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
- I_C = 1A High Continuous Collector Current
- $R_{CE(sat)}$ = 180mΩ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(sat)}$ < 220mV @ 1A
- P_D up to 2.47W for Power-Demanding Applications
- $R_{\theta JA}$ Efficient, 40% Lower than SOT26
- Low Profile 0.6mm High Package for Thin Applications

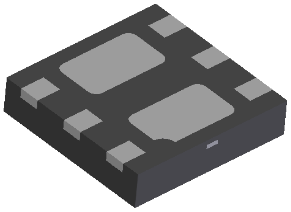
Mechanical Data

- Package: U-DFN2020-6 (Type B)
- Package Material: Molded Plastic. “Green” Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu, Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.0065 grams (Approximate)

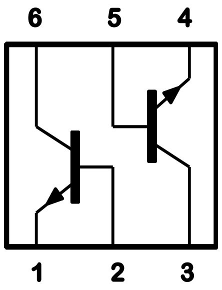
Application

- Load switches
- Power management
- Charging circuits
- Power switches (e.g. motors, fans)

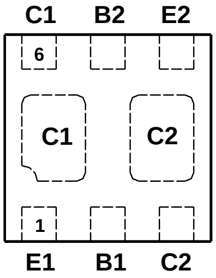
U-DFN2020-6 (Type B)



Bottom View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	1	A
Peak Pulse Collector Current	I_{CM}	1.5	A
Base Current	I_B	300	mA
Peak Base Current	I_{BM}	1	A

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

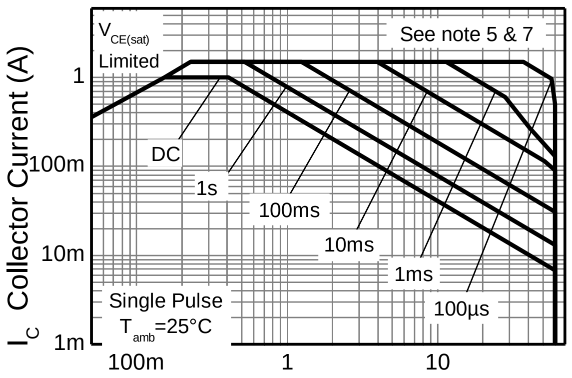
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5, 7)	P_D	405	mW
	(Note 5, 8)		510	
	(Note 6, 7)		1650	
	(Note 6, 8)		2470	
Thermal Resistance, Junction to Ambient	(Note 5, 7)	$R_{θJA}$	308	°C/W
	(Note 5, 8)		245	
	(Note 6, 7)		76	
	(Note 6, 8)		51	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{θJL}$	18	°C/W
Operating and Storage Temperature Range		$T_{J,}$ T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

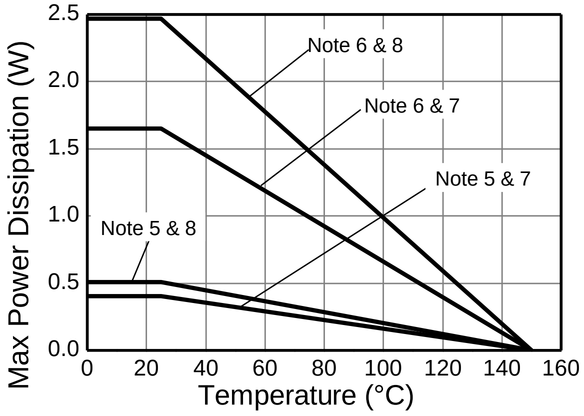
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge – Charged Device Model	ESD CDM	1000	V	C3

Notes:
5. For a device mounted with the exposed collector pads on minimum recommended pad layout that is on a single-sided 1.6mm 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 with the collector pad on 28mm x 28mm (8cm^2) 2oz copper.
7. For a dual device with one active die.
8. For dual device with two active die running at equal power.
9. Thermal resistance from junction to solder-point (on the exposed collector pads).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

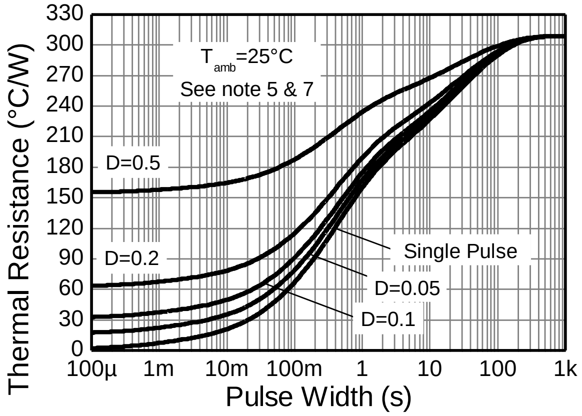
Thermal Characteristics and Derating Information



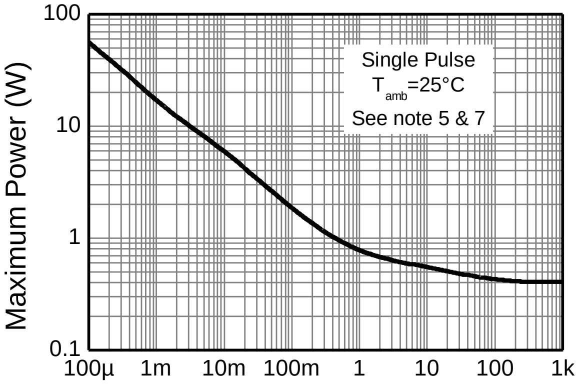
Safe Operating Area



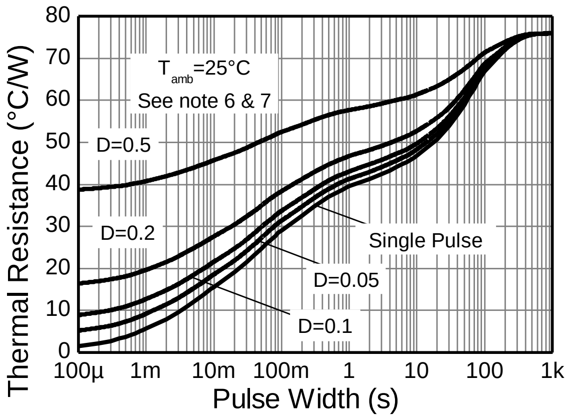
Derating Curve



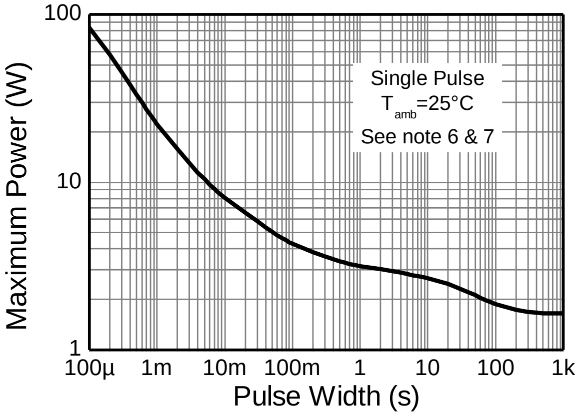
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV_{CBO}	60	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	60	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	—	V	I_E = 100μA
Collector-Base Cutoff Current	I_{CBO}	—	—	100	nA	V_{CB} = 48V, I_E = 0
		—	—	50	μA	V_{CB} = 48V, I_E = 0, T_A = +150°C
Emitter-Base Cutoff Current	I_{EBO}	—	—	100	nA	V_{EB} = 5.6V, I_C = 0
DC Current Gain (Note 11)	h_{FE}	290	430	—	—	V_{CE} = 2V, I_C = 100mA
		150	220	—		V_{CE} = 2V, I_C = 500mA
		70	110	—		V_{CE} = 2V, I_C = 1A
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	—	90	120	mV	I_C = 500mA, I_B = 50mA
		—	170	220		I_C = 1A, I_B = 100mA
		—	185	240		I_C = 1A, I_B = 50mA
Equivalent On-Resistance (Note 11)	$R_{CE(sat)}$	—	180	240	mΩ	I_C = 500mA, I_B = 50mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	—	1	V	I_C = 0.5A, I_B = 50mA
		—	—	1.1		I_C = 1A, I_B = 50mA
		—	—	1.1		I_C = 1A, I_B = 100mA
Base-Emitter Turn-on Voltage (Note 11)	$V_{BE(on)}$	—	—	0.9	V	V_{CE} = 2V, I_C = 0.5A
Transition Frequency	f_T	90	175	—	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Output (Collector) Capacitance	C_{obc}	—	4	6	pF	V_{CB} = 10V, f = 1MHz
Turn-On Time	t_{on}	—	105	—	ns	V_{CC} = 10V, I_C = 0.5A, I_{B1} = -I_{B2} = 25mA
Delay Time	t_d	—	15	—	ns	
Rise Time	t_r	—	90	—	ns	
Turn-Off Time	t_{off}	—	540	—	ns	
Storage Time	t_s	—	410	—	ns	
Fall Time	t_f	—	130	—	ns	

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤2%.

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

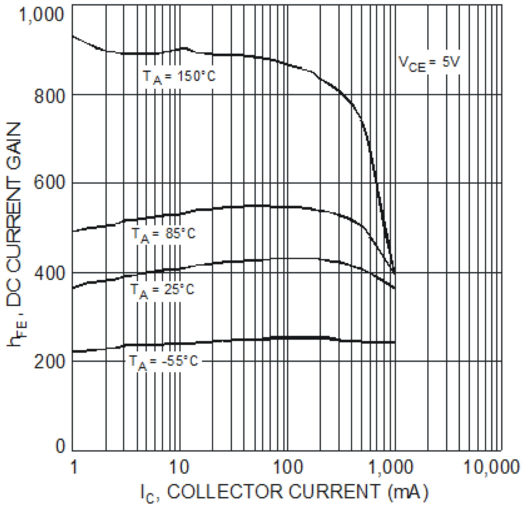


Fig. 1 Typical DC Current Gain vs. Collector Current

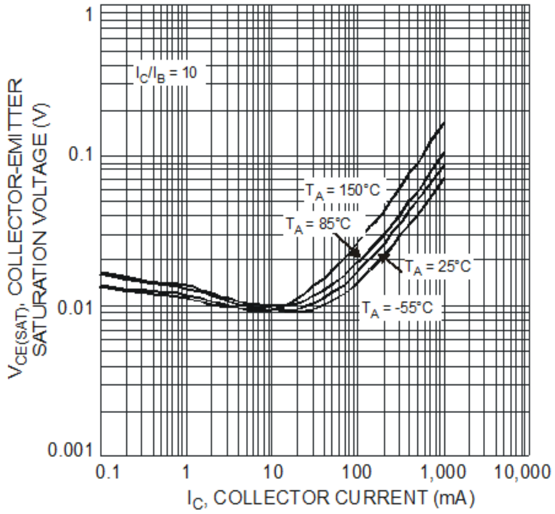


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

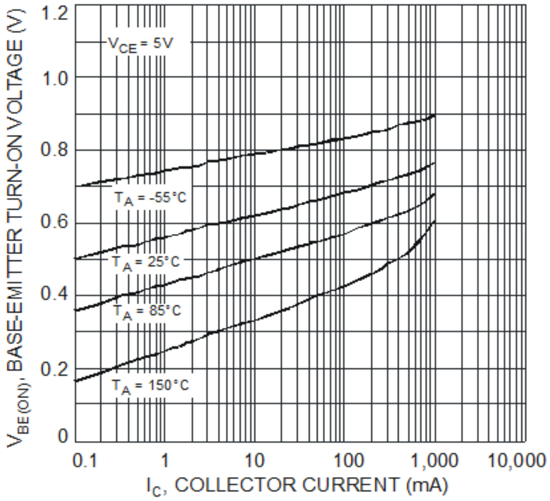


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

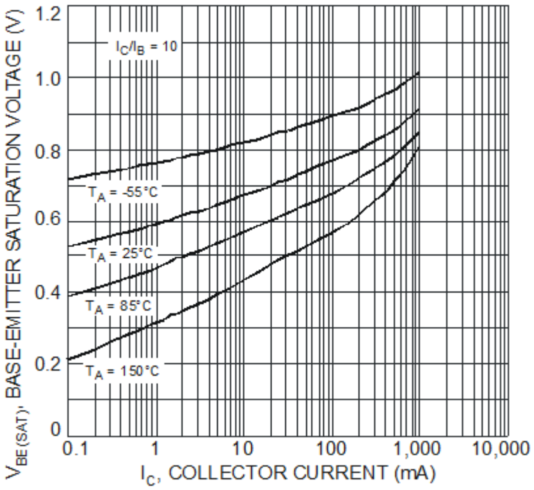


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

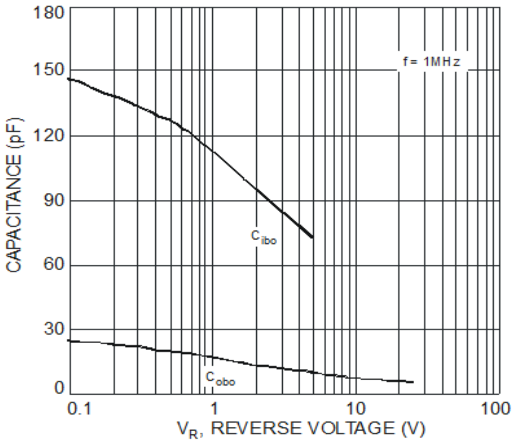
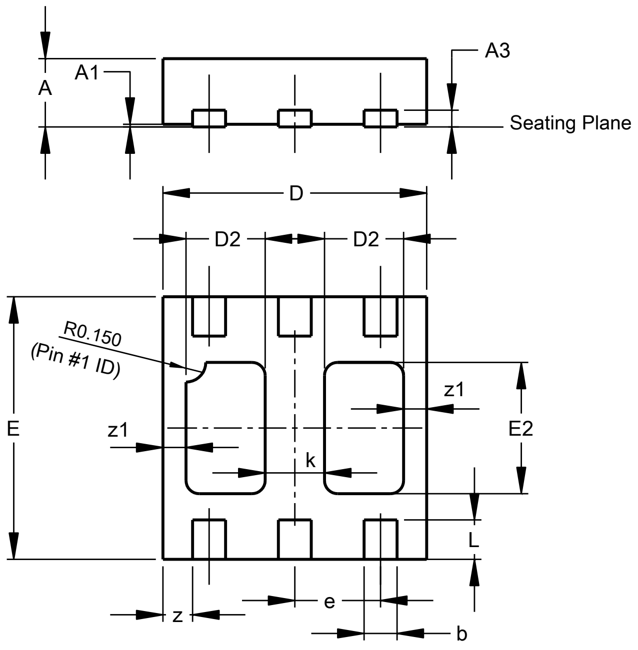


Fig. 5 Typical Capacitance Characteristics

Package Outline Dimensions

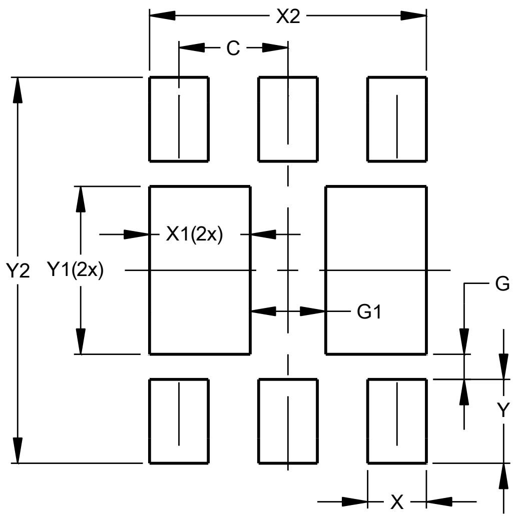
U-DFN2020-6 (Type B)



U-DFN2020-6 Type B			
Dim	**Min**	**Max**	**Typ**
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	–	–	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	–	–	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	–	–	0.45
L	0.25	0.35	0.30
z	–	–	0.225
z1	–	–	0.175
All Dimensions in mm			

Suggested Pad Layout

U-DFN2020-6 (Type B)



Dimensions	Value (in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2.300