

EMF5XV6T5

Preferred Devices

Power Management, Dual Transistors

NPN Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- These are Pb-Free Devices

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
--------	--------	-------	------

Q₁ (T_A = 25°C unless otherwise noted, common for Q₁ and Q₂)

Collector-Base Voltage	V _{CB0}	50	Vdc
Collector-Emitter Voltage	V _{CEO}	50	Vdc
Collector Current	I _C	100	mAdc
Electrostatic Discharge	ESD	HBM Class 1 MM Class B	

Q₂ (T_A = 25°C)

Collector-Emitter Voltage	V _{CEO}	-12	Vdc
Collector-Base Voltage	V _{CB0}	-15	Vdc
Emitter-Base Voltage	V _{EBO}	-6.0	Vdc
Collector Current – Peak – Continuous	I _C	-1.0 (Note 1) -0.5	Adc
Electrostatic Discharge	ESD	HBM Class 3B MM Class C	

THERMAL CHARACTERISTICS

Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation T _A = 25°C Derate above 25°C	P _D	357 (Note 2) 2.9 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	R _{θJA}	350 (Note 2)	°C/W
Characteristic (Both Junctions Heated)	Symbol	Max	Unit
Total Device Dissipation T _A = 25°C Derate above 25°C	P _D	500 (Note 2) 4.0 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	R _{θJA}	250 (Note 2)	°C/W
Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C

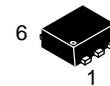
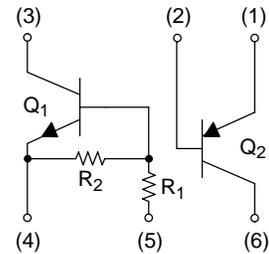
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Single pulse 1.0 ms.
2. FR-4 @ Minimum Pad.



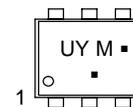
ON Semiconductor®

<http://onsemi.com>



SOT-563
CASE 463A
PLASTIC

MARKING DIAGRAM



UY = Specific Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
EMF5XV6T5	SOT-563 (Pb-Free)	8000/Tape & Reel
EMF5XV6T5G	SOT-563 (Pb-Free)	8000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

EMF5XV6T5

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, common for Q_1 and Q_2)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

Q_1

OFF CHARACTERISTICS

Collector-Base Cutoff Current ($V_{CB} = 50\text{ V}, I_E = 0$)	I_{CBO}	-	-	100	nAdc
Collector-Emitter Cutoff Current ($V_{CE} = 50\text{ V}, I_B = 0$)	I_{CEO}	-	-	500	nAdc
Emitter-Base Cutoff Current ($V_{EB} = 6.0\text{ V}, I_C = 0$)	I_{EBO}	-	-	0.1	mAdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}, I_E = 0$)	$V_{(BR)CBO}$	50	-	-	Vdc
Collector-Emitter Breakdown Voltage (Note 3) ($I_C = 2.0\text{ mA}, I_B = 0$)	$V_{(BR)CEO}$	50	-	-	Vdc

ON CHARACTERISTICS (Note 3)

DC Current Gain ($V_{CE} = 10\text{ V}, I_C = 5.0\text{ mA}$)	h_{FE}	80	140	-	
Collector-Emitter Saturation Voltage ($I_C = 10\text{ mA}, I_B = 0.3\text{ mA}$)	$V_{CE(sat)}$	-	-	0.25	Vdc
Output Voltage (on) ($V_{CC} = 5.0\text{ V}, V_B = 3.5\text{ V}, R_L = 1.0\text{ k}\Omega$)	V_{OL}	-	-	0.2	Vdc
Output Voltage (off) ($V_{CC} = 5.0\text{ V}, V_B = 0.5\text{ V}, R_L = 1.0\text{ k}\Omega$)	V_{OH}	4.9	-	-	Vdc
Input Resistor	R1	32.9	47	61.1	k Ω
Resistor Ratio	R1/R2	0.8	1.0	1.2	

