



Is Now Part of



**ON Semiconductor®**

To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.



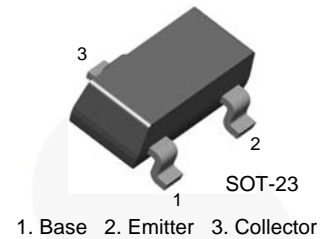
October 2014

# KST2222A

## NPN Epitaxial Silicon Transistor

### Features

- General-Purpose Transistor



### Ordering Information

Part Number	Marking	Package	Packing Method
KST2222AMTF	1P	SOT-23 3L	Tape and Reel

### Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$V_{\text{CBO}}$	Collector-Base Voltage	75	V
$V_{\text{CEO}}$	Collector-Emitter Voltage	40	V
$V_{\text{EBO}}$	Emitter-Base Voltage	6	V
$I_{\text{C}}$	Collector Current	600	mA
$T_{\text{STG}}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$

### Thermal Characteristics<sup>(1)</sup>

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$P_{\text{D}}$	Power Dissipation	350	mW
	Derate Above $25^\circ\text{C}$	2.8	mW/ $^\circ\text{C}$
$R_{\theta\text{JA}}$	Thermal Resistance, Junction-to-Ambient	357	$^\circ\text{C}/\text{W}$

#### Note:

1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\ \mu\text{A}, I_E = 0$	75		V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\ \text{mA}, I_B = 0$	40		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\ \mu\text{A}, I_C = 0$	6		V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 60\ \text{V}, I_E = 0$		0.01	$\mu\text{A}$
$h_{FE}$	DC Current Gain <sup>(2)</sup>	$V_{CE} = 10\ \text{V}, I_C = 0.1\ \text{mA}$	35		
		$V_{CE} = 10\ \text{V}, I_C = 1\ \text{mA}$	50		
		$V_{CE} = 10\ \text{V}, I_C = 10\ \text{mA}$	75		
		$V_{CE} = 10\ \text{V}, I_C = 150\ \text{mA}$	100	300	
		$V_{CE} = 10\ \text{V}, I_C = 500\ \text{mA}$	40		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(2)</sup>	$I_C = 150\ \text{mA}, I_B = 15\ \text{mA}$		0.3	V
		$I_C = 500\ \text{mA}, I_B = 50\ \text{mA}$		1.0	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage <sup>(2)</sup>	$I_C = 150\ \text{mA}, I_B = 15\ \text{mA}$	0.6	1.2	V
		$I_C = 500\ \text{mA}, I_B = 50\ \text{mA}$		2.0	
$f_T$	Current Gain Bandwidth Product	$I_C = 20\ \text{mA}, V_{CE} = 20\ \text{V}, f = 100\ \text{MHz}$	300		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10\ \text{V}, I_E = 0, f = 1\ \text{MHz}$		8	pF
NF	Noise Figure	$I_C = 100\ \mu\text{A}, V_{CE} = 10\ \text{V}, R_S = 1\ \text{k}\Omega, f = 1\ \text{MHz}$		4	dB
$t_{ON}$	Turn-On Time	$V_{CC} = 30\ \text{V}, I_C = 150\ \text{mA}, V_{BE} = 0.5\ \text{V}, I_{B1} = 15\ \text{mA}$		35	ns
$t_{OFF}$	Turn-Off Time	$V_{CC} = 30\ \text{V}, I_C = 150\ \text{mA}, I_{B1} = I_{B2} = 15\ \text{mA}$		285	ns

