

Bipolar Transistor

–50 V, –10 A, Low $V_{CE(sat)}$, PNP TO–220F–3FS

2SA2222SG

Features

- Adoption of MBIT Process
- Large Current Capacity ($I_C = -10$ A)
- Low Collector to Emitter Saturation Voltage ($V_{CE(sat)} = -250$ mV (Typ.))
- High-speed Switching ($t_f = 22$ ns (Typ.))
- This is a Pb-Free Device

Applications

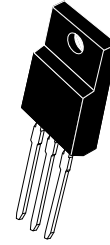
- Relay Drivers, Lamp Drivers, Motor Drivers

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS at $T_a = 25^\circ\text{C}$

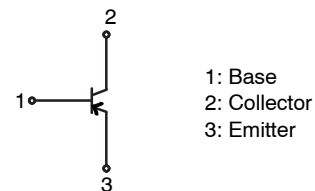
Symbol	Parameter	Condition	Value	Unit
V_{CBO}	Collector-to-Base Voltage		–50	V
V_{CEO}	Collector-to-Emitter Voltage		–50	V
V_{EBO}	Emitter-to-Base Voltage		–6	V
I_C	Collector Current		–10	A
I_{CP}	Collector Current (Pulse)	$PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$	–13	A
I_B	Base Current		–2	A
P_C	Collector Dissipation	$T_c = 25^\circ\text{C}$, $P_T \leq 1\text{s}$	25	W
T_J	Junction Temperature		150	$^\circ\text{C}$
T_{STG}	Storage Temperature		–55 to +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

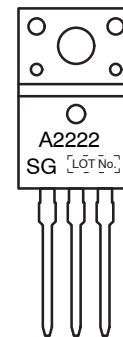


TO–220F–3FS
CASE 221AM

ELECTRICAL CONNECTION



MARKING DIAGRAM



ORDERING INFORMATION

Device	Package	Shipping
2SA2222SG	TO–220F–3FS (Pb-Free)	50 Units/Tube

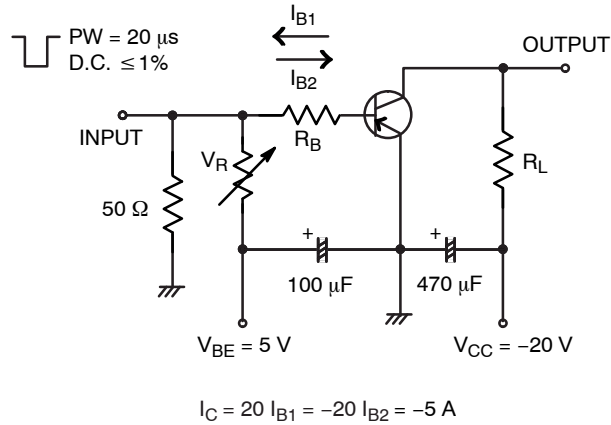
2SA2222SG

ELECTRICAL CHARACTERISTICS at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	$V_{CB} = -40 \text{ V}, I_E = 0 \text{ A}$			-10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = -4\text{V}, I_C = 0 \text{ A}$			-10	μA
DC Current Gain	h_{FE}	$V_{CE} = -2 \text{ V}, I_C = -270 \text{ mA}$	150		450	
Gain-Bandwidth Product	f_T	$V_{CE} = -10 \text{ V}, I_C = -1 \text{ A}$		230		MHz
Output Capacitance	C_{ob}	$V_{CB} = -10 \text{ V}, f = 1 \text{ MHz}$		115		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -6 \text{ A}, I_B = -300 \text{ mA}$		-250	-500	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = -6 \text{ A}, I_B = -300 \text{ mA}$			-1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -100 \mu\text{A}, I_E = 0 \text{ A}$	-50			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -1 \text{ mA}, R_{BE} = \infty$	-50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -100 \mu\text{A}, I_C = 0 \text{ A}$	-6			V
Turn-On Time	t_{on}	See specified Test Circuit		40		ns
Storage Time	t_{stg}			240		ns
Fall Time	t_f			22		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Switching Time Test Circuit



TYPICAL CHARACTERISTICS

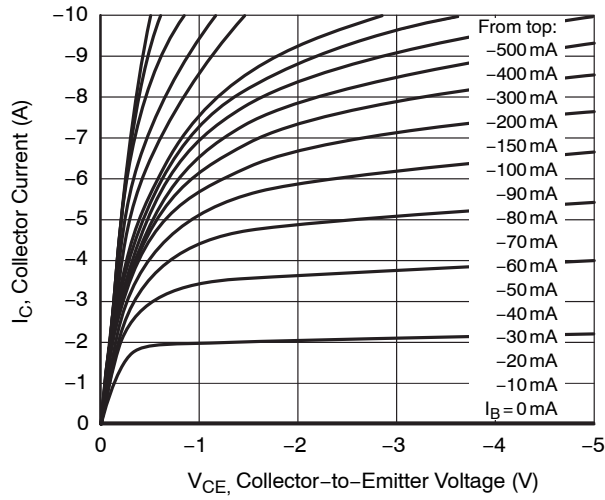


Figure 1. $I_C - V_{CE}$

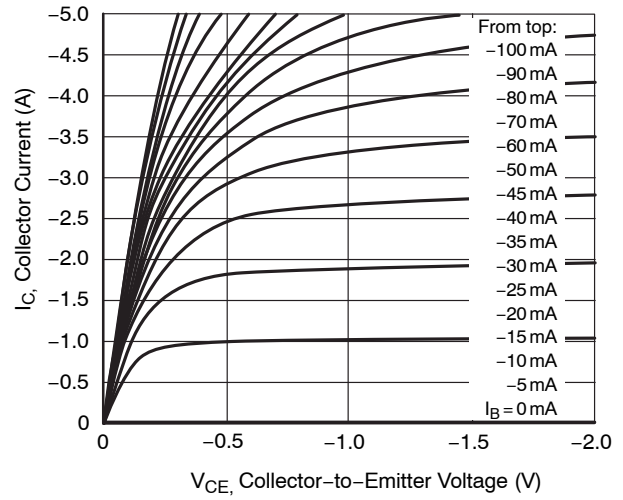


Figure 2. $I_C - V_{CE}$

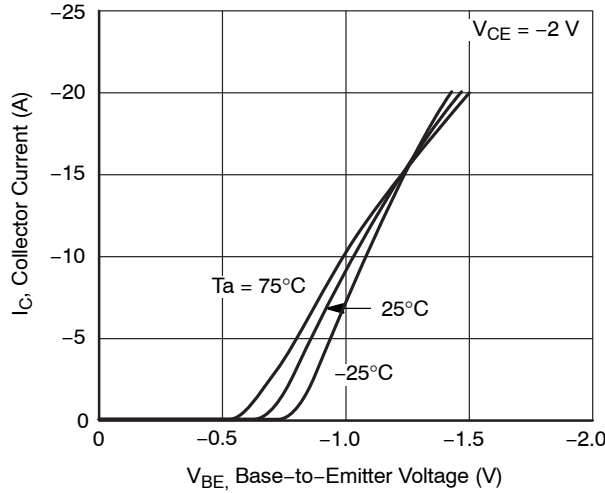


Figure 3. $I_C - V_{BE}$

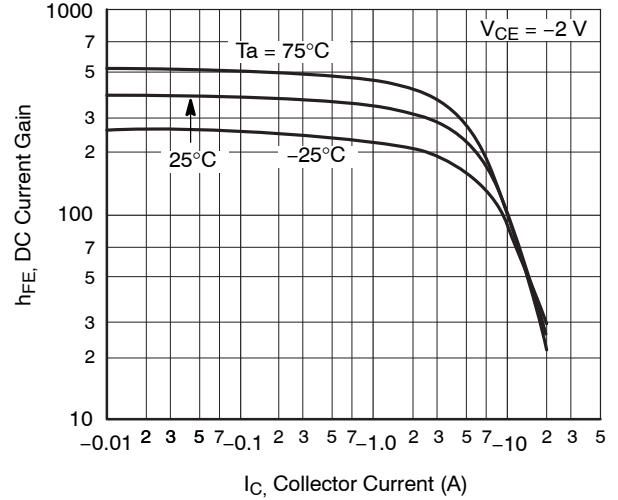


Figure 4. $h_{FE} - I_C$

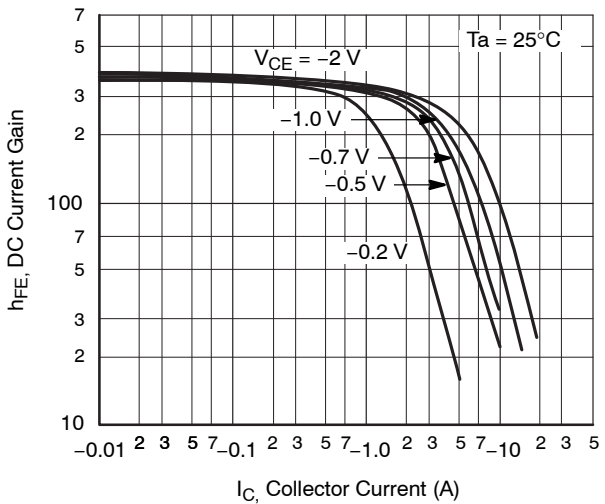


Figure 5. $h_{FE} - I_C$

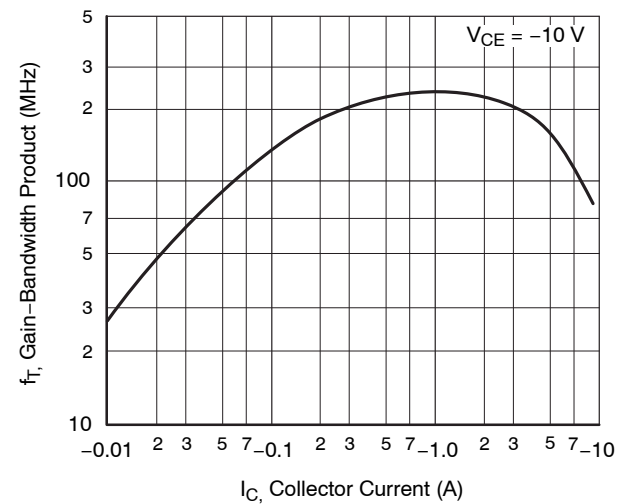
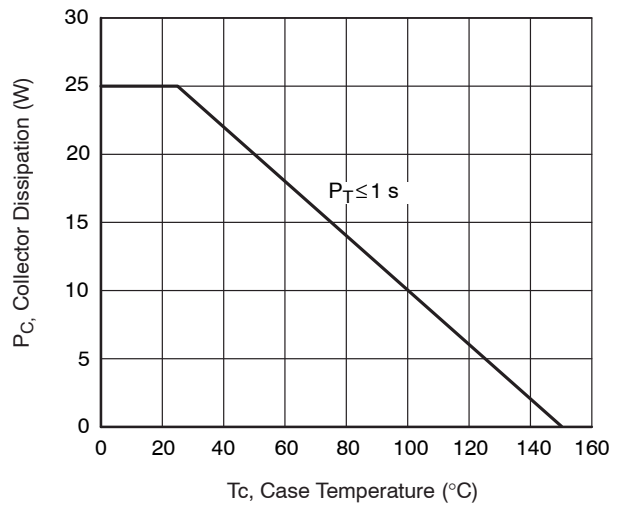
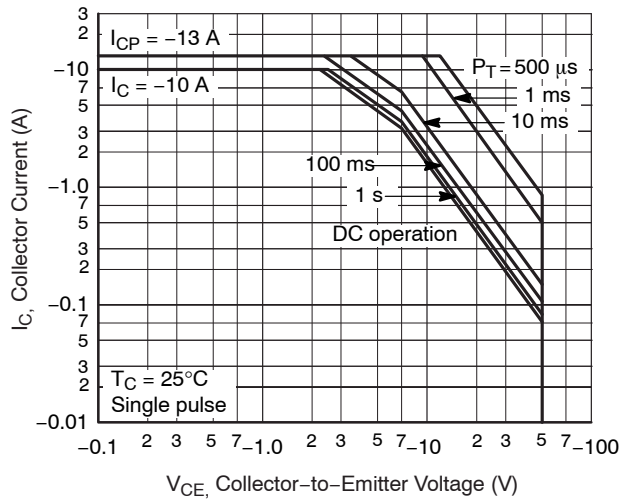
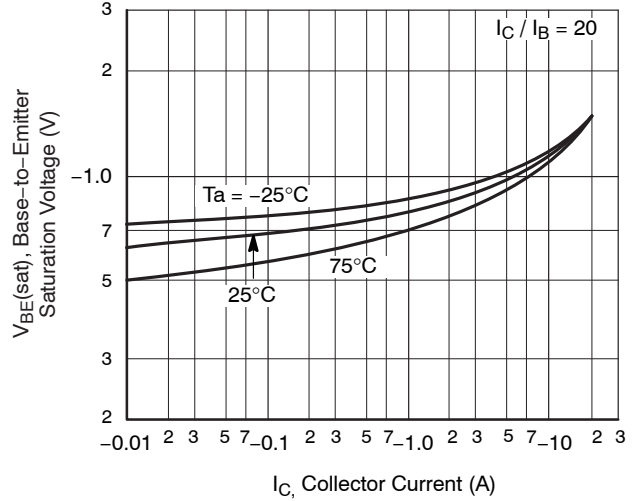
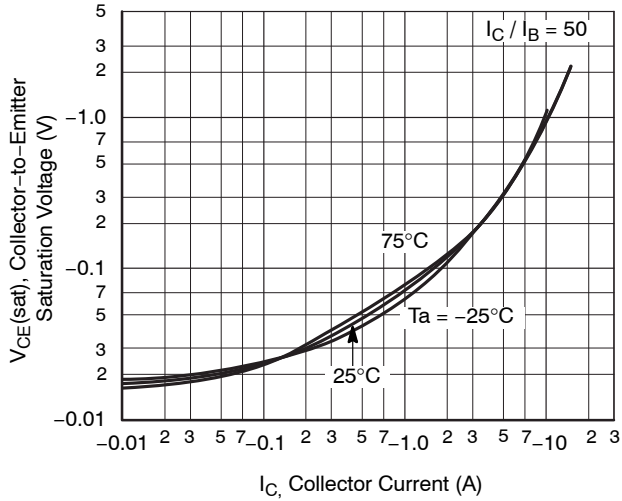
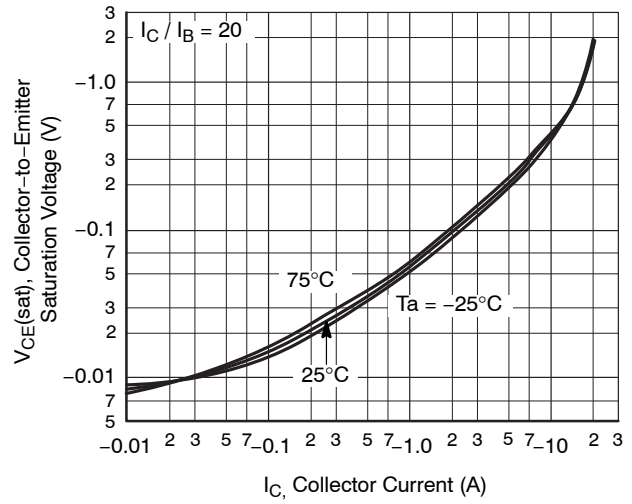
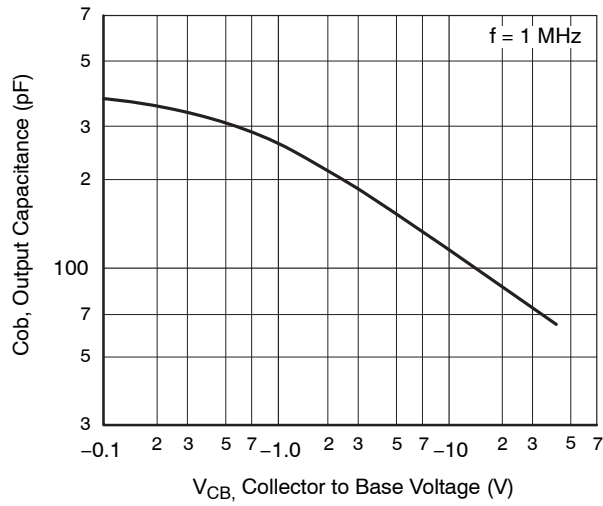


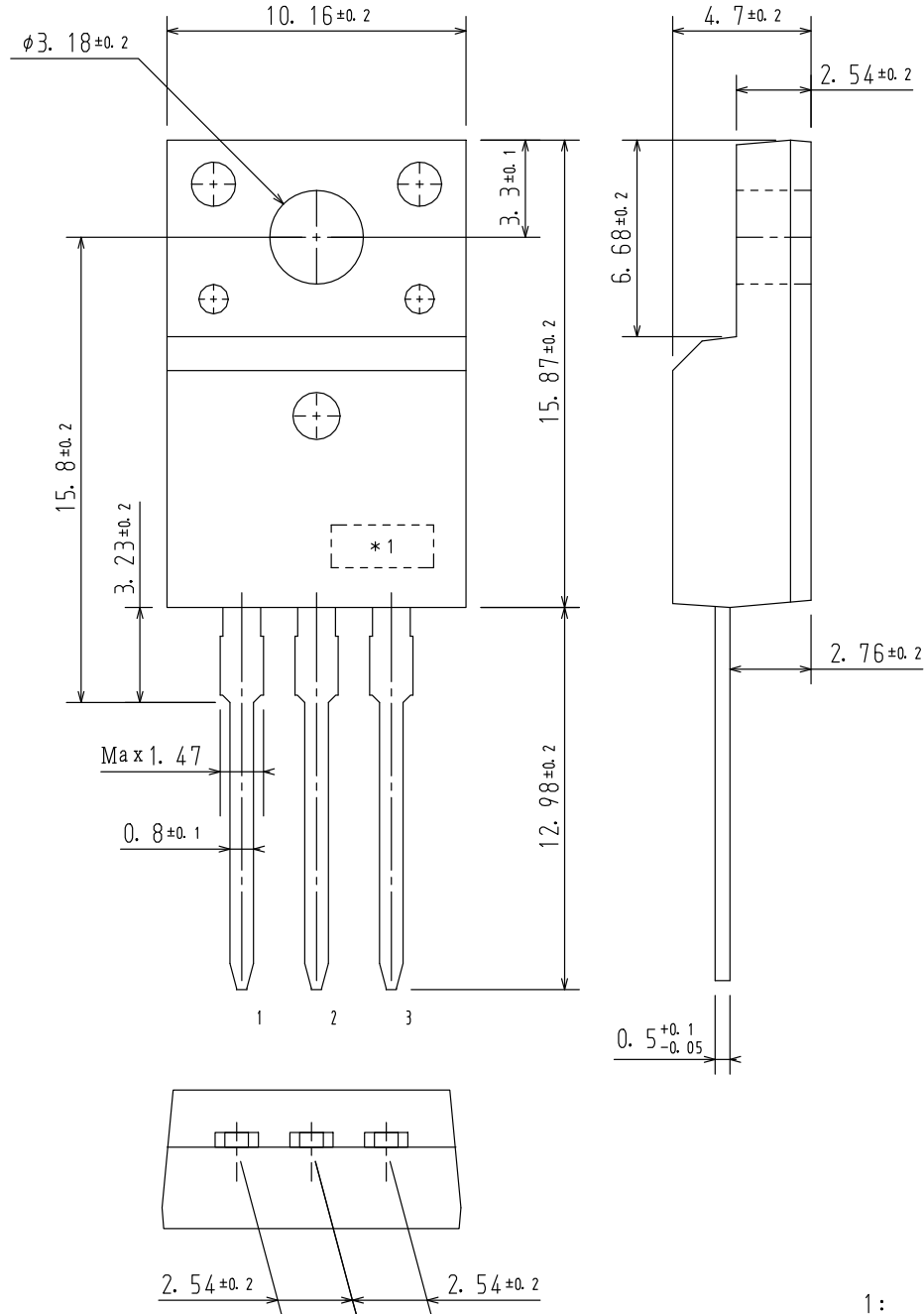
Figure 6. $f_T - I_C$

TYPICAL CHARACTERISTICS (CONTINUED)



TO-220F-3FS
CASE 221AM
ISSUE O

DATE 30 JAN 2012



* 1 Lot indication

1:
2:
3:

DOCUMENT NUMBER:	98AON66226E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TO-220F-3FS	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[onsemi:](#)

[2SA2222SG](#)