

35 V, 7 A, Low $V_{CE(sat)}$ PNP Transistor NSS35200CF8T1G

onsemi's e²PowerEdge family of low $V_{CE(sat)}$ transistors are miniature surface mount devices featuring ultra low saturation voltage ($V_{CE(sat)}$) and high current gain capability. These are designed for use in low voltage, high speed switching applications where affordable efficient energy control is important.

Typical application are DC-DC converters and power management in portable and battery powered products such as cellular and cordless phones, PDAs, computers, printers, digital cameras and MP3 players. Other applications are low voltage motor controls in mass storage products such as disc drives and tape drives. In the automotive industry they can be used in air bag deployment and in the instrument cluster. The high current gain allows e²PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

Features

- This is a Pb-Free Device

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	-35	Vdc
Collector-Base Voltage	V_{CBO}	-55	Vdc
Emitter-Base Voltage	V_{EBO}	-5.0	Vdc
Collector Current – Continuous	I_C	-2.0	Adc
Collector Current – Peak	I_{CM}	-7.0	A
Electrostatic Discharge	ESD	HBM Class 3 MM Class C	

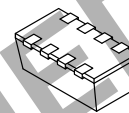
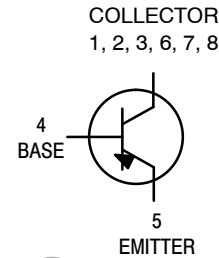
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 1)	635 5.1	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 1)	200	$^\circ\text{C}/\text{W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 2)	1.35 11	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 2)	90	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Lead #1	$R_{\theta JL}$	15	$^\circ\text{C}/\text{W}$
Total Device Dissipation (Single Pulse < 10 sec)	$P_{D\text{single}}$ (Notes 2 & 3)	2.75	W
Junction and Storage Temperature Range	T_J, T_{stg}	-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.

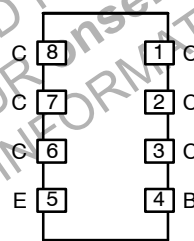
- FR-4 @ 100 mm², 1 oz copper traces.
- FR-4 @ 500 mm², 1 oz copper traces.
- Thermal response.

35 VOLTS
7.0 AMPS
PNP LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 78 m Ω

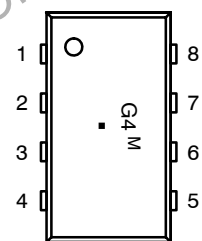


ChipFET™
CASE 1206A
STYLE 4

PIN CONNECTIONS



MARKING DIAGRAM



G4 = Specific Device Code
M = Month Code
▪ = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NSS35200CF8T1G	ChipFET (Pb-Free)	3000/ 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.

NSS35200CF8T1G

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typical	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage ($I_C = -10\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	-35	-45	–	Vdc
Collector – Base Breakdown Voltage ($I_C = -0.1\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	-55	-65	–	Vdc
Emitter – Base Breakdown Voltage ($I_E = -0.1\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	-5.0	-7.0	–	Vdc
Collector Cutoff Current ($V_{CB} = -35\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	-0.03	-0.1	μAdc
Collector – Emitter Cutoff Current ($V_{CES} = -35\text{ Vdc}$)	I_{CES}	–	-0.03	-0.1	μAdc
Emitter Cutoff Current ($V_{EB} = -6.0\text{ Vdc}$)	I_{EBO}	–	-0.01	-0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain (Note 4) ($I_C = -1.0\text{ A}$, $V_{CE} = -2.0\text{ V}$) ($I_C = -1.5\text{ A}$, $V_{CE} = -2.0\text{ V}$) ($I_C = -2.0\text{ A}$, $V_{CE} = -2.0\text{ V}$)	h_{FE}	100 100 100	200 200 200	– 400 –	
Collector – Emitter Saturation Voltage (Note 4) ($I_C = -0.1\text{ A}$, $I_B = -0.010\text{ A}$) ($I_C = -1.0\text{ A}$, $I_B = -0.010\text{ A}$) ($I_C = -2.0\text{ A}$, $I_B = -0.02\text{ A}$)	$V_{CE(sat)}$	– – –	– – –	-0.10 -0.15 -0.30	V
Base – Emitter Saturation Voltage (Note 4) ($I_C = -1.0\text{ A}$, $I_B = -0.01\text{ A}$)	$V_{BE(sat)}$	–	-0.68	-0.85	V
Base – Emitter Turn-on Voltage (Note 4) ($I_C = -2.0\text{ A}$, $V_{CE} = -3.0\text{ V}$)	$V_{BE(on)}$	–	-0.81	-0.875	V
Cutoff Frequency ($I_C = -100\text{ mA}$, $V_{CE} = -5.0\text{ V}$, $f = 100\text{ MHz}$)	f_T	100	–	–	MHz
Input Capacitance ($V_{EB} = -0.5\text{ V}$, $f = 1.0\text{ MHz}$)	C_{ibo}	–	600	650	pF
Output Capacitance ($V_{CB} = -3.0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{obo}	–	85	100	pF
Turn-on Time ($V_{CC} = -10\text{ V}$, $I_{B1} = -100\text{ mA}$, $I_C = -1\text{ A}$, $R_L = 3\ \Omega$)	t_{on}	–	35	–	nS
Turn-off Time ($V_{CC} = -10\text{ V}$, $I_{B1} = I_{B2} = -100\text{ mA}$, $I_C = 1\text{ A}$, $R_L = 3\ \Omega$)	t_{off}	–	225	–	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.

4. Pulsed Condition: Pulse Width = 300 μsec , Duty Cycle $\leq 2\%$

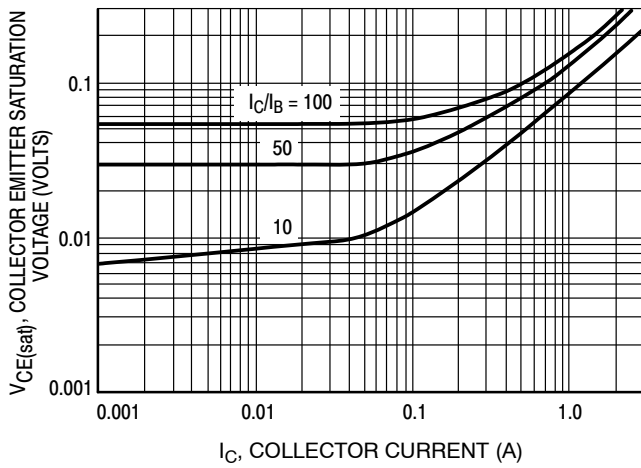


Figure 1. Collector Emitter Saturation Voltage versus Collector Current

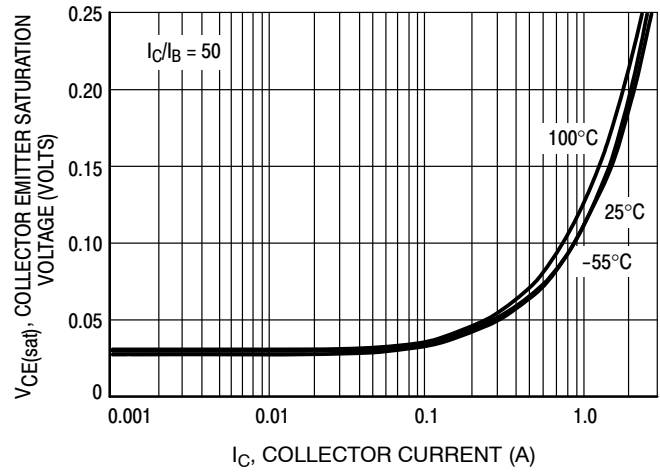


Figure 2. Collector Emitter Saturation Voltage versus Collector Current

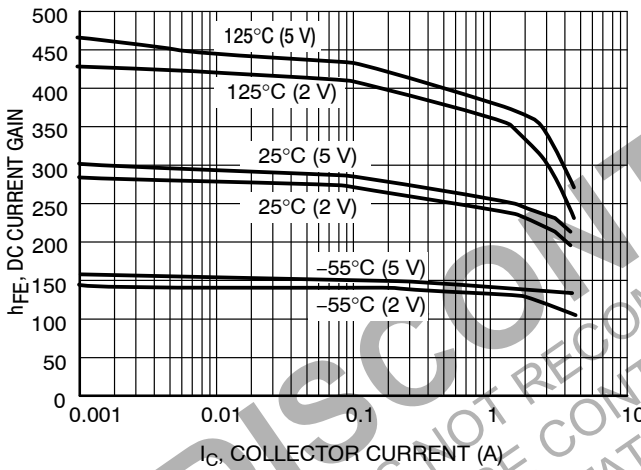


Figure 3. DC Current Gain versus Collector Current

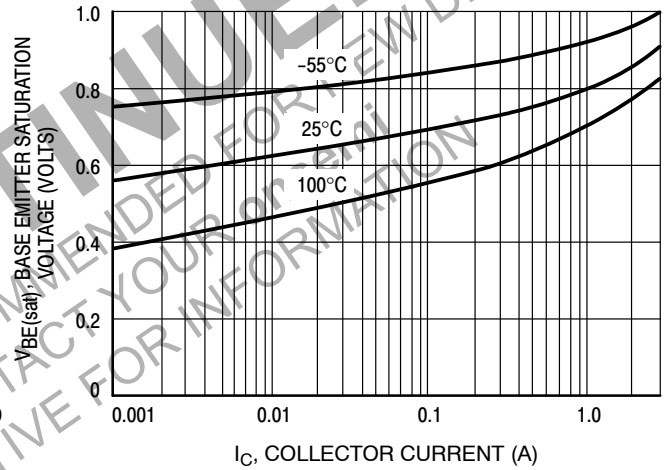


Figure 4. Base Emitter Saturation Voltage versus Collector Current

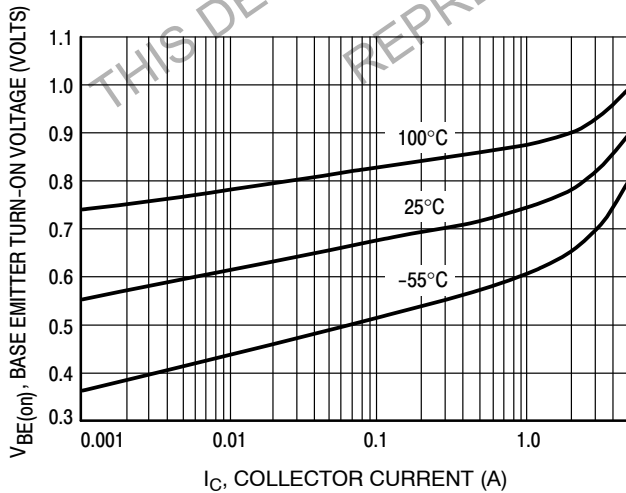


Figure 5. Base Emitter Turn-On Voltage versus Collector Current

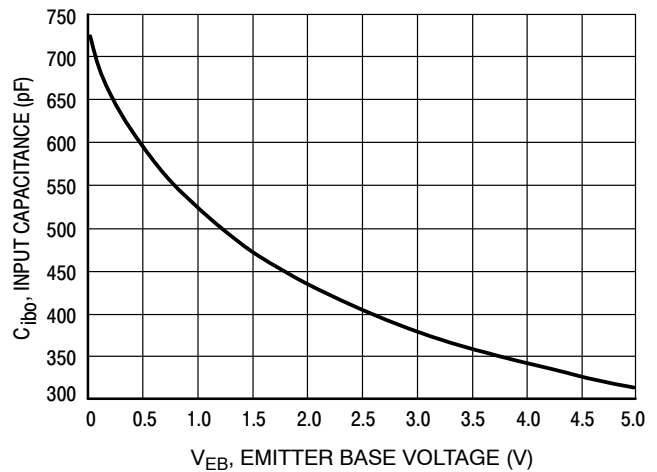


Figure 6. Input Capacitance

NSS35200CF8T1G

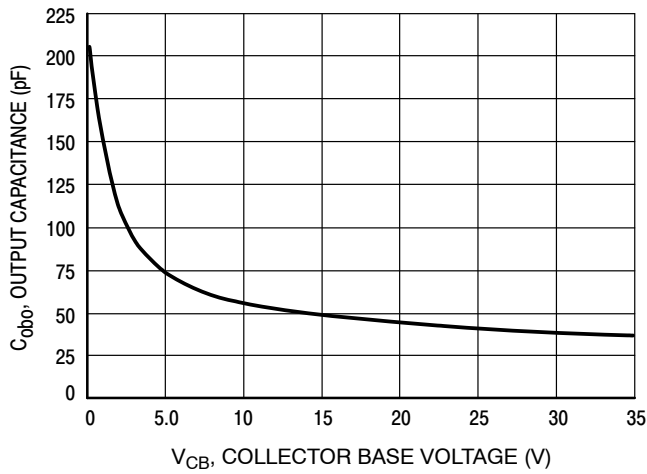


Figure 7. Output Capacitance

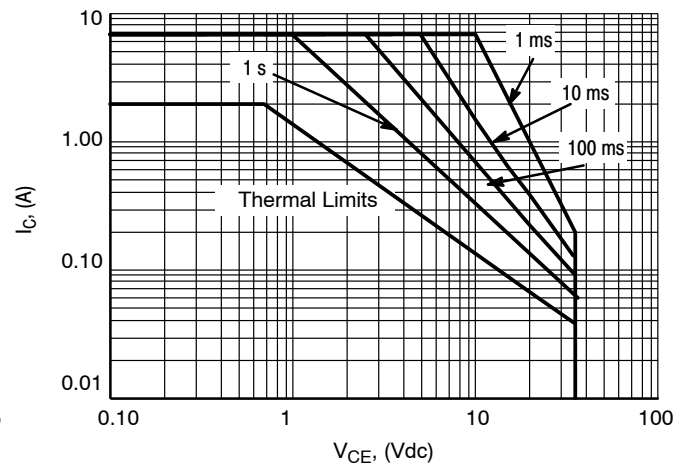


Figure 8. Safe Operating Area

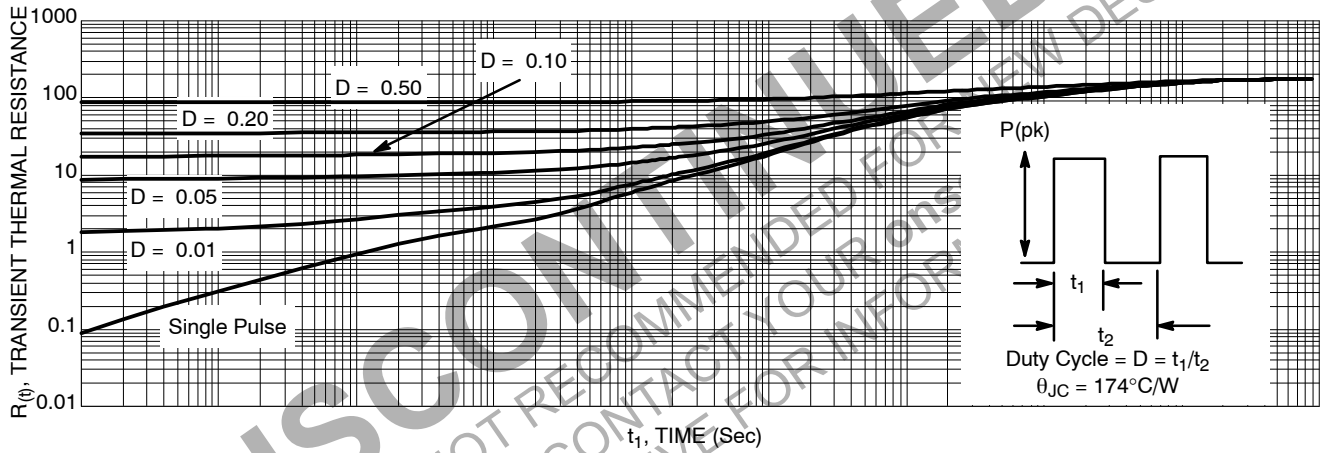
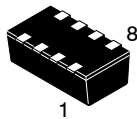
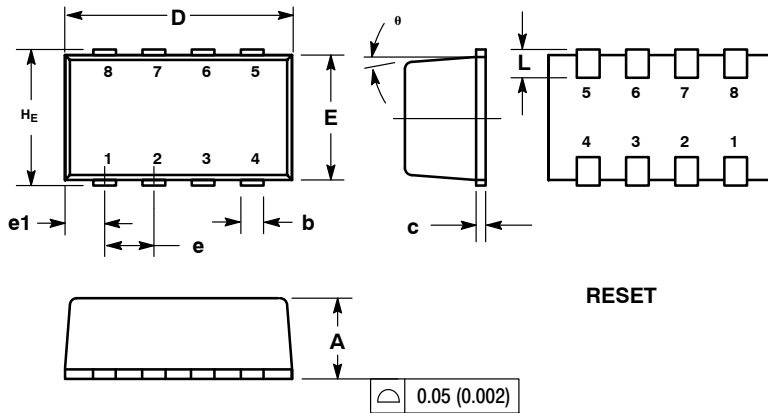


Figure 9. Normalized Thermal Response



SCALE 1:1



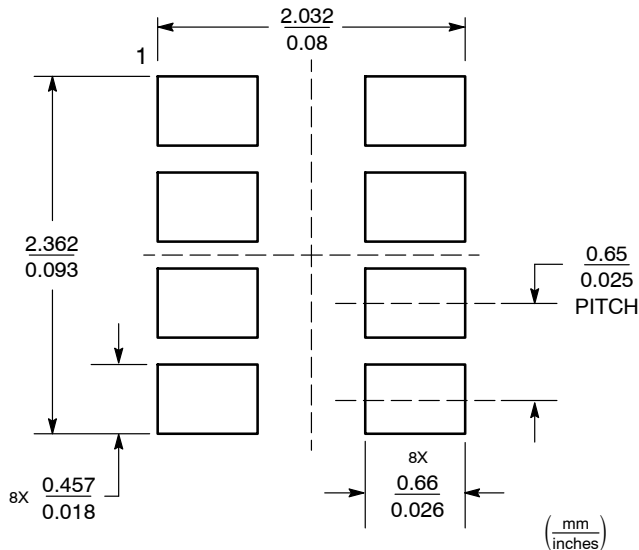
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MOLD GATE BURRS SHALL NOT EXCEED 0.13 MM PER SIDE.
4. LEADFRAME TO MOLDED BODY OFFSET IN HORIZONTAL AND VERTICAL SHALL NOT EXCEED 0.08 MM.
5. DIMENSIONS A AND B EXCLUSIVE OF MOLD GATE BURRS.
6. NO MOLD FLASH ALLOWED ON THE TOP AND BOTTOM LEAD SURFACE.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.00	1.05	1.10	0.039	0.041	0.043
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	1.55	1.65	1.70	0.061	0.065	0.067
e	0.65 BSC			0.025 BSC		
e1	0.55 BSC			0.022 BSC		
L	0.28	0.35	0.42	0.011	0.014	0.017
H _E	1.80	1.90	2.00	0.071	0.075	0.079
θ	5° NOM			5° NOM		

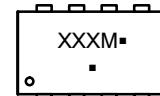
STYLE 1: PIN 1. DRAIN 2. DRAIN 3. DRAIN 4. GATE 5. SOURCE 6. DRAIN 7. DRAIN 8. DRAIN	STYLE 2: PIN 1. SOURCE 1 2. GATE 1 3. SOURCE 2 4. GATE 2 5. DRAIN 2 6. DRAIN 2 7. DRAIN 1 8. DRAIN 1	STYLE 3: PIN 1. ANODE 2. ANODE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. CATHODE 8. CATHODE	STYLE 4: PIN 1. COLLECTOR 2. COLLECTOR 3. COLLECTOR 4. BASE 5. EMITTER 6. COLLECTOR 7. COLLECTOR 8. COLLECTOR	STYLE 5: PIN 1. ANODE 2. ANODE 3. DRAIN 4. DRAIN 5. SOURCE 6. GATE 7. CATHODE 8. CATHODE	STYLE 6: PIN 1. ANODE 2. DRAIN 3. DRAIN 4. GATE 5. SOURCE 6. DRAIN 7. DRAIN 8. CATHODE / DRAIN
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SOLDERING FOOTPRINT



Basic Style

GENERIC MARKING DIAGRAM*



- XXX = Specific Device Code
M = Month Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

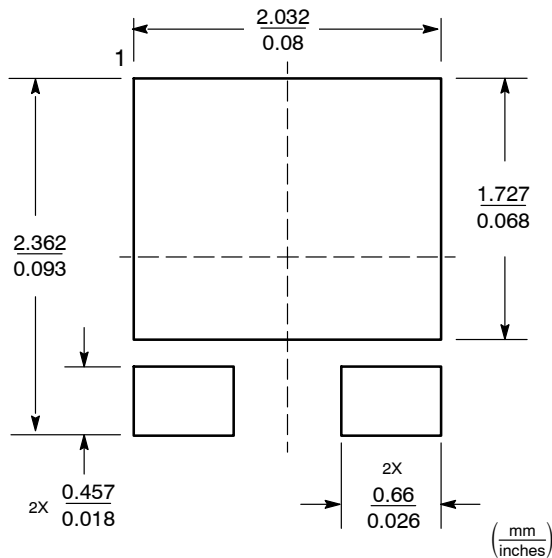
*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

OPTIONAL SOLDERING FOOTPRINTS ON PAGE 2

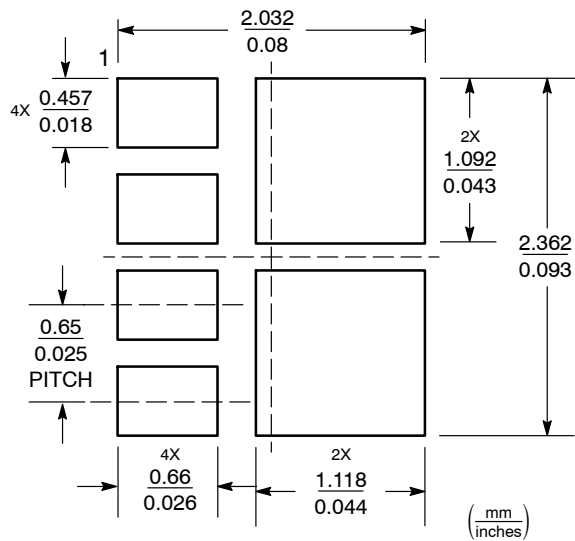
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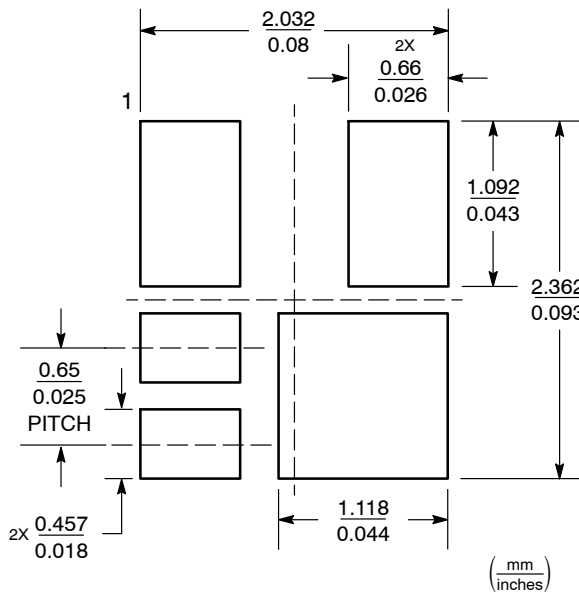
ADDITIONAL SOLDERING FOOTPRINTS*



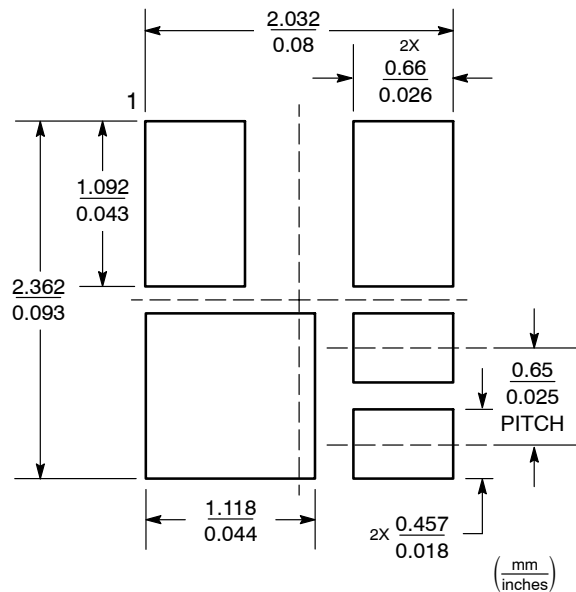
Styles 1 and 4



Style 2



Style 3



Style 5

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

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