

Features

- $BV_{CEO} > 20V$
- $I_C = 6.0A$ Continuous Current
- Low Saturation Voltage $V_{CE(sat)} < 48mV @ 1A$
- $R_{sat} = 30m\Omega$ for a Low Equivalent On-Resistance
- $P_D = 2.4W$ Power Dissipation
- Complementary part number: ZXTP25020DZ
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.05 grams (Approximate)

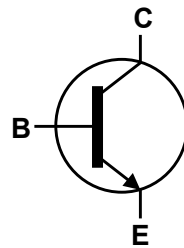
Application

- Emergency lighting circuits
- Motor driving
- Camera strobe
- Boost converters
- Backlight inverters
- MOSFET gate drivers
- LED Driving

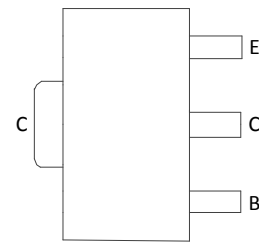
SOT89



Top View



Device Symbol



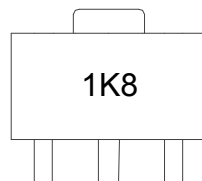
Top View
Pin Out

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
ZXTN25020DZTA	Standard	1K8	7	12	1,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



1K8 = Product Type Marking Code

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

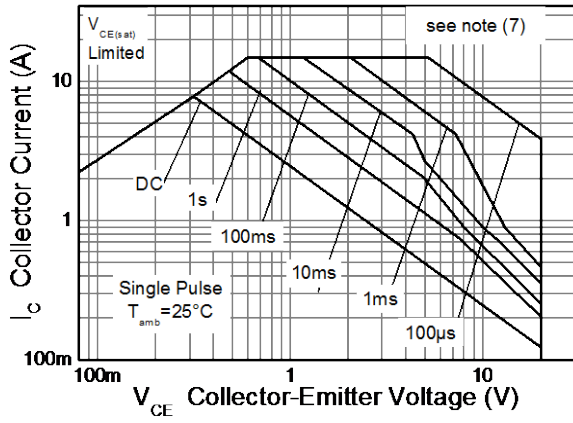
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage (forward blocking)	V_{CEX}	100	V
Collector-Emitter Voltage	V_{CEO}	20	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	6	A
Peak Pulse Collector Current (single pulse)	I_{CM}	15	A
Base current	I_B	1	A

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

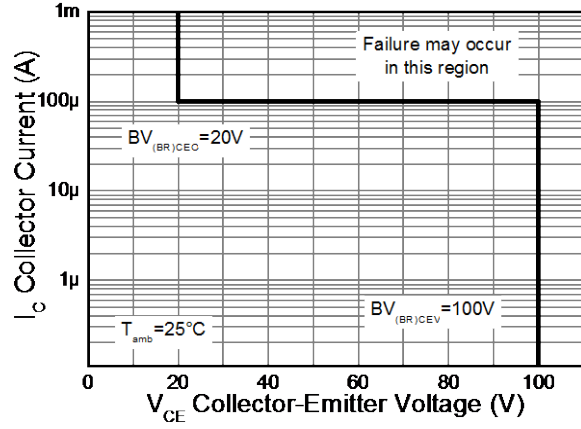
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.1	W mW/ $^\circ\text{C}$
Linear Derating Factor		8.8	
Power Dissipation (Note 6)		1.8	
Linear Derating Factor		14.4	
Power Dissipation (Note 7)		2.4	
Linear Derating Factor		19.2	
Power Dissipation (Note 8)		4.46	
Linear Derating Factor		35.7	
Power Dissipation (Note 9)		19.2	
Linear Derating Factor		153	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	117	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Note 6)		68	
Thermal Resistance, Junction to Ambient (Note 7)		51	
Thermal Resistance, Junction to Ambient (Note 8)		28	
Junction to case (Note 9)	$R_{\theta JC}$	7.95	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
 6. Same as note (5), except the device is mounted on 25mm x 25mm x 1.6mm single sided 2oz weight copper.
 7. Same as note (5), except the device is mounted on 50mm x 50mm x 1.6mm single sided 2oz weight copper.
 8. Same as note (5), except the device is measured at $t < 5$ seconds.
 9. Junction to case (collector tab). Typical.

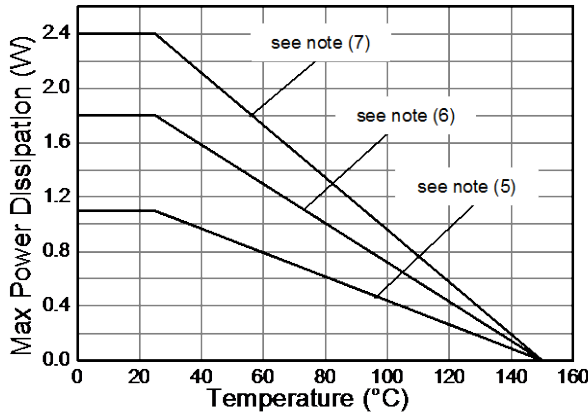
Thermal Characteristics and Derating Information



Safe Operating Area

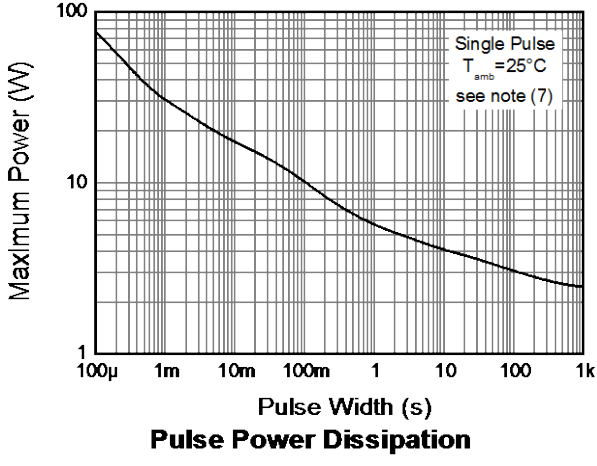
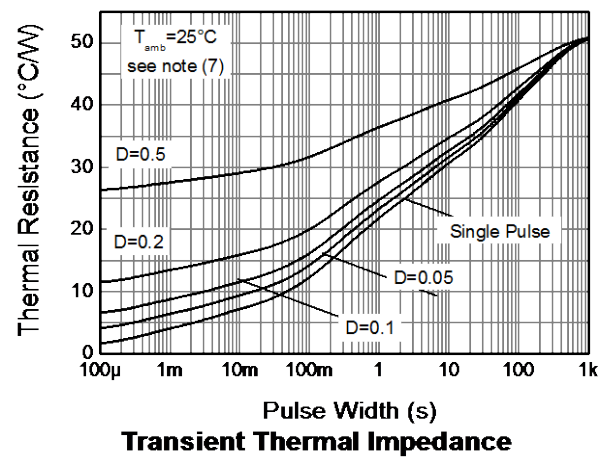
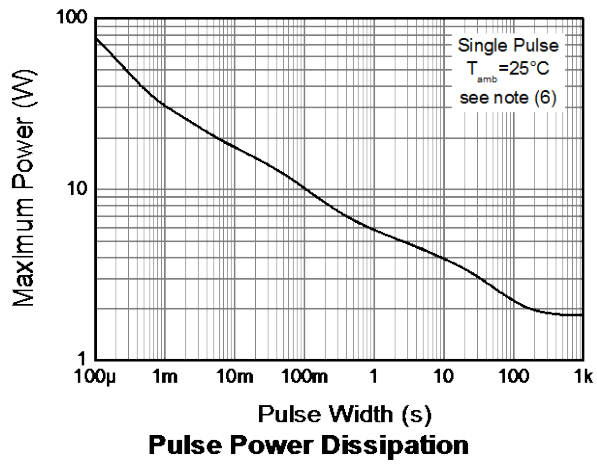
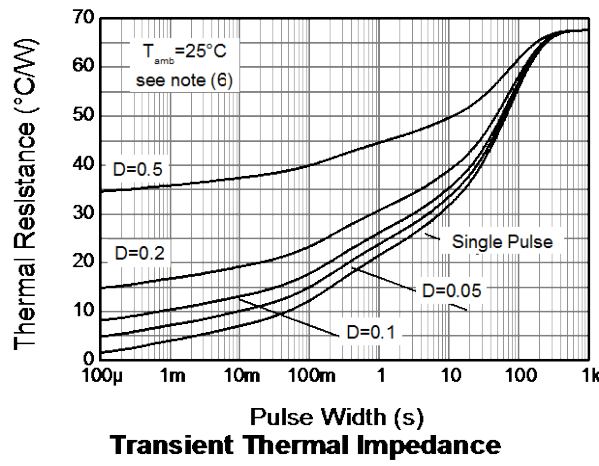
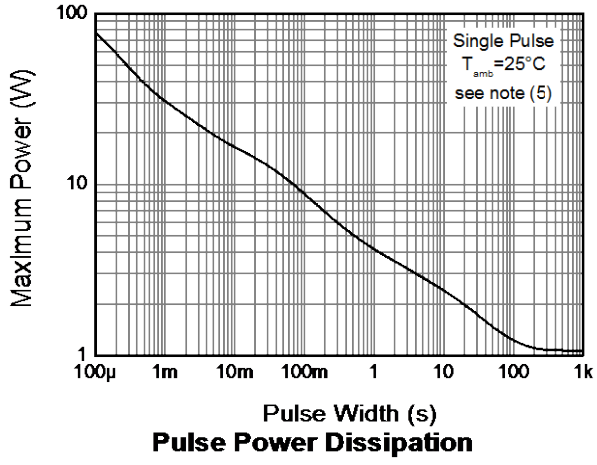
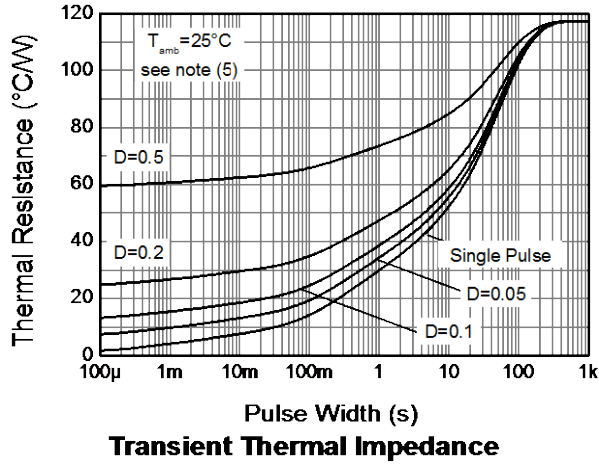


Safe Operating Area



Derating Curve

Thermal Characteristics and Derating Information

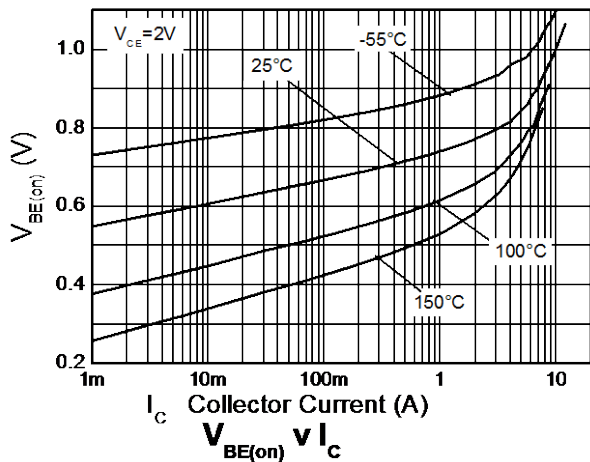
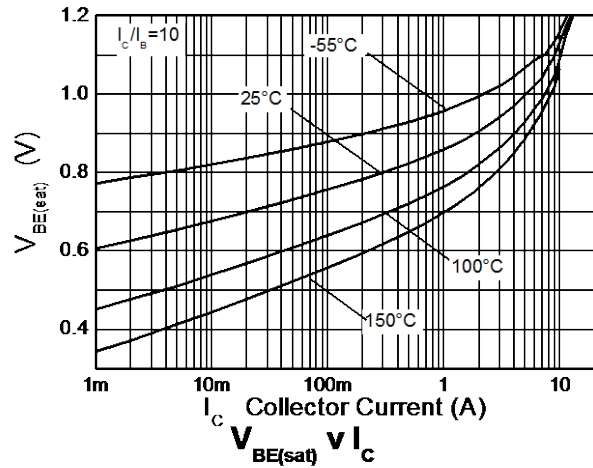
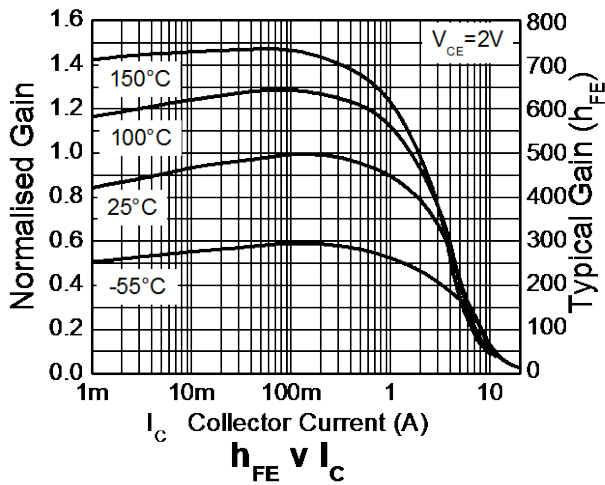
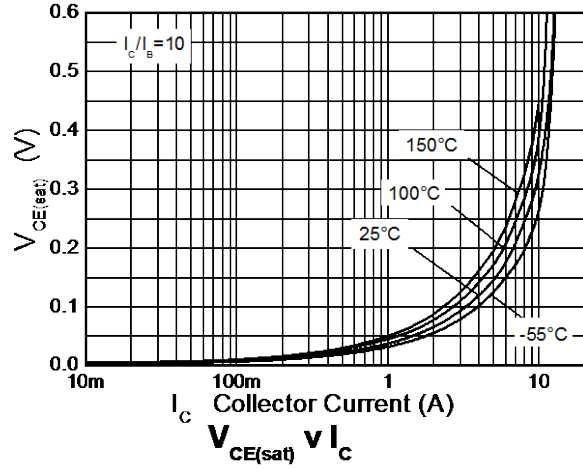
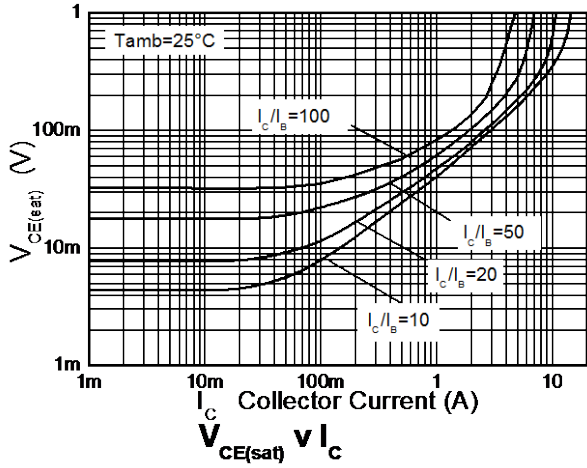


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	125	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (forward blocking)	BV_{CEX}	100	120	—	V	$I_C = 100\mu\text{A}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector- Emitter Breakdown Voltage (Note 10)	BV_{CEO}	20	35	—	V	$I_C = 10\text{mA}$
Emitter-Collector Breakdown Voltage (reverse blocking)	BV_{ECX}	6	8	—	V	$I_E = 100\mu\text{A}$, $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-Base Breakdown Voltage	BV_{EBO}	5.0	6.0	—	V	$I_E = 100\mu\text{A}$
Emitter-Collector Breakdown Voltage	BV_{ECO}	7.0	8.3	—	V	$I_E = 100\mu\text{A}$
Collector Base Cut-Off Current	I_{CBO}	—	1	50	nA μA	$V_{CB} = 100\text{V}$ $V_{CB} = 100\text{V}$, $T_A = +100^\circ\text{C}$
Collector Emitter Cut-Off Current	I_{CEX}	—	—	100	nA	$V_{CE} = 100\text{V}$; $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter Cut-Off Current	I_{EBO}	—	1	50	nA	$V_{EB} = -5.6\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	40 60 100 130 100 210	48 75 120 180 120 270	mV	$I_C = 1\text{A}$, $I_B = 100\text{mA}$ $I_C = 1\text{A}$, $I_B = 20\text{mA}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}$ $I_C = 2\text{A}$, $I_B = 20\text{mA}$ $I_C = 3\text{A}$, $I_B = 300\text{mA}$ $I_C = 6\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	1000	1050	mV	$I_C = 6\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	875	950	mV	$I_C = 6\text{A}$, $V_{CE} = 2\text{V}$
DC Current Gain (Note 10)	h_{FE}	—	300 250 50 —	450 360 110 15	—	$I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 6\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 15\text{A}$, $V_{CE} = 2\text{V}$
Transitional frequency	f_T	—	215	—	MHz	$I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$, $f = 100\text{MHz}$
Output Capacitance	C_{ibo}	—	152	—	pF	$V_{EB} = 0.5\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{obo}	—	16.5	25	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$
Delay time	t_d	—	67.7	—	ns	$V_{CC} = 10\text{V}$, $I_C = 1\text{A}$, $I_{B1} = -I_{B2} = 10\text{mA}$
Rise time	t_r		72.2			
Storage time	t_s		361			
Fall time	t_f		63.9			

Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

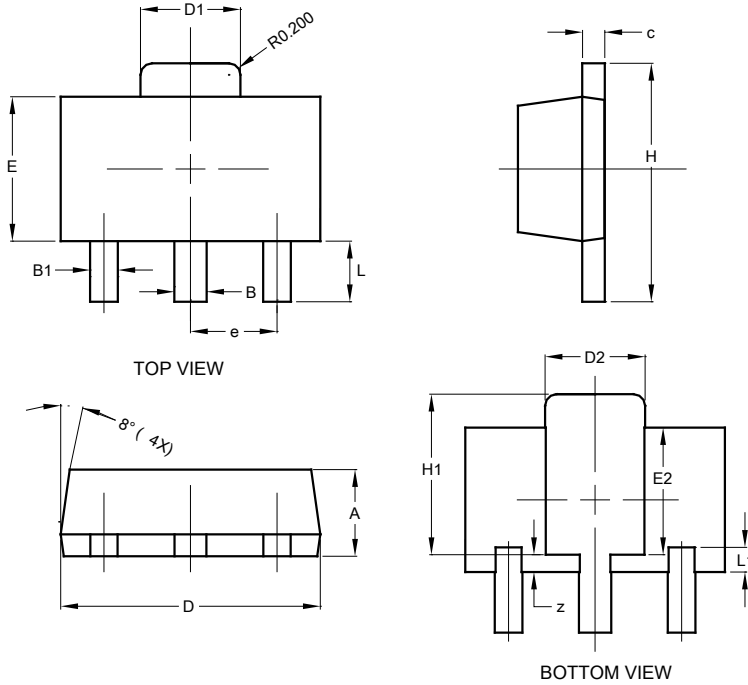
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT89

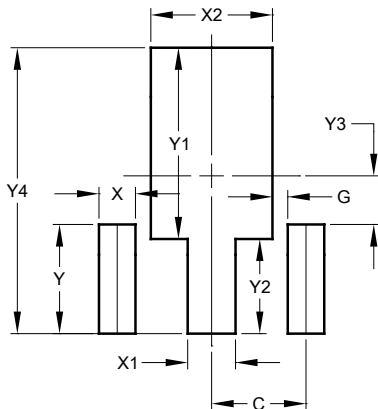


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

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

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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