

## 12V LOW $V_{CE(sat)}$ PNP SURFACE MOUNT TRANSISTOR

### Features

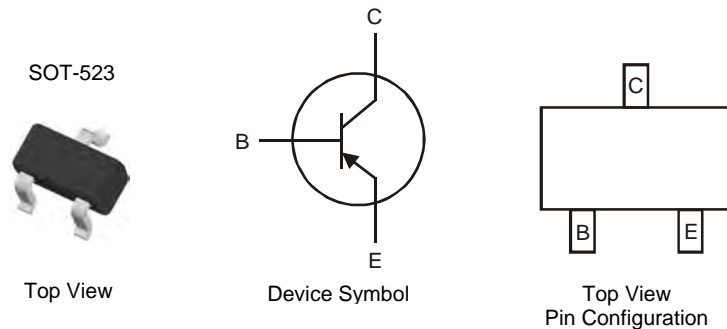
- Low Collector-Emitter Saturation Voltage,  $V_{CE(sat)}$
- Ultra-Small Surface Mount Package
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD rating: 400V-MM, 8KV-HBM

### Applications

- DC-DC converter
- Portable equipments
- Power management units

### Mechanical Data

- Case: SOT-523
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.002 grams (approximate)

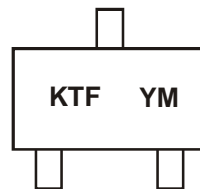


### Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
2DA2018-7	KTF	7	8mm	3,000

- 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



KTF = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: W = 2009)  
 M = Month (ex: 9 = September)

#### Date Code Key

Year Code	2009	2010	2011	2012	2013	2014	2015	2015
Code	W	X	Y	Z	A	B	C	C

Month Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-15	V
Collector-Emitter Voltage	$V_{CEO}$	-12	V
Emitter-Base Voltage	$V_{EBO}$	-6	V
Collector Current - Continuous	$I_C$	-500	mA
Peak Pulse Collector Current	$I_{CM}$	-1	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Thermal Resistance, Junction to Ambient (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Notes: 4. Device mounted on FR-4 PCB with minimum recommended pad layout.

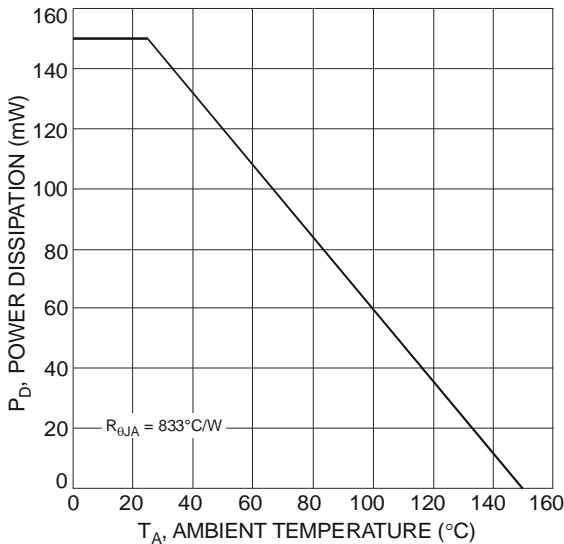


Fig. 1 Power Dissipation vs. Ambient Temperature

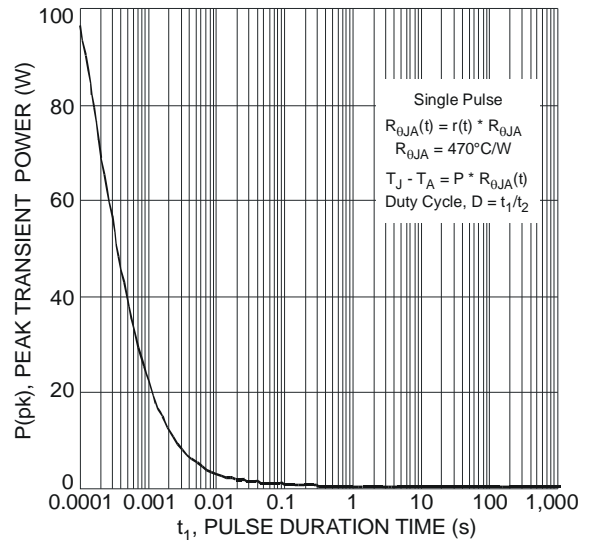


Fig. 2 Single Pulse Maximum Power Dissipation

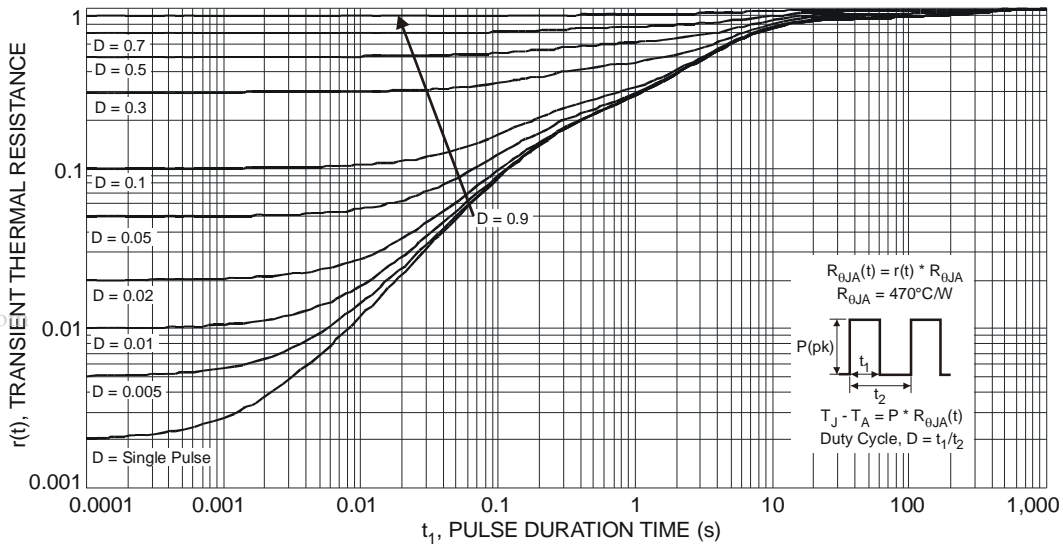


Fig. 3 Transient Thermal Response

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**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-15	—	—	V	$I_C = -10\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 5)	$BV_{CEO}$	-12	—	—	V	$I_C = -1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-6	—	—	V	$I_E = -10\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CBO}$	—	—	-100 -50	nA $\mu\text{A}$	$V_{CB} = -15\text{V}, I_E = 0$ $V_{CB} = -15\text{V}, I_E = 0, T_A = 150^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	—	—	-100	nA	$V_{EB} = -6\text{V}, I_C = 0$
DC Current Gain (Note 5)	$h_{FE}$	270	—	680	—	$V_{CE} = -2\text{V}, I_C = -10\text{mA}$
Collector-Emitter Saturation Voltage (Note 5)	$V_{CE(sat)}$	—	—	-250	mV	$I_C = -200\text{mA}, I_B = -10\text{mA}$
Output Capacitance	$C_{obo}$	—	7.4	—	pF	$V_{CB} = -10\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	$f_T$	—	260	—	MHz	$V_{CE} = -2\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$
Turn-On Time	$t_{on}$	—	40	—	ns	$V_{CC} = -6\text{V}$ $I_C = -200\text{mA}, I_{B1} = I_{B2} = -10\text{mA}$
Delay Time	$t_d$	—	18	—	ns	
Rise Time	$t_r$	—	22	—	ns	
Turn-Off Time	$t_{off}$	—	106	—	ns	
Storage Time	$t_s$	—	87	—	ns	
Fall Time	$t_f$	—	19	—	ns	

Notes: 5. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

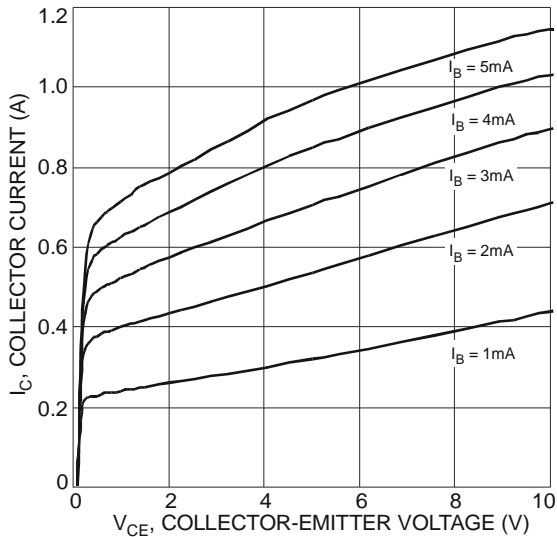


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

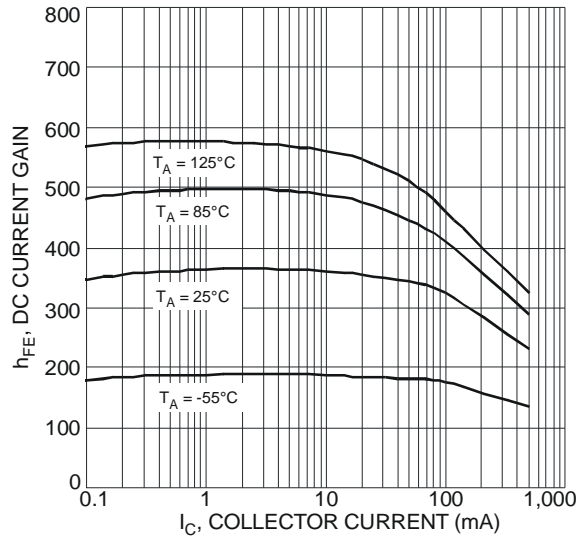


Fig. 5 Typical DC Current Gain vs. Collector Current

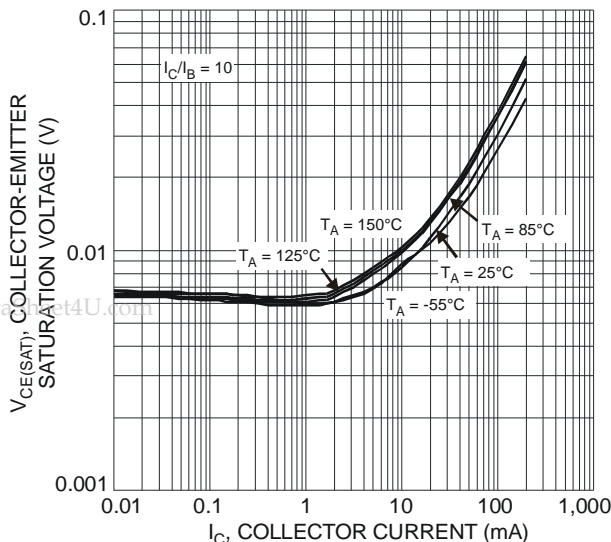


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

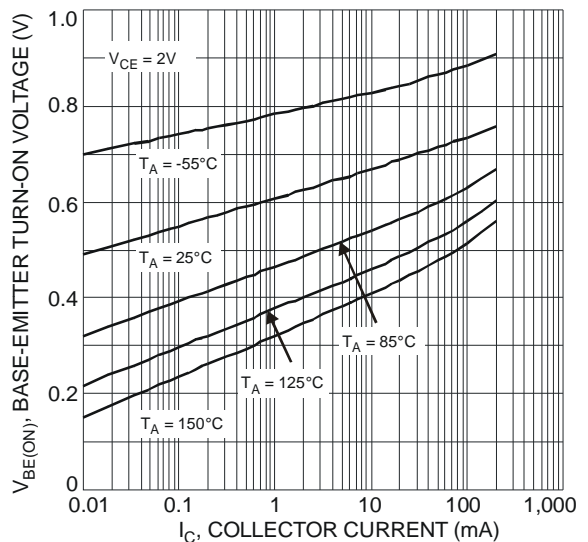


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

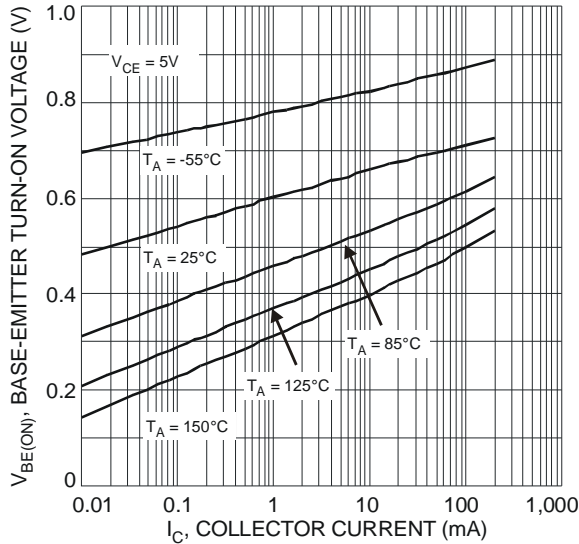


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

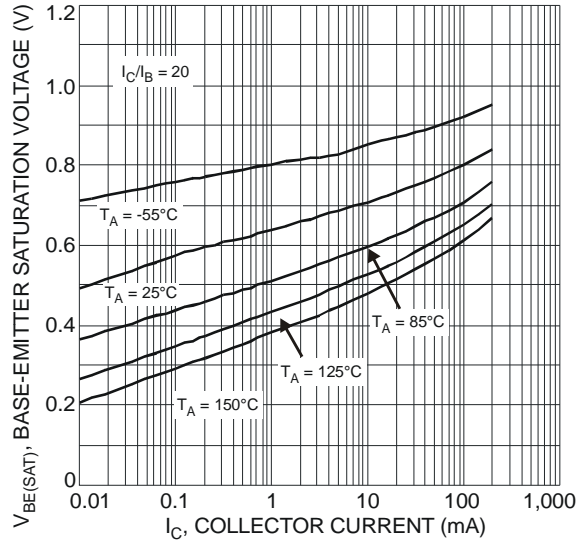


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

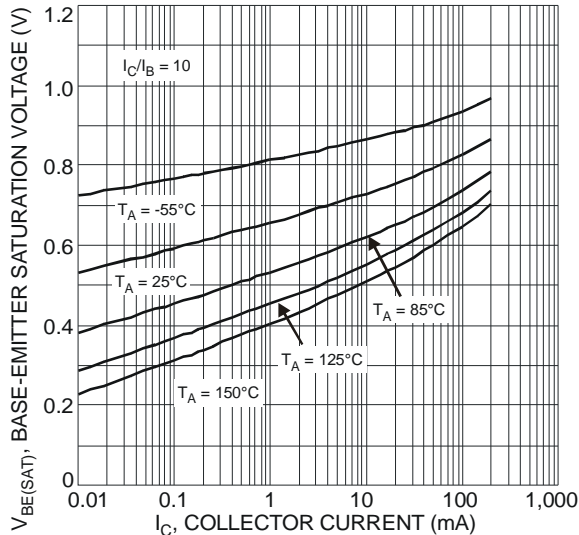


Fig. 10 Typical Base-Emitter Saturation Voltage vs. Collector Current

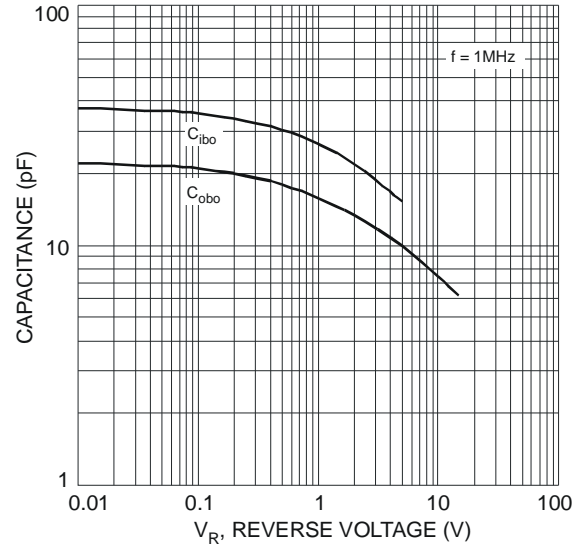
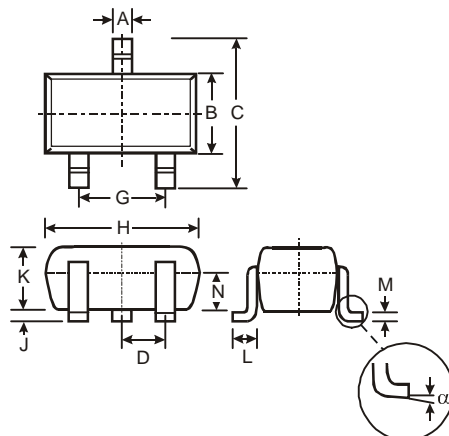


Fig. 11 Typical Capacitance Characteristics

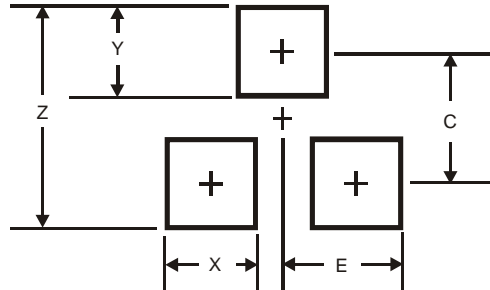
**Package Outline Dimensions**



SOT-523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

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## Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.8
X	0.4
Y	0.51
C	1.3
E	0.7

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