	300	527	800	—	$I_C = -10\text{mA}, V_{CE} = -2\text{V}$
		250	432	—	—	$I_C = -500\text{mA}, V_{CE} = -2\text{V}$
		200	377	—	—	$I_C = -1\text{A}, V_{CE} = -2\text{V}$
		150	273	—	—	$I_C = -2\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	—	-99	-200	mV	$I_C = -500\text{mA}, I_B = -5\text{mA}$
		—	-177	-400	mV	$I_C = -1\text{A}, I_B = -10\text{mA}$
		—	-200	-500	mV	$I_C = -2\text{A}, I_B = -50\text{mA}$
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	-0.8	-1	V	$I_C = -1\text{A}, I_B = -10\text{mA}$
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	—	-0.75	0.9	V	$I_C = -1\text{A}, V_{CE} = -2\text{V}$
Transitional Frequency	f_T	100	—	—	MHz	$I_C = -50\text{mA}, V_{CE} = -5\text{V}, f = 50\text{MHz}$
Output Capacitance	C_{obo}	—	24	—	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Switching Time	t_{ON}	—	35	—	ns	$V_{CC} = -10\text{V}, I_C = -500\text{mA},$
	t_{OFF}	—	600	—	ns	$I_{B1} = -I_{B2} = -50\text{mA}$

Note: 11. Measured under pulsed conditions. Pulse width $\leq 300 \mu\text{s}$. Duty cycle $\leq 2\%$.

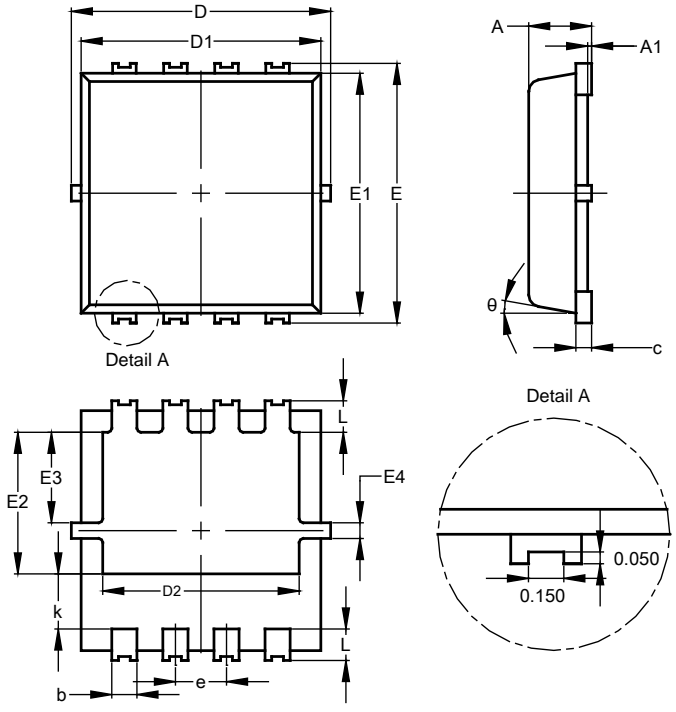
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI3333-8 (SWP) (Type UX)

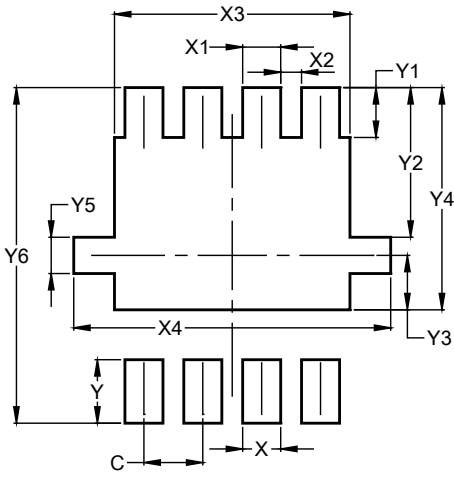


PowerDI3333-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	—
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	—	—	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40
θ	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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

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