ZXTC6719MC

DUAL 50V NPN & 40V PNP LOW SATURATION TRANSISTOR COMBINATION

Features and Benefits

NPN Transistor
- BV_{CEO} > 50V
- I_C = 4A Continuous Collector Current
- Low Saturation Voltage (100mV max @ 1A)
- R_{SAT} = 68mΩ for a low equivalent On-Resistance

PNP Transistor
- BV_{CEO} > -40V
- I_C = -3A Continuous Collector Current
- Low Saturation Voltage (-220mV max @ -1A)
- R_{SAT} = 104mΩ for a low equivalent On-Resistance

- h_{FE} characterized up to 6A for high current gain hold up
- Low profile 0.8mm high package for thin applications
- $R_{\theta JA}$ efficient, 40% lower than SOT26
- $6mm^2$ footprint, 50% smaller than TSOP6 and SOT26
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

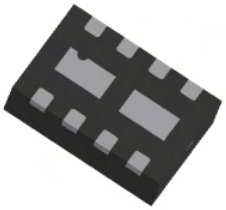
- Case: DFN3020B-8
- Case material: Molded Plastic. "Green" Molding Compound.
- Terminals: Pre-Plated NiPdAu leadframe.
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.013 grams (approximate)

Applications

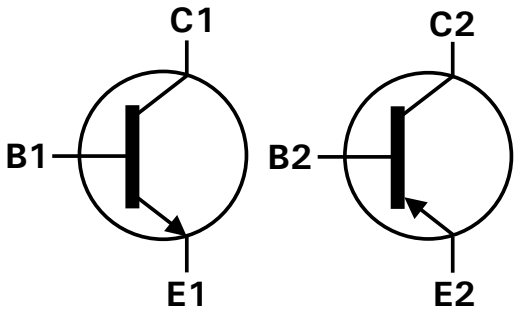
- DC – DC Converters
- Charging circuits
- Power switches
- Motor control
- CCFL Backlighting circuits
- Portable applications

DFN3020B-8

Top View

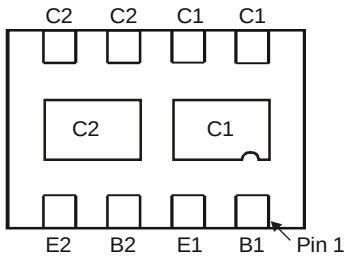


Bottom View



NPN Transistor

PNP Transistor



Bottom View
Pin Out

Equivalent Circuit

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC6719MCTA	DC3	7	8	3000

Notes:
1. No purposefully added lead.
2. Diodes Inc's "Green" Policy can be found on our website at http://www.diodes.com
3. For Packaging Details, go to our website at http://www.diodes.com.

Marking Information

DC3 = Product type Marking Code
Dot denotes Pin 1

Maximum Ratings @ T_A = 25°C unless otherwise specified

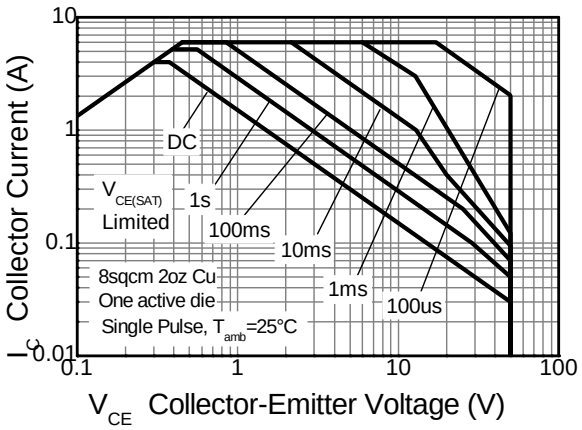
Parameter		Symbol	NPN	PNP	Unit
Collector-Base Voltage		V_{CBO}	100	-50	V
Collector-Emitter Voltage		V_{CEO}	50	-40	
Emitter-Base Voltage		V_{EBO}	7	-7	
Peak Pulse Current		I_{CM}	6	-4	A
Continuous Collector Current	(Notes 4 & 7)	I_C	4	-3	
	(Notes 5 & 7)		4.5	-3.5	
Base Current		I_B	1		

Thermal Characteristics @ T_A = 25°C unless otherwise specified

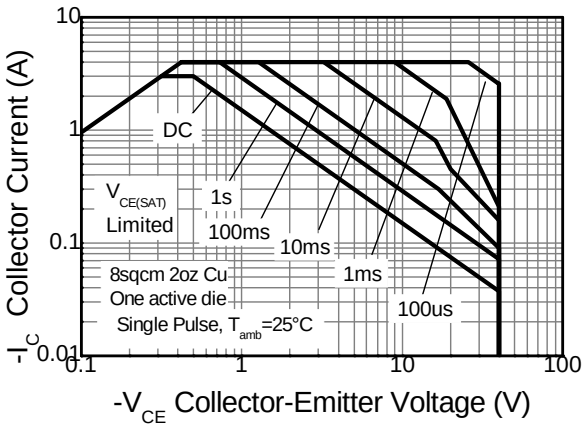
Characteristic		Symbol	NPN	PNP	Unit
Power Dissipation Linear Derating Factor	(Notes 4 & 7)	P_D	1.5 12		W mW/°C
	(Notes 5 & 7)		2.45 19.6		
	(Notes 6 & 7)		1.13 8		
	(Notes 6 & 8)		1.7 13.6		
Thermal Resistance, Junction to Ambient	(Notes 4 & 7)	$R_{\theta JA}$	83.3		°C/W
	(Notes 5 & 7)		51.0		
	(Notes 6 & 7)		111		
	(Notes 6 & 8)		73.5		
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	$R_{\theta JL}$	17.1		
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150		°C

Notes:
4. For a dual device surface mounted on 28mm x 28mm (8cm^2) FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed collector pads connected to each half.
5. Same as note (3), except the device is measured at t <5 sec.
6. Same as note (3), except the device is surface mounted on 31mm x 31mm (10cm^2) FR4 PCB with high coverage of single sided 1oz copper.
7. For a dual device with one active die.
8. For dual device with 2 active die running at equal power.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).

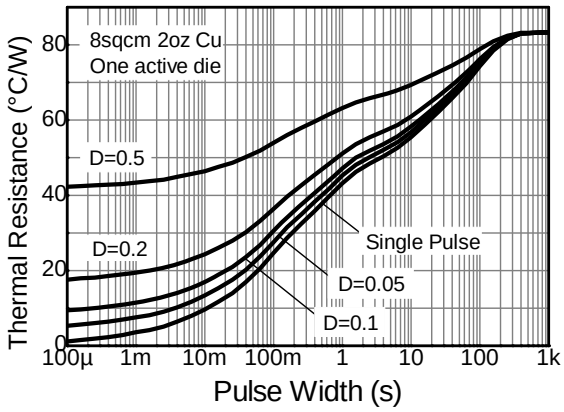
Thermal Characteristics



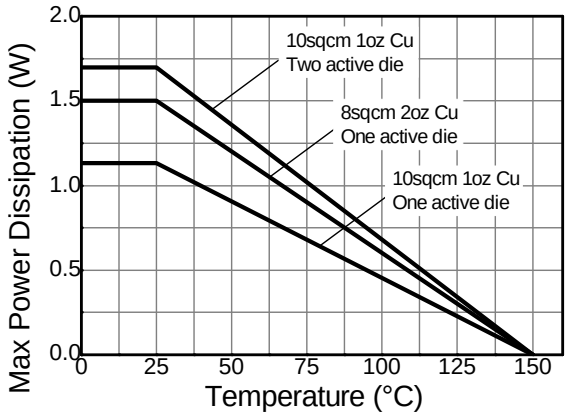
NPN Safe Operating Area



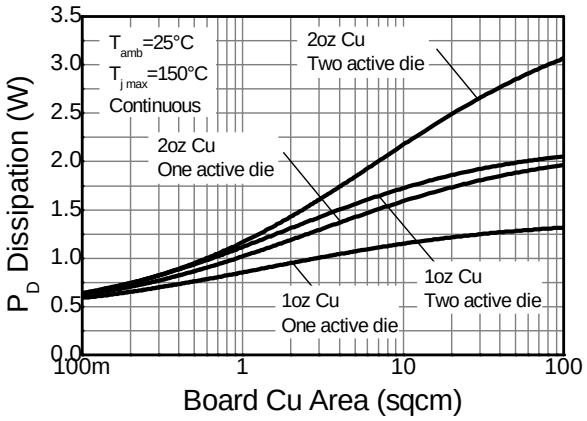
PNP Safe Operating Area



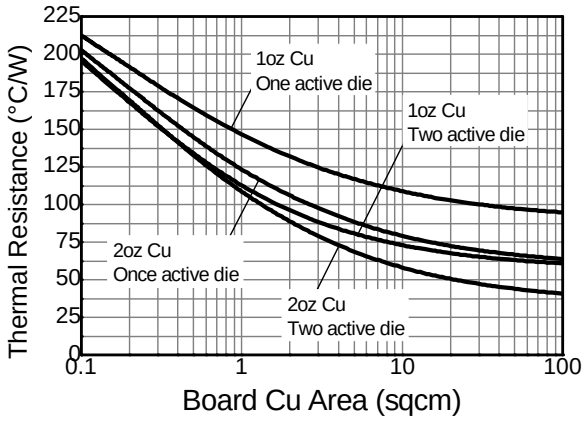
Transient Thermal Impedance



Derating Curve



Power Dissipation v Board Area



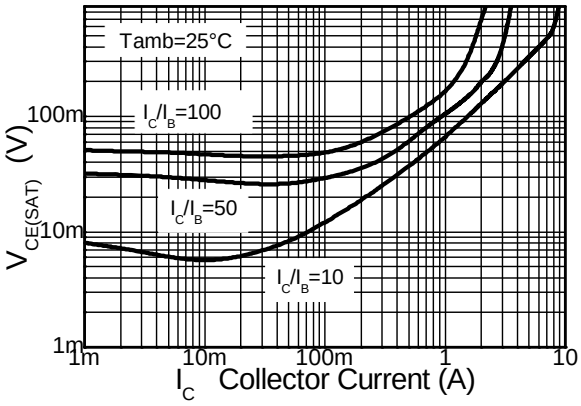
Thermal Resistance v Board Area

NPN - Electrical Characteristics @ T_A = 25°C unless otherwise specified

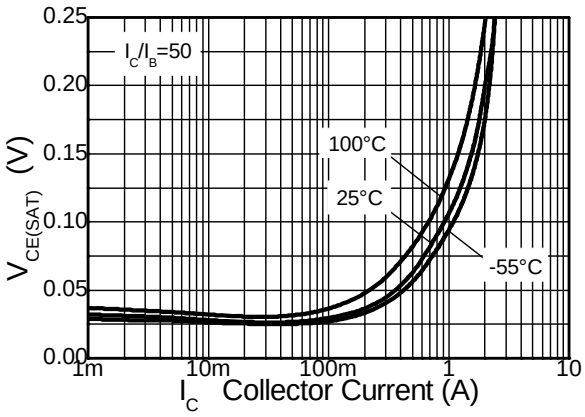
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	100	190	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	$V_{(BR)CEO}$	50	65	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	7	8.2	-	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	-	-	100	nA	V_{CB} = 80V
Emitter Cutoff Current	I_{EBO}	-	-	100	nA	V_{EB} = 6V
Collector Emitter Cutoff Current	I_{CES}	-	-	100	nA	V_{CES} = 40V
Static Forward Current Transfer Ratio (Note 10)	h_{FE}	200 300 200 100 -	400 450 400 225 40	- - - - -	-	I_C = 10mA, V_{CE} = 2V I_C = 200mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 6A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	- - - - - -	10 145 70 115 225 270	20 200 100 220 300 320	mV	I_C = 0.1A, I_B = 10mA I_C = 1A, I_B = 10mA I_C = 1A, I_B = 50mA I_C = 2A, I_B = 50mA I_C = 3A, I_B = 100mA I_C = 4A, I_B = 200mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	-	0.94	1.00	V	I_C = 4A, V_{CE} = 2V
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	-	1.00	1.07	V	I_C = 4A, I_B = 200mA
Output Capacitance	C_{obo}	-	12	20	pF	V_{CB} = 10V. f = 1MHz
Transition Frequency	f_T	100	165	-	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Turn-on Time	t_{on}	-	170	-	ns	V_{CC} = 10V, I_C = 1A
Turn-off Time	t_{off}	-	750	-	ns	I_{B1} = I_{B2} = 10mA

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

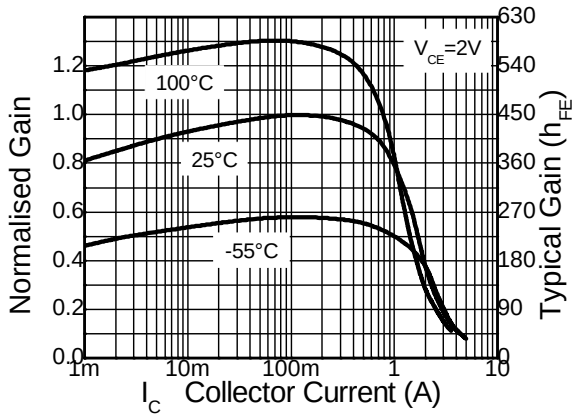
NPN – Typical Electrical Characteristics



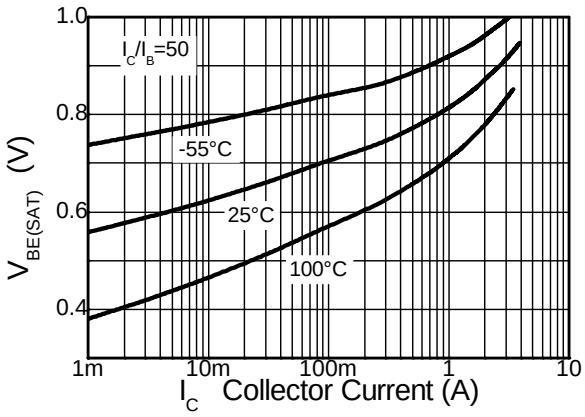
$V_{CE(SAT)}$ v I_C



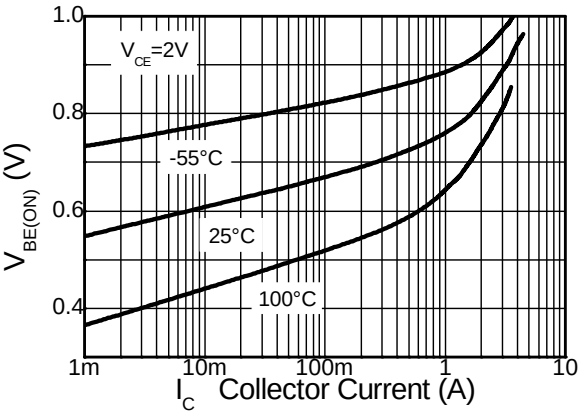
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



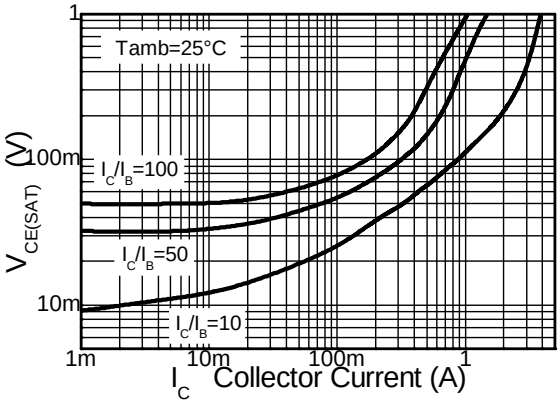
$V_{BE(ON)}$ v I_C

PNP - Electrical Characteristics @T_A = 25°C unless otherwise specified

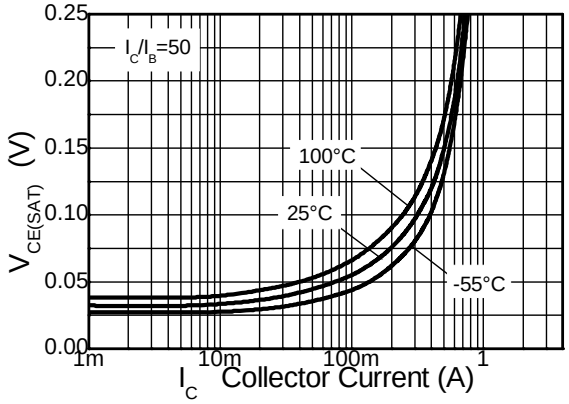
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50	-80	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 11)	$V_{(BR)CEO}$	-40	-70	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-7	-8.5	-	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	V_{CB} = -40V
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	V_{EB} = -6V
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	V_{CES} = -32V
Static Forward Current Transfer Ratio (Note 11)	h_{FE}	300 300 180 60 12	480 450 290 130 22	- - - - -	-	I_C = -10mA, V_{CE} = -2V I_C = -100mA, V_{CE} = -2V I_C = -1A, V_{CE} = -2V I_C = -1.5A, V_{CE} = -2V I_C = -3A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	- - - - -	-25 -150 -195 -210 -260	-40 -220 -300 -300 -370	mV	I_C = -0.1A, I_B = -10mA I_C = -1A, I_B = -50mA I_C = -1.5A, I_B = -100mA I_C = -2A, I_B = -200mA I_C = -2.5A, I_B = -250mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	-	-0.89	-0.95	V	I_C = -2.5A, V_{CE} = -2V
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	-	-0.97	-1.05	V	I_C = -2.5A, I_B = -250mA
Output Capacitance	C_{obo}	-	19	25	pF	V_{CB} = -10V. f = 1MHz
Transition Frequency	f_T	150	190	-	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Turn-on Time	t_{on}	-	40	-	ns	V_{CC} = -15V, I_C = -0.75A
Turn-off Time	t_{off}	-	435	-	ns	I_{B1} = I_{B2} = -10mA

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

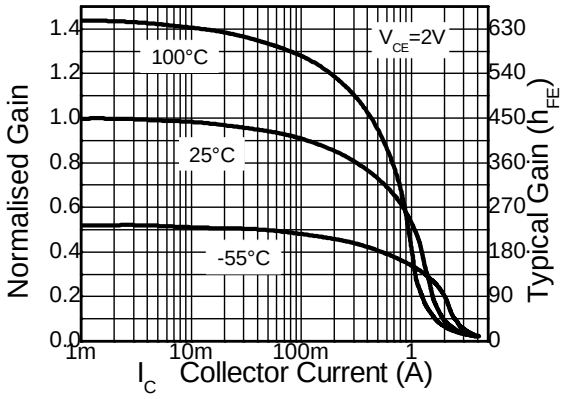
PNP – Typical Electrical Characteristics



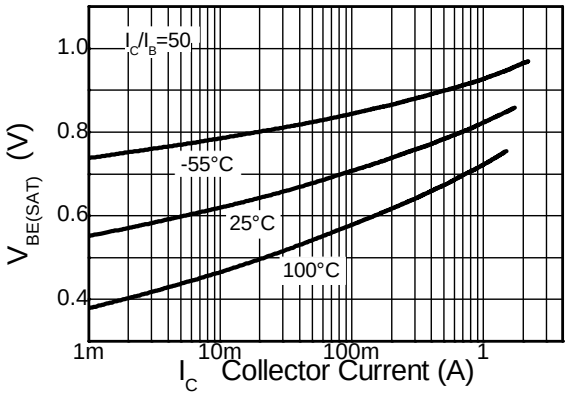
$V_{CE(SAT)}$ v I_C



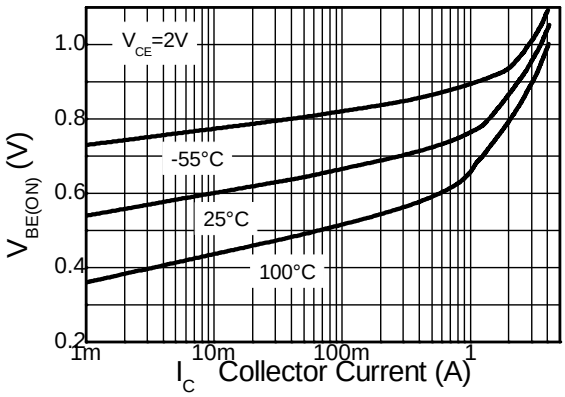
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

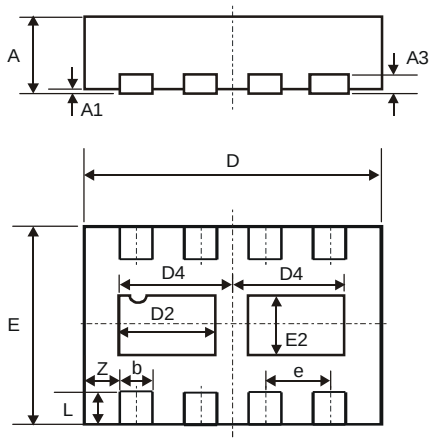


$V_{BE(SAT)}$ v I_C



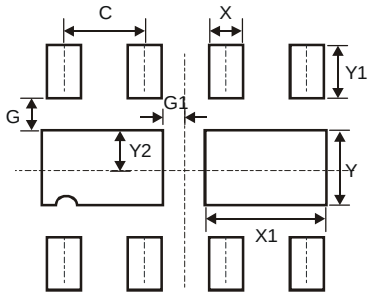
$V_{BE(ON)}$ v I_C

Package Outline Dimensions



DFN3020B-8			
Dim	**Min**	**Max**	**Typ**
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
G	0.285
G1	0.090
X	0.400
X1	1.120
Y	0.730
Y1	0.500
Y2	0.365

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