### Note:

2. Pulse test: Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

Typical Performance Characteristics

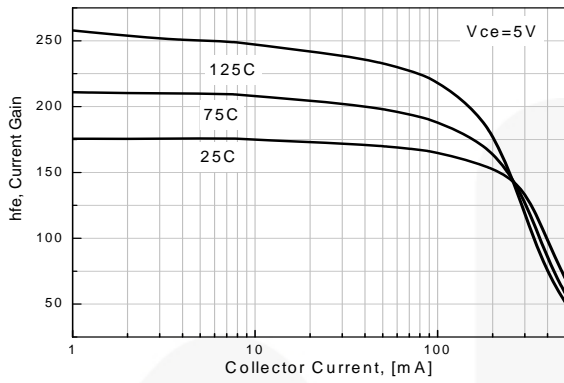


Figure 1. DC Current Gain

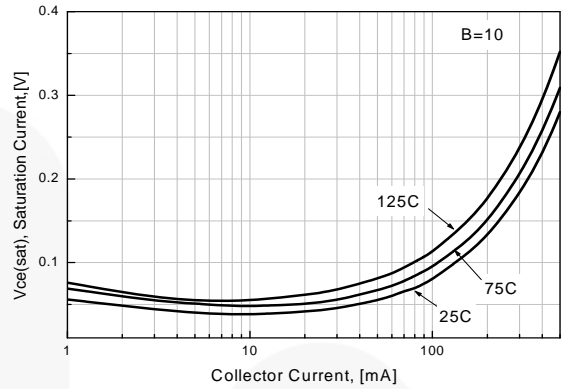


Figure 2. Collector-Emitter Saturation Voltage

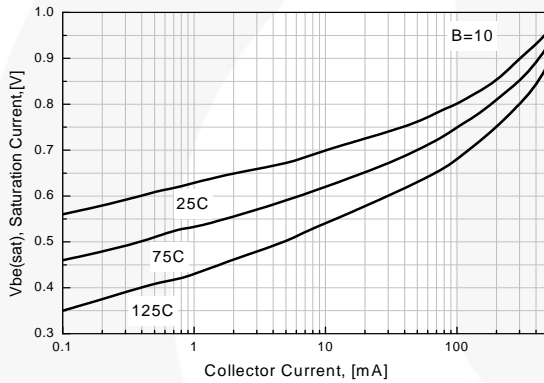


Figure 3. Base-Emitter Saturation Voltage

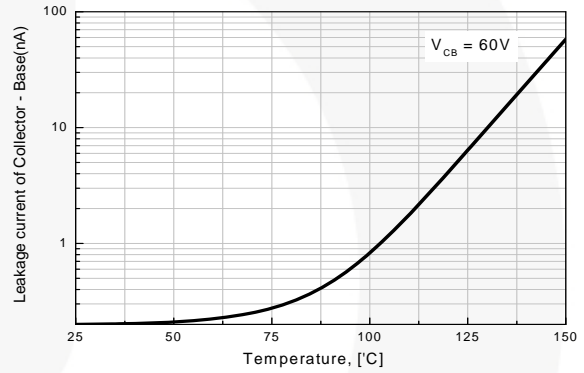


Figure 4. Collector-Base Leakage Current

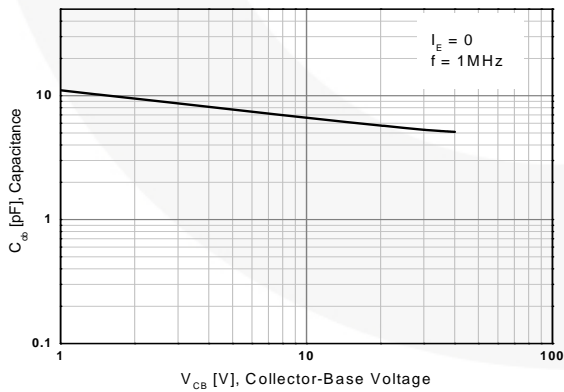


Figure 5. Output Capacitance

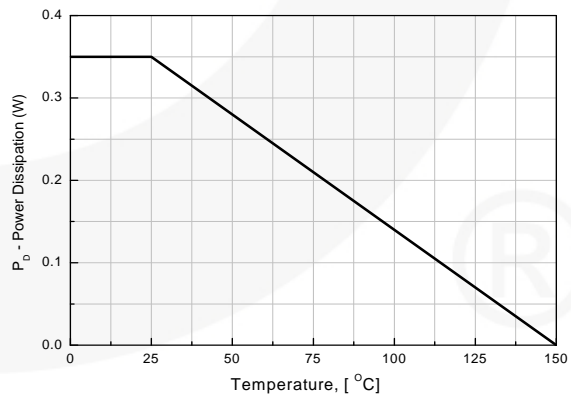
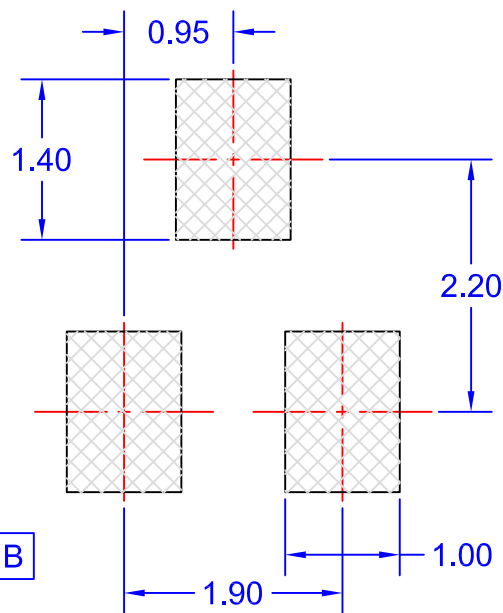
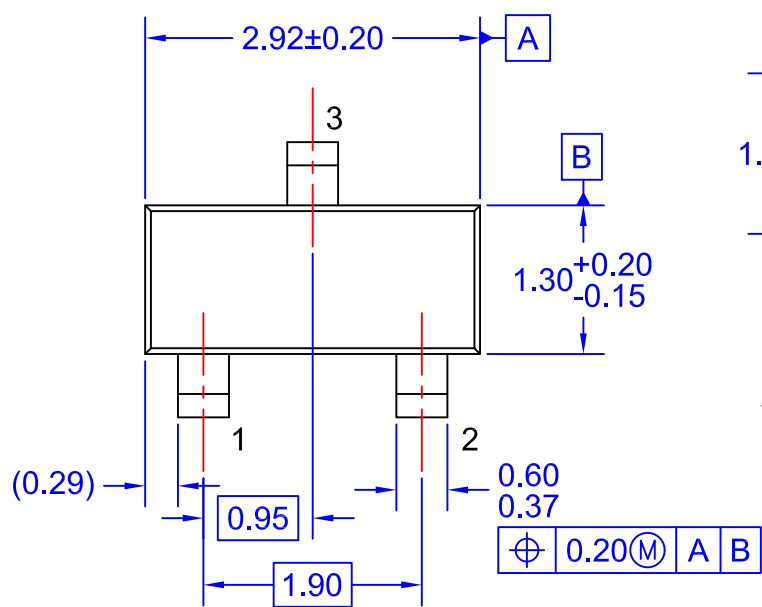
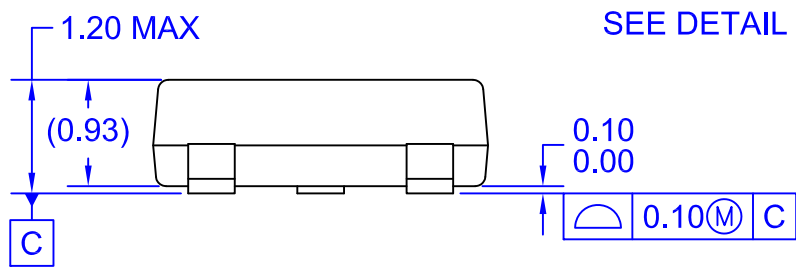


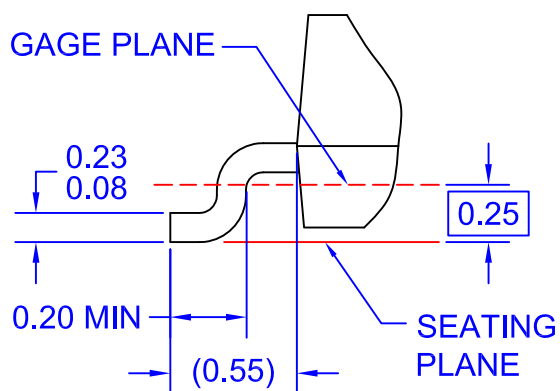
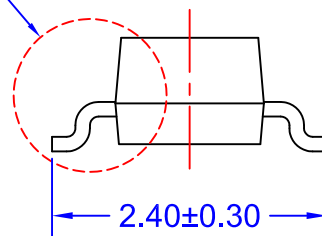
Figure 6. Power Dissipation vs. Ambient Temperature



LAND PATTERN  
RECOMMENDATION



SEE DETAIL A



**DETAIL A**  
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.
- E) DRAWING FILE NAME: MA03DREV12



ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative