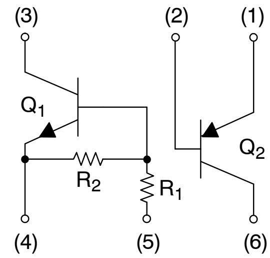
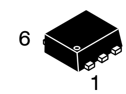
DATA SHEET
www.onsemi.com

Power Management, Dual Transistors

NPN Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

EMF5XV6T5





SOT−563
CASE 463A
PLASTIC

Features

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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Q_1 (T_A = 25°C unless otherwise noted, common for Q_1 and Q_2)			
Collector-Base Voltage	V_{CBO}	50	Vdc
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector Current	I_C	100	mAdc
Electrostatic Discharge	ESD	HBM Class 1 MM Class B	
Q_2 (T_A = 25°C)			
Collector-Emitter Voltage	V_{CEO}	−12	Vdc
Collector-Base Voltage	V_{CBO}	−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	

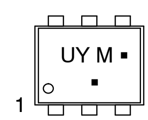
THERMAL CHARACTERISTICS

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	$R_{\theta JA}$	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	$R_{\theta JA}$	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.

MARKING DIAGRAM



UY = Specific Device Code
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
EMF5XV6T5G	SOT−563 (Pb−Free)	8000/Tape & Reel
EMF5XV6T1G	SOT−563 (Pb−Free)	4000/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.

ELECTRICAL CHARACTERISTICS (T_A = 25°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 V, I_E = 0)	I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current	(V_{CE} = 50 V, I_B = 0)	I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current	(V_{EB} = 6.0 V, I_C = 0)	I_{EBO}	–	–	0.1	mAdc
Collector-Base Breakdown Voltage	(I_C = 10 μA, I_E = 0)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 3)	(I_C = 2.0 mA, I_B = 0)	$V_{(BR)CEO}$	50	–	–	Vdc
ON CHARACTERISTICS (Note 3)						
DC Current Gain	(V_{CE} = 10 V, I_C = 5.0 mA)	h_{FE}	80	140	–	
Collector-Emitter Saturation Voltage	(I_C = 10 mA, I_B = 0.3 mA)	$V_{CE(sat)}$	–	–	0.25	Vdc
Output Voltage (on)	(V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ)	V_{OL}	–	–	0.2	Vdc
Output Voltage (off)	(V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)	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 mAdc, I_B = 0)	$V_{(BR)CEO}$	–12	–	–	Vdc
Collector – Base Breakdown Voltage	(I_C = –0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	–15	–	–	Vdc
Emitter – Base Breakdown Voltage	(I_E = –0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	–6.0	–	–	Vdc
Collector Cutoff Current	(V_{CB} = –15 Vdc, I_E = 0)	I_{CBO}	–	–	–0.1	μAdc
Emitter Cutoff Current	(V_{EB} = –6.0 Vdc)	I_{EBO}	–	–	–0.1	μAdc
ON CHARACTERISTICS						
DC Current Gain (Note 4)	(I_C = –10 mA, V_{CE} = –2.0 V)	h_{FE}	270	–	680	
Collector – Emitter Saturation Voltage (Note 4)	(I_C = –200 mA, I_B = –10 mA)	$V_{CE(sat)}$	–	–	–250	mV
Base – Emitter Saturation Voltage (Note 4)	(I_C = –150 mA, I_B = –20 mA)	$V_{BE(sat)}$	–	–0.81	–0.90	V
Base – Emitter Turn–on Voltage (Note 4)	(I_C = –150 mA, V_{CE} = –3.0 V)	$V_{BE(on)}$	–	–0.81	–0.875	V
Input Capacitance	(V_{EB} = 0 V, f = 1.0 MHz)	C_{ibo}	–	52	–	pF
Output Capacitance	(V_{CB} = 0 V, f = 1.0 MHz)	C_{obo}	–	30	–	pF
Turn–On Time	(I_{BI} = –50 mA, I_C = –500 mA, R_L = 3.0 Ω)	t_{on}	–	50	–	ns
Turn–Off Time	(I_{B1} = I_{B2} = –50 mA, I_C = –500 mA, R_L = 3.0 Ω)	t_{off}	–	80	–	ns

3. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%.
4. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%.

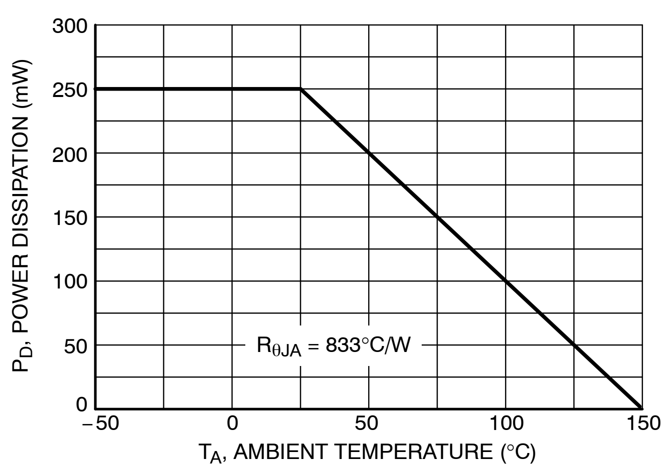


Figure 1. Derating Curve

TYPICAL ELECTRICAL CHARACTERISTICS FOR Q1

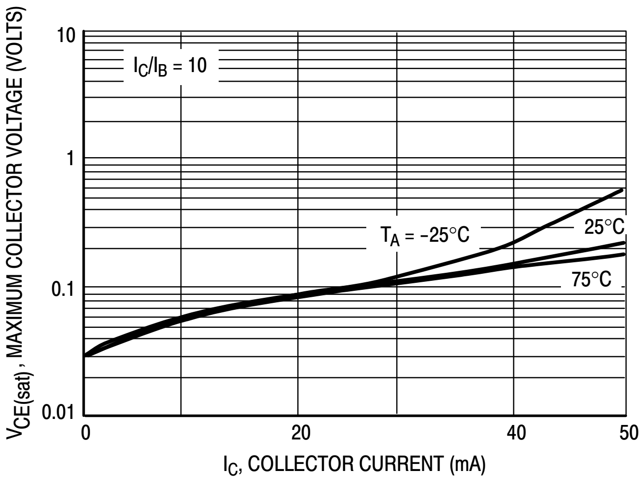


Figure 2. $V_{CE(sat)}$ versus I_C

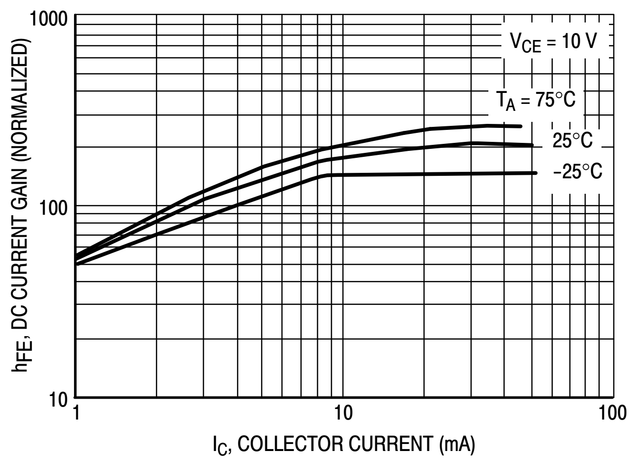


Figure 3. DC Current Gain

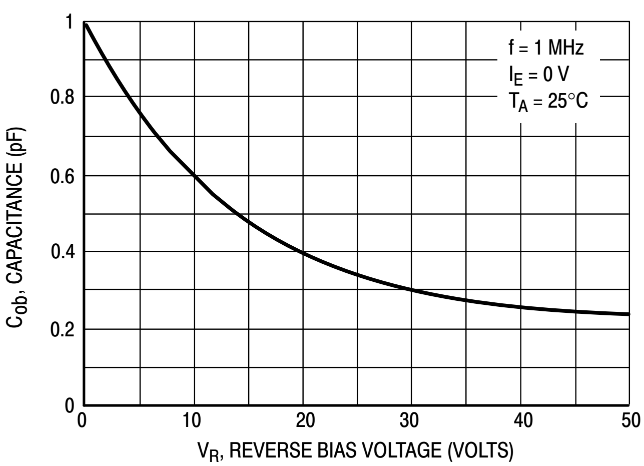


Figure 4. Output Capacitance

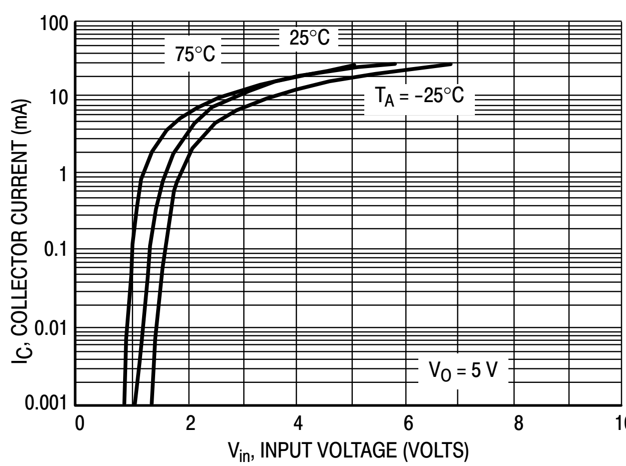


Figure 5. Output Current versus Input Voltage

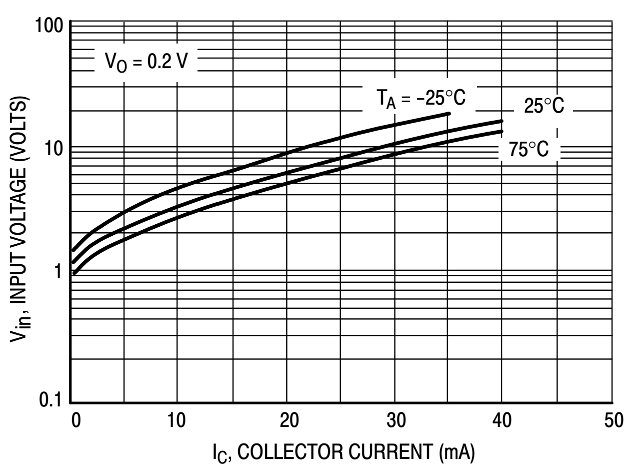


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS FOR Q2

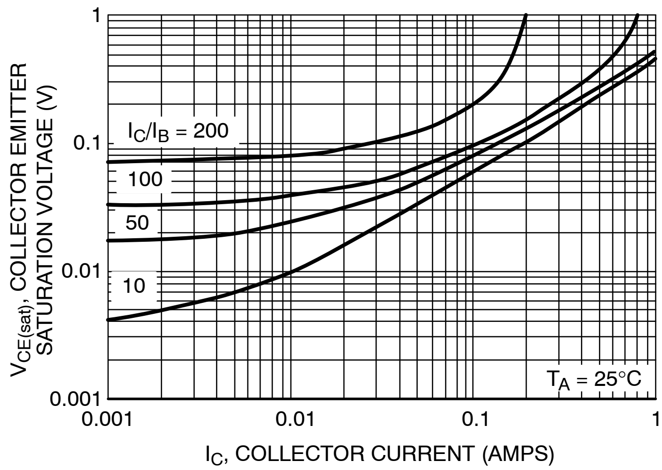


Figure 7. Collector Emitter Saturation Voltage vs. Collector Current

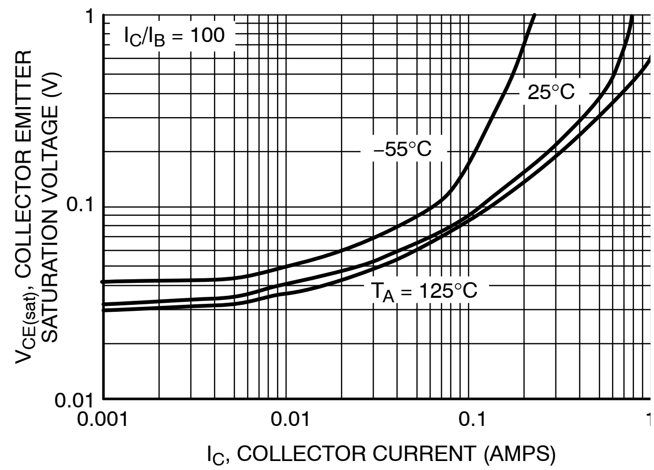


Figure 8. Collector Emitter Saturation Voltage vs. Collector Current

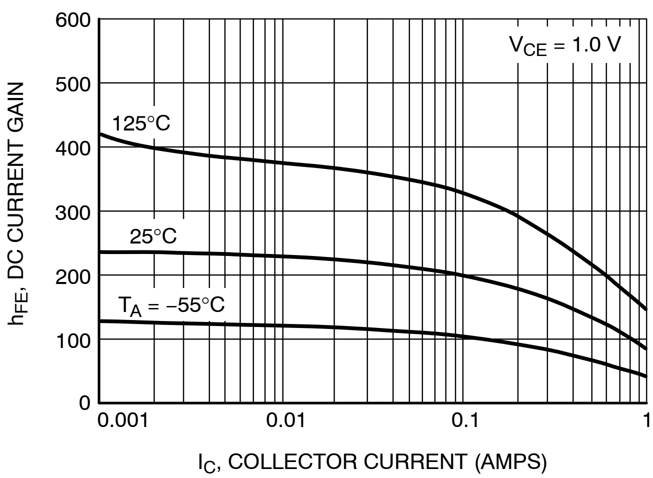


Figure 9. DC Current Gain

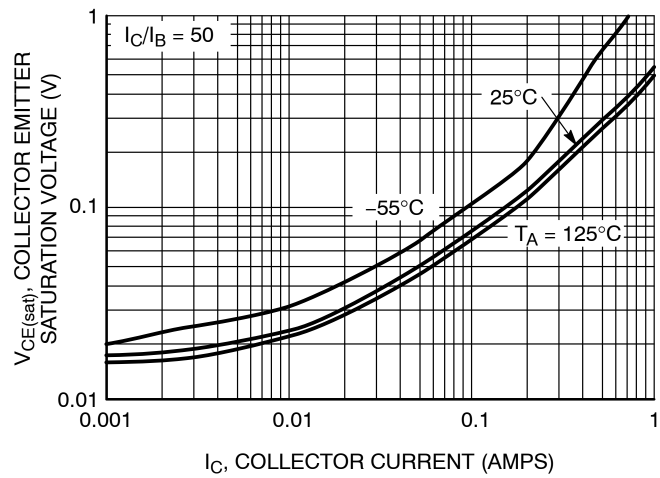


Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

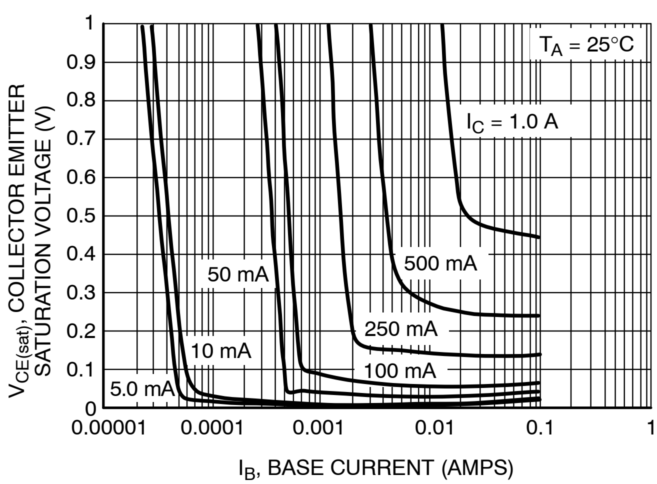


Figure 11. Collector Emitter Saturation Voltage vs Base Current

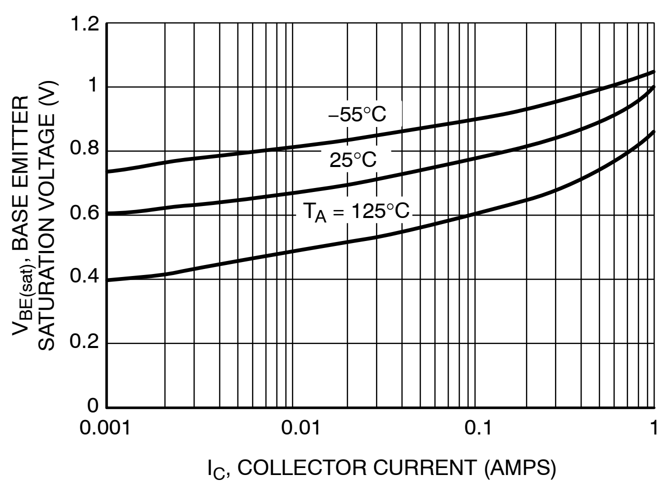


Figure 12. Base Emitter Saturation Voltage vs. Collector Current

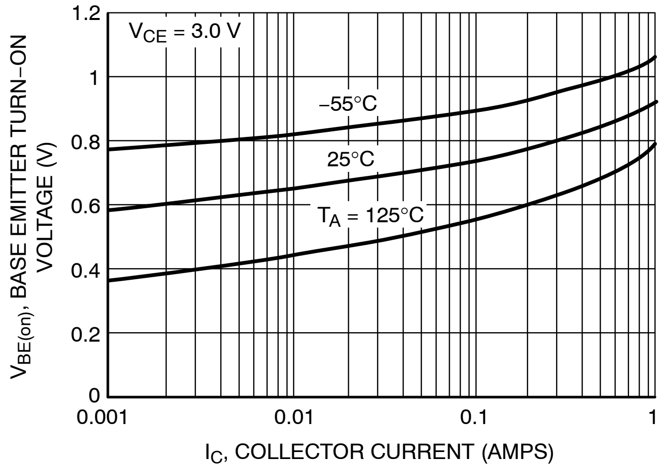


Figure 13. Base Emitter Turn−On Voltage vs. Collector Current

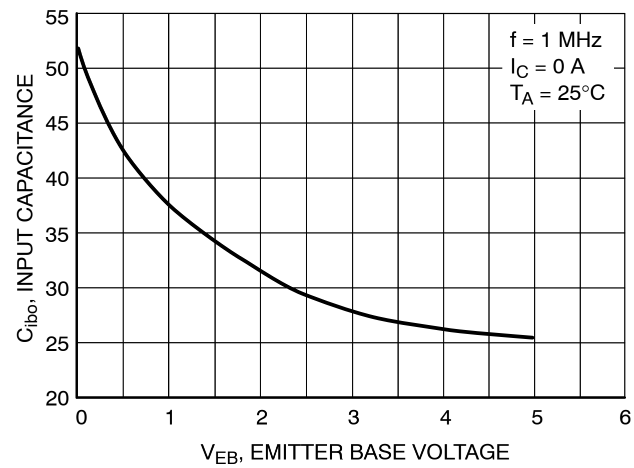


Figure 14. Input Capacitance

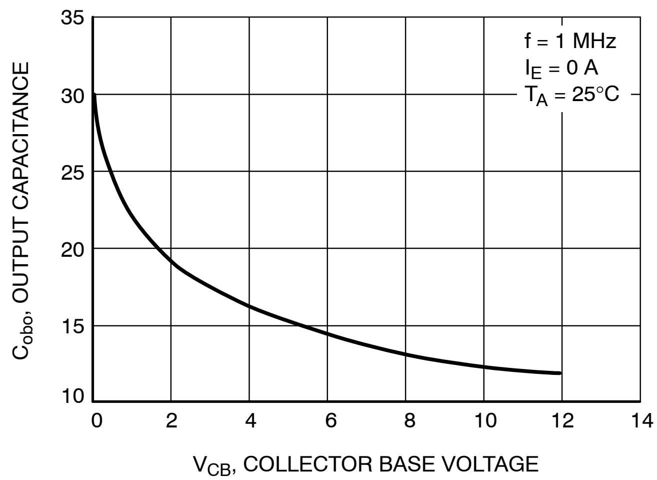
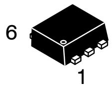


Figure 15. Output Capacitance

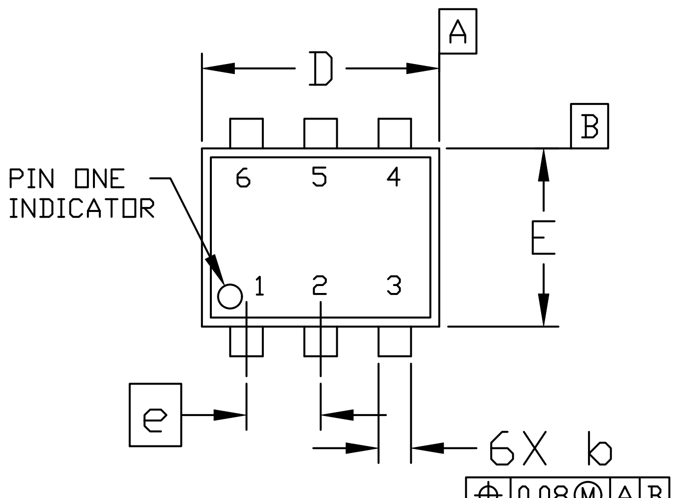


SCALE 4:1

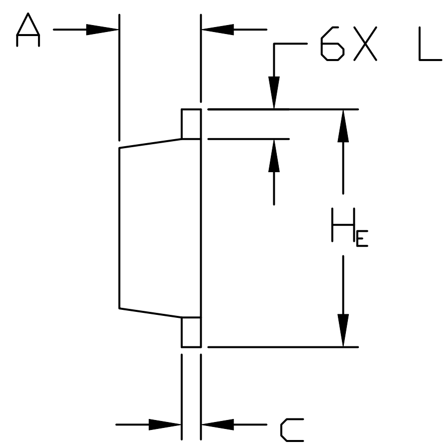
SOT−563, 6 LEAD
CASE 463A
ISSUE H

DATE 26 JAN 2021

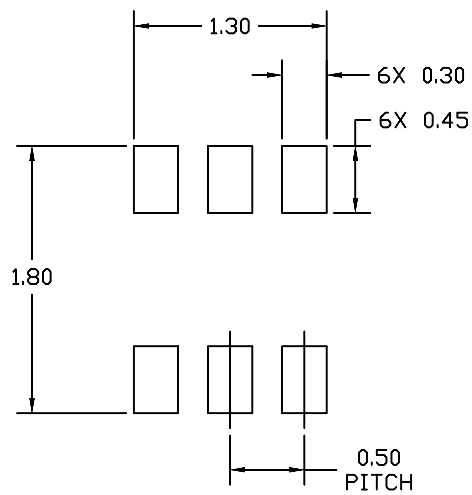
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



TOP VIEW



SIDE VIEW



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.

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

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DESCRIPTION:	**SOT−563, 6 LEAD**		**PAGE 1 OF 2**

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

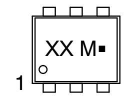
STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

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.

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