Q_2

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = -10\text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	-12	-	-	Vdc
Collector-Base Breakdown Voltage ($I_C = -0.1\text{ mAdc}, I_E = 0$)	$V_{(BR)CBO}$	-15	-	-	Vdc
Emitter-Base Breakdown Voltage ($I_E = -0.1\text{ mAdc}, I_C = 0$)	$V_{(BR)EBO}$	-6.0	-	-	Vdc
Collector Cutoff Current ($V_{CB} = -15\text{ Vdc}, I_E = 0$)	I_{CBO}	-	-	-0.1	μAdc
Emitter Cutoff Current ($V_{EB} = -6.0\text{ Vdc}$)	I_{EBO}	-	-	-0.1	μAdc

ON CHARACTERISTICS

DC Current Gain (Note 4) ($I_C = -10\text{ mA}, V_{CE} = -2.0\text{ V}$)	h_{FE}	270	-	680	
Collector-Emitter Saturation Voltage (Note 4) ($I_C = -200\text{ mA}, I_B = -10\text{ mA}$)	$V_{CE(sat)}$	-	-	-250	mV
Base-Emitter Saturation Voltage (Note 4) ($I_C = -150\text{ mA}, I_B = -20\text{ mA}$)	$V_{BE(sat)}$	-	-0.81	-0.90	V
Base-Emitter Turn-on Voltage (Note 4) ($I_C = -150\text{ mA}, V_{CE} = -3.0\text{ V}$)	$V_{BE(on)}$	-	-0.81	-0.875	V
Input Capacitance ($V_{EB} = 0\text{ V}, f = 1.0\text{ MHz}$)	C_{ibo}	-	52	-	pF
Output Capacitance ($V_{CB} = 0\text{ V}, f = 1.0\text{ MHz}$)	C_{obo}	-	30	-	pF
Turn-On Time ($I_{B1} = -50\text{ mA}, I_C = -500\text{ mA}, R_L = 3.0\text{ }\Omega$)	t_{on}	-	50	-	ns
Turn-Off Time ($I_{B1} = I_{B2} = -50\text{ mA}, I_C = -500\text{ mA}, R_L = 3.0\text{ }\Omega$)	t_{off}	-	80	-	ns

- Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.
- Pulsed Condition: Pulse Width = 300 μsec , Duty Cycle \leq 2%.

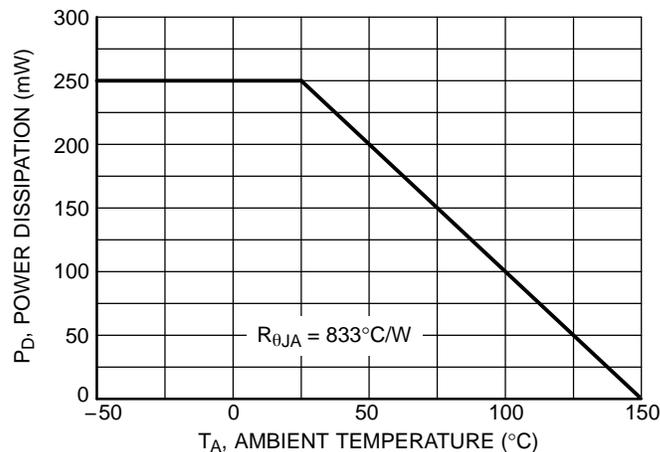


Figure 1. Derating Curve

EMF5XV6T5

TYPICAL ELECTRICAL CHARACTERISTICS FOR Q1

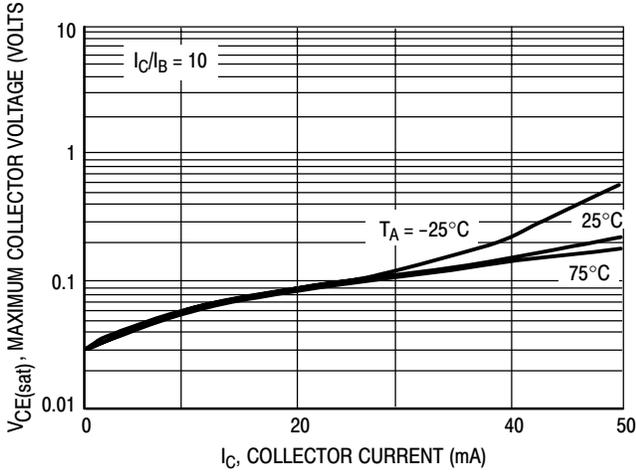


Figure 2. $V_{CE(sat)}$ versus I_C

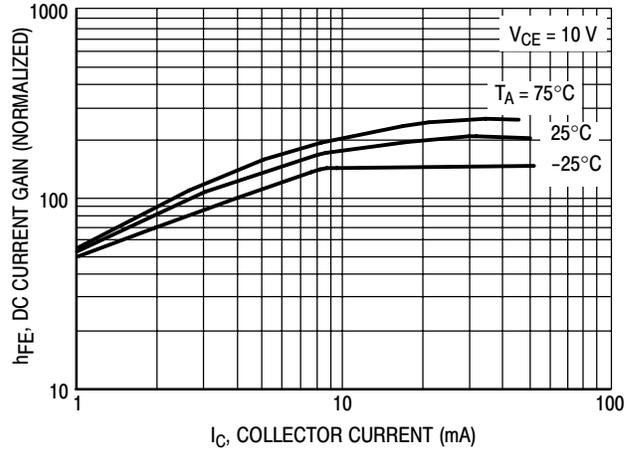


Figure 3. DC Current Gain

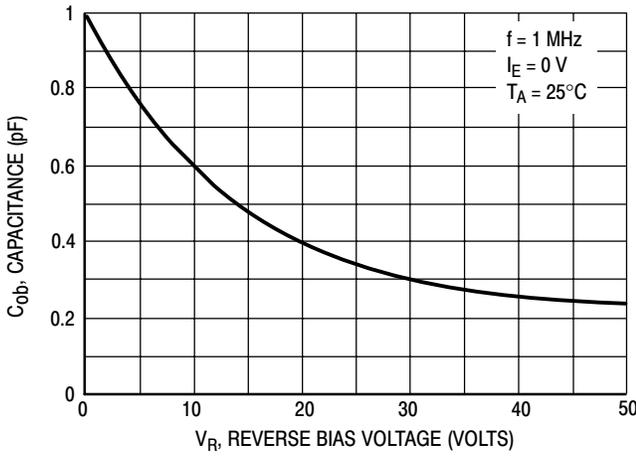


Figure 4. Output Capacitance

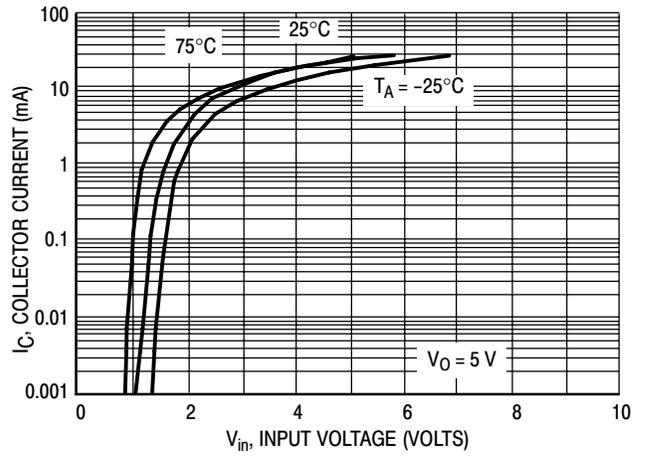


Figure 5. Output Current versus Input Voltage

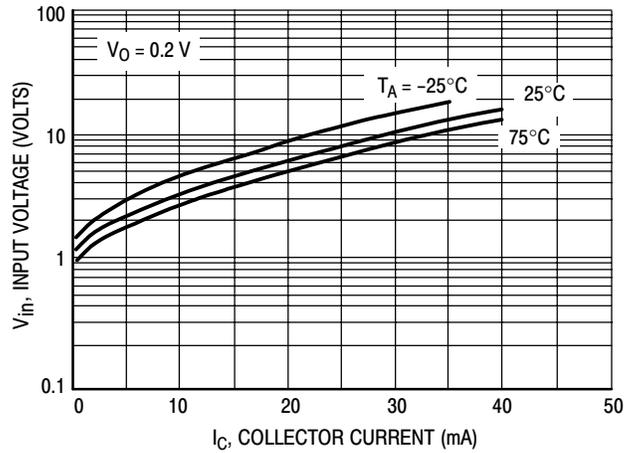


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS FOR Q2

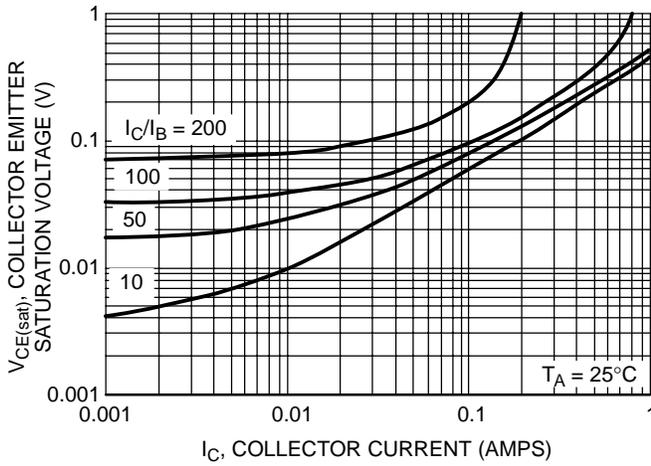


Figure 7. Collector Emitter Saturation Voltage vs. Collector Current

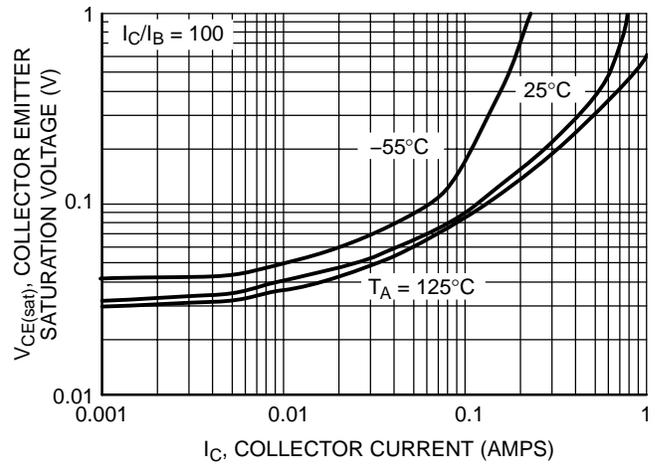


Figure 8. Collector Emitter Saturation Voltage vs. Collector Current

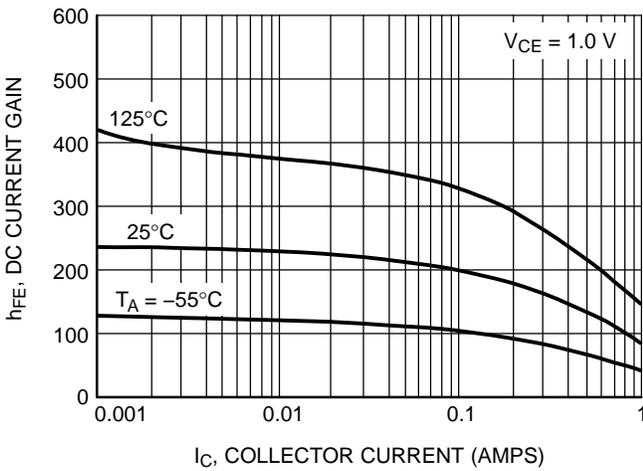


Figure 9. DC Current Gain

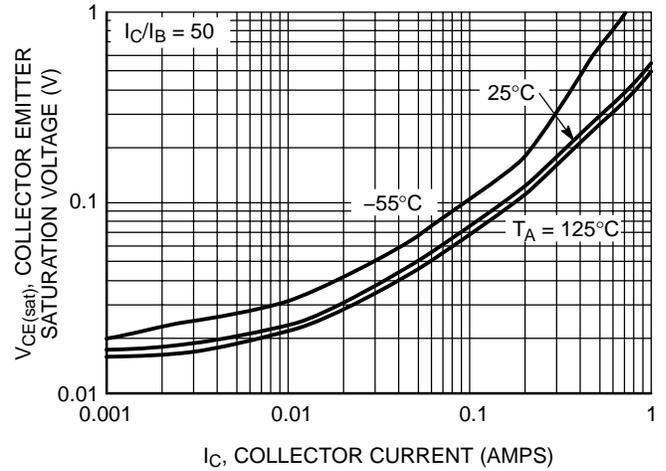


Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

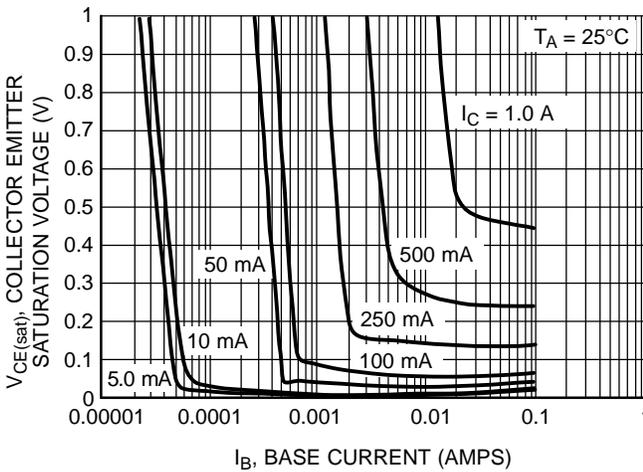


Figure 11. Collector Emitter Saturation Voltage vs Base Current

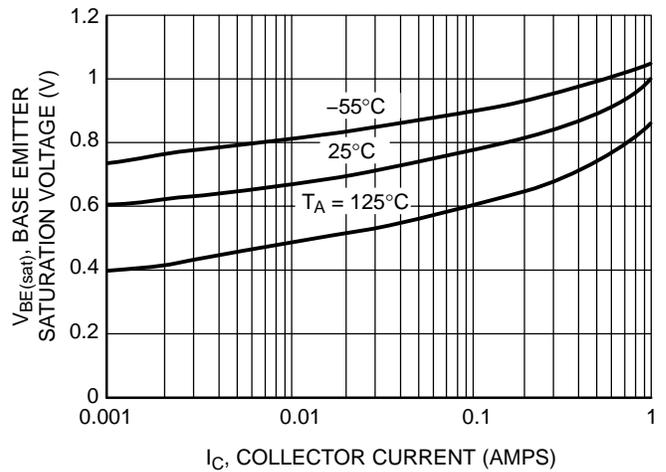


Figure 12. Base Emitter Saturation Voltage vs. Collector Current

EMF5XV6T5

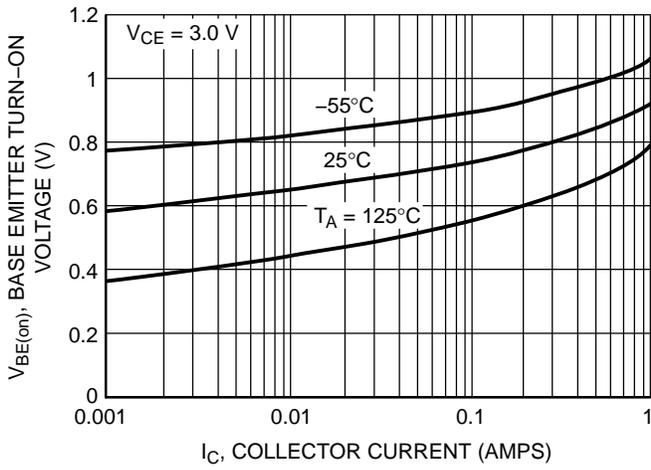


Figure 13. Base Emitter Turn-On Voltage vs. Collector Current

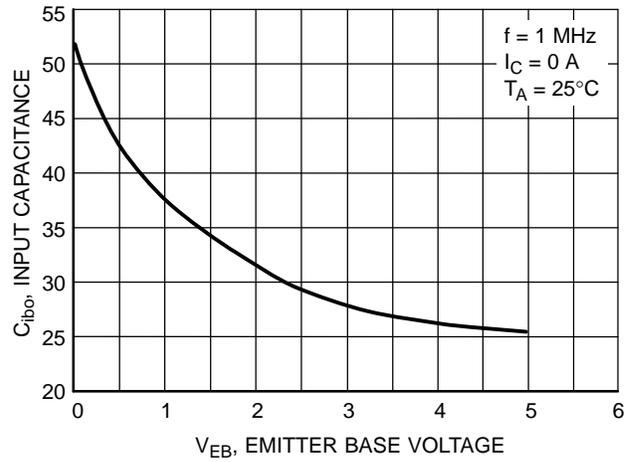


Figure 14. Input Capacitance

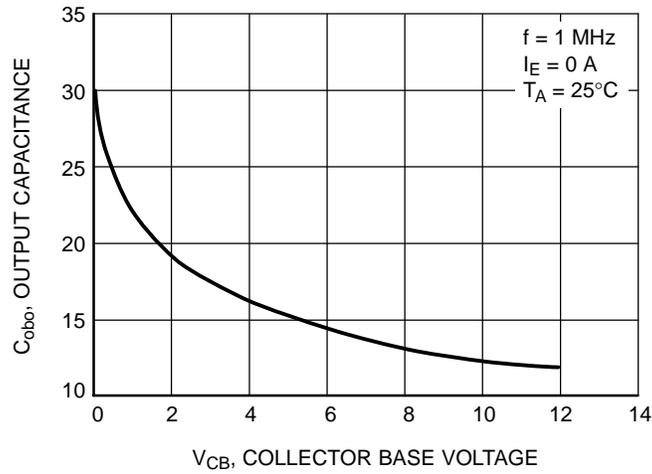
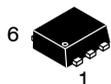


Figure 15. Output Capacitance

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



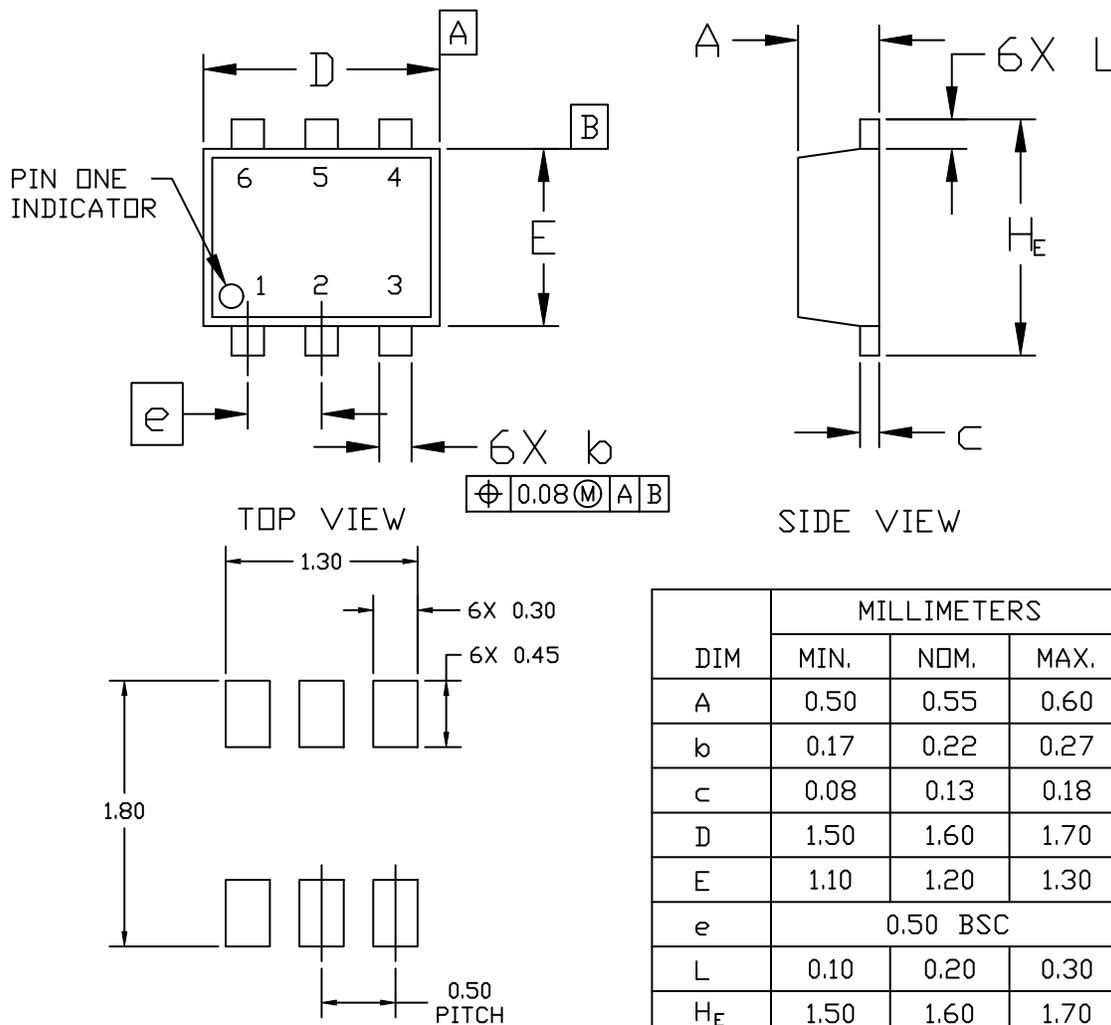
SCALE 4:1

SOT-563, 6 LEAD
CASE 463A
ISSUE H

DATE 26 JAN 2021

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
b	0.17	0.22	0.27
c	0.08	0.13	0.18
D	1.50	1.60	1.70
E	1.10	1.20	1.30
e	0.50 BSC		
L	0.10	0.20	0.30
H _E	1.50	1.60	1.70

RECOMMENDED MOUNTING FOOTPRINT*

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DOCUMENT NUMBER:	98AON11126D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	SOT-563, 6 LEAD	PAGE 1 OF 2

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 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

SOT-563, 6 LEAD
CASE 463A
ISSUE H

DATE 26 JAN 2021

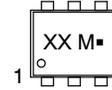
STYLE 1: PIN 1. EMITTER 1 2. BASE 1 3. COLLECTOR 2 4. EMITTER 2 5. BASE 2 6. COLLECTOR 1	STYLE 2: PIN 1. EMITTER 1 2. EMITTER 2 3. BASE 2 4. COLLECTOR 2 5. BASE 1 6. COLLECTOR 1	STYLE 3: PIN 1. CATHODE 1 2. CATHODE 1 3. ANODE/ANODE 2 4. CATHODE 2 5. CATHODE 2 6. ANODE/ANODE 1
--	--	--

STYLE 4: PIN 1. COLLECTOR 2. COLLECTOR 3. BASE 4. EMITTER 5. COLLECTOR 6. COLLECTOR	STYLE 5: PIN 1. CATHODE 2. CATHODE 3. ANODE 4. ANODE 5. CATHODE 6. CATHODE	STYLE 6: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE
---	--	--

STYLE 7: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. ANODE 6. CATHODE	STYLE 8: PIN 1. DRAIN 2. DRAIN 3. GATE 4. SOURCE 5. DRAIN 6. DRAIN	STYLE 9: PIN 1. SOURCE 1 2. GATE 1 3. DRAIN 2 4. SOURCE 2 5. GATE 2 6. DRAIN 1
--	--	--

STYLE 10: PIN 1. CATHODE 1 2. N/C 3. CATHODE 2 4. ANODE 2 5. N/C 6. ANODE 1	STYLE 11: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2
---	---

**GENERIC
MARKING DIAGRAM***



XX = Specific Device Code
M = Month Code
■ = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON11126D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	SOT-563, 6 LEAD	PAGE 2 OF 2

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 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. ON Semiconductor 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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative