



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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Description

This bipolar junction transistors (BJT) is designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CEO} > -60V$
- $I_C = -2A$ High Continuous Collector Current
- $R_{CE(sat)} = 250m\Omega$ for a Low Equivalent On-Resistance
- Sidewall Tin Plating for Wettable Flanks in AOI
- P_D Up to 2.47W for Power Demanding Applications
- Low Profile 0.6mm High Package for Thin Applications

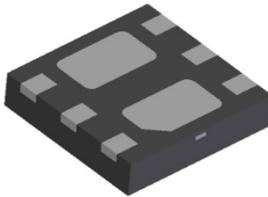
Mechanical Data

- Case: U-DFN2020-6 (SWP) (Type A) with Sidewall Plating
- 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 208③
- Weight: 0.0065 grams (Approximate)

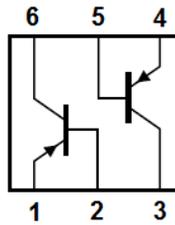
Application

- Matrix LED Lighting
- Power Management

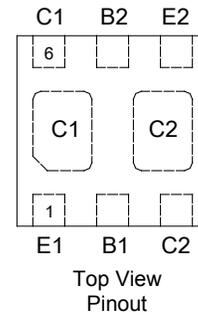
U-DFN2020-6 (SWP) (Type A)



Bottom View



Device Symbol



Top View Pinout

Absolute Maximum Ratings – Q1 & Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-60	V
Collector-Emitter Voltage	V _{CEO}	-60	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-2	A
Peak Pulse Collector Current	I _{CM}	-3	A
Base Current	I _B	-300	mA
Peak Base Current	I _{BM}	-1	A

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

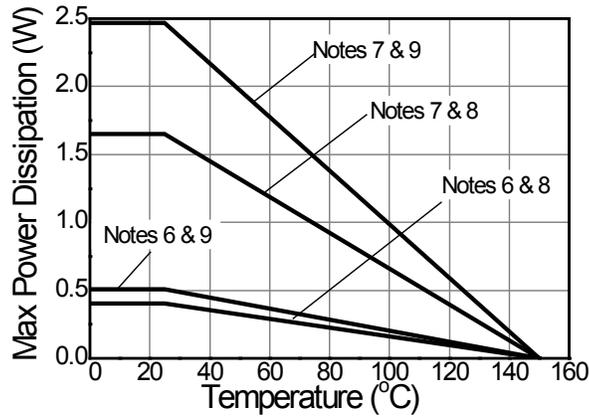
Characteristic		Symbol	Value	Unit
Power Dissipation	(Notes 5 & 7)	P _D	405	mW
	(Notes 5 & 8)		510	
	(Notes 6 & 7)		1650	
	(Notes 6 & 8)		2470	
Thermal Resistance, Junction to Ambient	(Notes 5 & 7)	R _{θJA}	308	°C/W
	(Notes 5 & 8)		245	
	(Notes 6 & 7)		76	
	(Notes 6 & 8)		51	
Thermal Resistance, Junction 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)

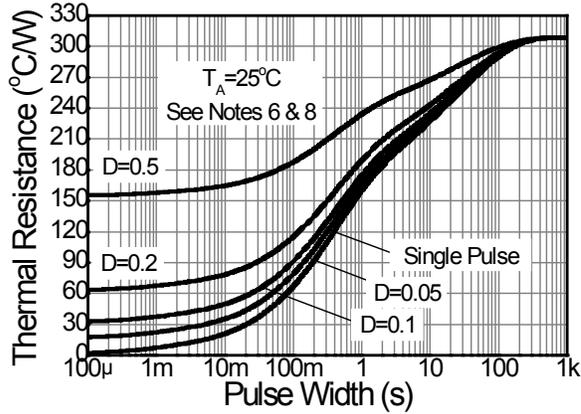
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- Notes:
- For a device mounted with the exposed collector pads on minimum recommended pad layout that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as Note 5, except the device is mounted with the collector pad on 28mm × 28mm (8cm²) 2oz copper.
 - For a dual device with one active die.
 - For dual device with two active die running at equal power.
 - Thermal resistance from junction to solder-point (on the exposed collector pads).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

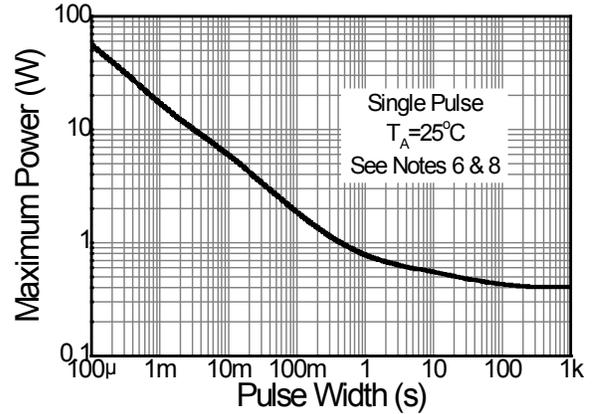
Thermal Characteristics and Derating Information



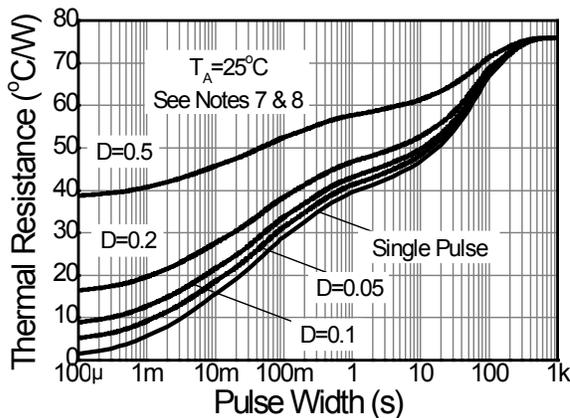
Derating Curve



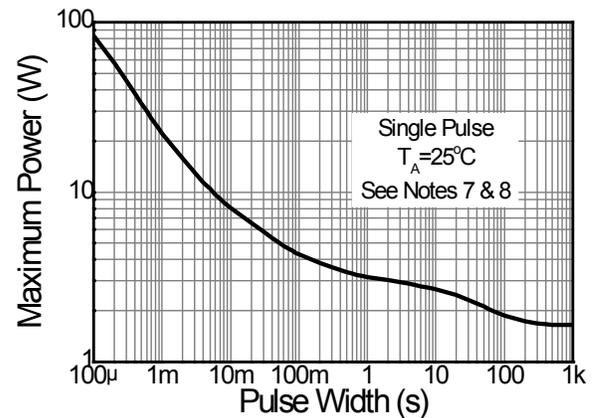
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



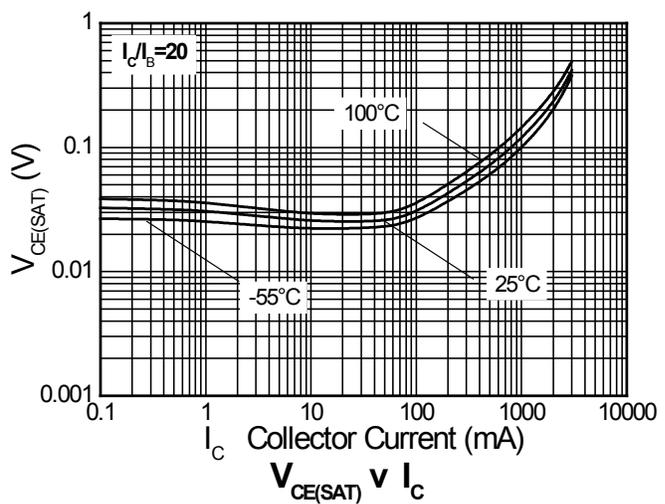
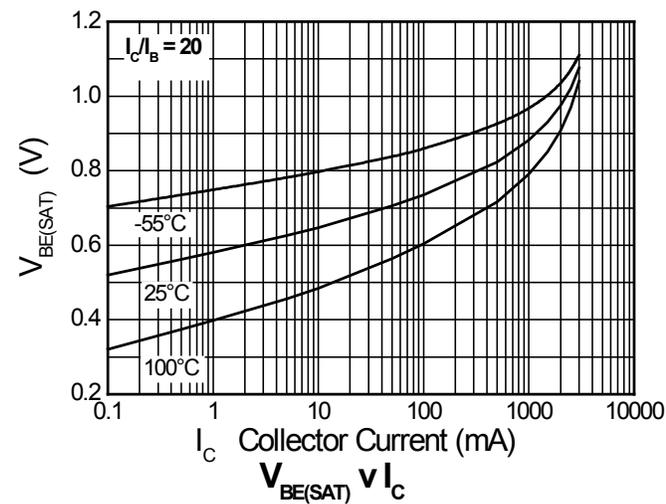
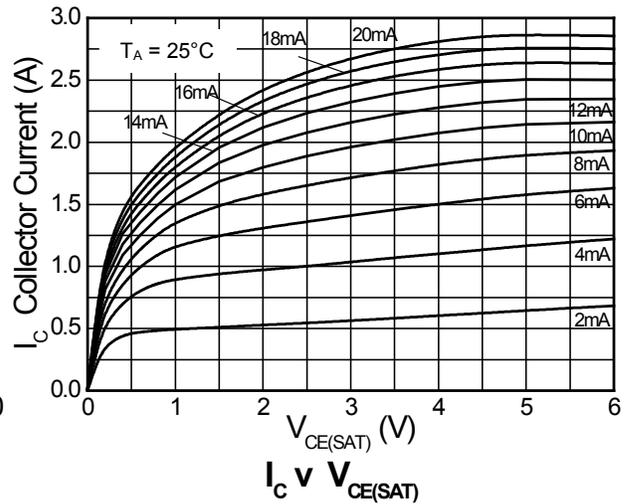
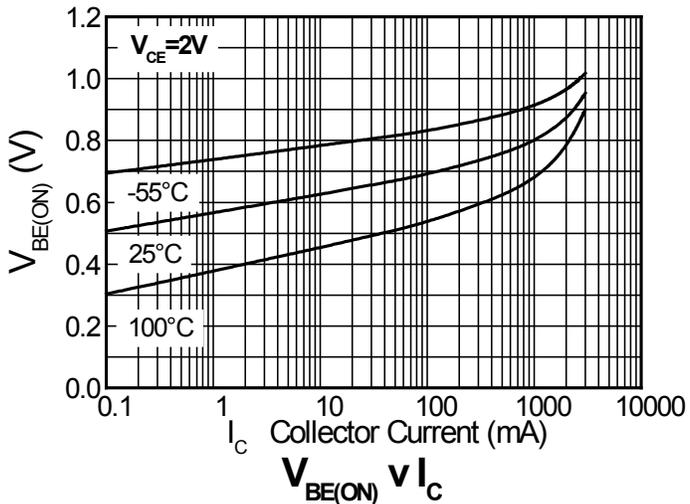
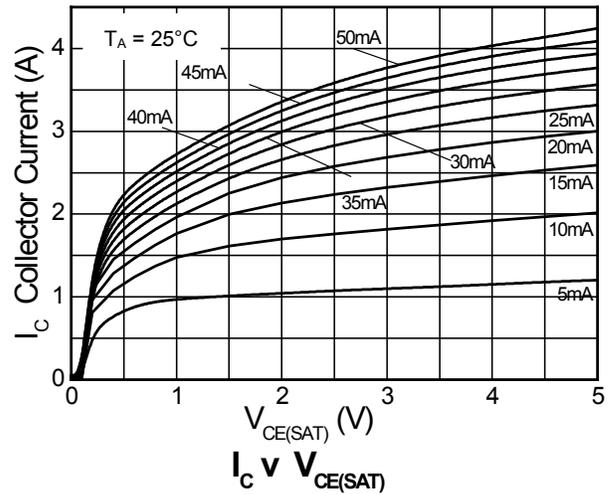
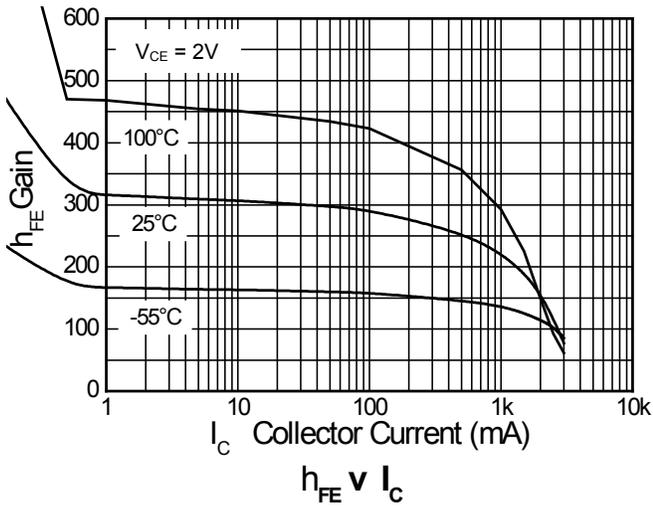
Pulse Power Dissipation

Electrical Characteristics – Q1 & Q2 (@T_A = +25°C, unless otherwise specified.)

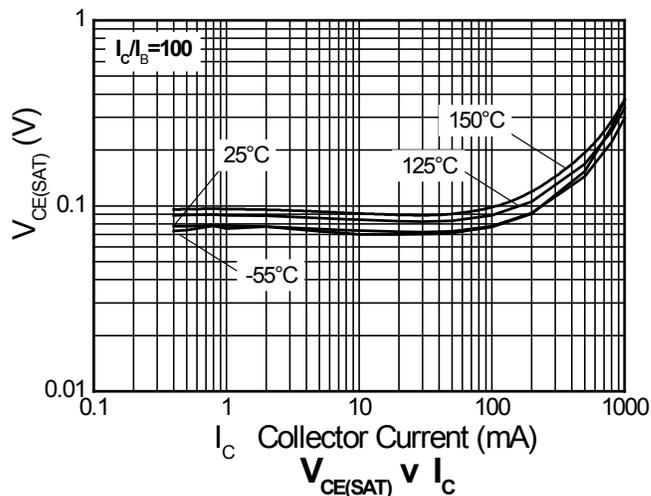
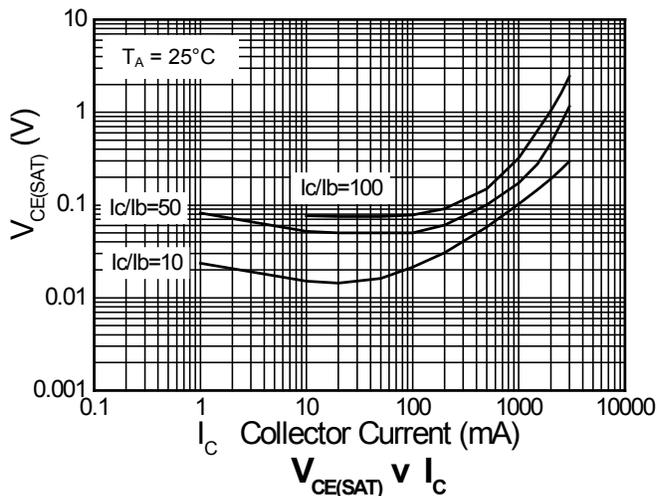
Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV _{CB0}	-60	—	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	-60	—	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7	—	—	V	I _E = -100μA
Collector-Base Cutoff Current	I _{CBO}	—	—	-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}	170	—	—	—	V _{CE} = -2V, I _C = -100mA
		140	—	—		V _{CE} = -2V, I _C = -500mA
		110	—	—		V _{CE} = -2V, I _C = -1A
		50	—	—		V _{CE} = -2V, I _C = -2A
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(sat)}	—	—	-120	mV	I _C = -500mA, I _B = -50mA
		—	—	-250		I _C = -1A, I _B = -50mA
		—	—	-420		I _C = -0.7A, I _B = -7mA
		—	—	-450		I _C = -2A, I _B = -200mA
Equivalent On-Resistance (Note 11)	R _{CE(sat)}	—	—	250	mΩ	I _E = -1A, I _B = -50mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	—	—	-1	V	I _C = -0.5A, I _B = -50mA
		—	—	-1		I _C = -1A, I _B = -50mA
		—	—	-1.25		I _C = -2A, I _B = -200mA
Base-Emitter Turn-on Voltage (Note 11)	V _{BE(on)}	—	—	-0.9	V	V _{CE} = -2V, I _C = -0.5A
Turn-On Time	t _{on}	—	90	—	ns	I _C = -1A, I _{B1} = -I _{B2} = 50mA; T _A = +25°C
Delay Time	t _d	—	10	—	ns	
Rise Time	t _r	—	80	—	ns	

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

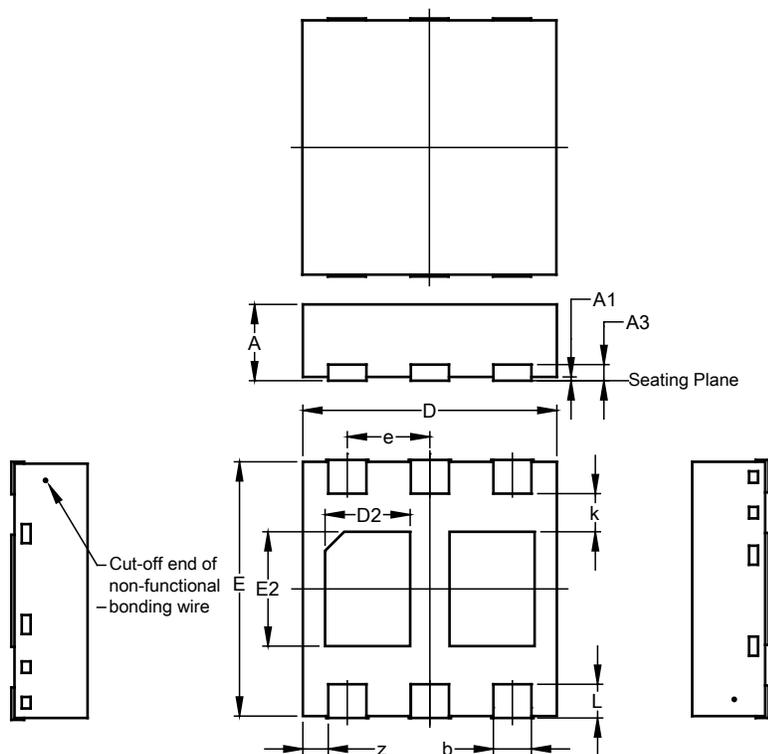
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



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

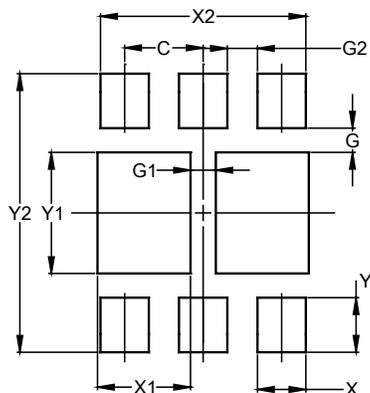


Package Outline Dimensions

U-DFN2020-6 (SWP) (Type A)


U-DFN2020-6 (SWP) (Type A)			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0.00	0.05	0.03
A3	--	--	0.127
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.57	0.77	0.67
E	1.95	2.05	2.00
E2	0.80	1.00	0.90
e	0.65BSC		
k	0.30BSC		
L	0.22	0.32	0.27
z	0.20BSC		
All Dimensions in mm			

Suggested Pad Layout

U-DFN2020-6 (SWP) (Type A)


Dimensions	Value (in mm)
C	0.650
G	0.200
G1	0.210
G2	0.250
X	0.400
X1	0.770
X2	1.700
Y	0.450
Y1	1.000
Y2	2.300