

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

Complementary Power Transistors

D²PAK for Surface Mount

Complementary power transistors are for general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

Features

- Low Collector–Emitter Saturation Voltage – $V_{CE(sat)} = 1.0 \text{ V (Max) @ } 8.0 \text{ A}$
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs
- Epoxy Meets UL 94 V–0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B > 8000 V
Machine Model, C > 400 V
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- Pb–Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	80	Vdc
Emitter–Base Voltage	V_{EB}	5	Vdc
Collector Current – Continuous – Peak	I_C	10 20	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	50 0.4	W W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	2.0 0.016	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

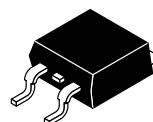


ON Semiconductor®

<http://onsemi.com>

**SILICON POWER
TRANSISTORS
10 AMPERES,
80 VOLTS, 50 WATTS**

MARKING DIAGRAM



D²PAK
CASE 418B
STYLE 1



x = 4 or 5
A = Assembly Location
Y = Year
WW = Work Week
G = Pb–Free Package

ORDERING INFORMATION

Device	Package	Shipping [†]
MJB44H11G	D ² PAK (Pb–Free)	50 Units/Rail
MJB44H11T4G	D ² PAK (Pb–Free)	800/Tape & Reel
NJVMJB44H11T4G	D ² PAK (Pb–Free)	800/Tape & Reel
MJB45H11G	D ² PAK (Pb–Free)	50 Units/Rail
MJB45H11T4G	D ² PAK (Pb–Free)	800/Tape & Reel
NJVMJB45H11T4G	D ² PAK (Pb–Free)	800/Tape & Reel

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

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

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

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

OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage ($I_C = 30\text{ mA}$, $I_B = 0$)	$V_{CE(sus)}$	80	–	–	Vdc
Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{BE} = 0$)	I_{CES}	–	–	10	μA
Emitter Cutoff Current ($V_{EB} = 5\text{ Vdc}$)	I_{EBO}	–	–	50	μA

ON CHARACTERISTICS

Collector-Emitter Saturation Voltage ($I_C = 8\text{ Adc}$, $I_B = 0.4\text{ Adc}$)	$V_{CE(sat)}$	–	–	1.0	Vdc
Base-Emitter Saturation Voltage ($I_C = 8\text{ Adc}$, $I_B = 0.8\text{ Adc}$)	$V_{BE(sat)}$	–	–	1.5	Vdc
DC Current Gain ($V_{CE} = 1\text{ Vdc}$, $I_C = 2\text{ Adc}$)	h_{FE}	60	–	–	–
DC Current Gain ($V_{CE} = 1\text{ Vdc}$, $I_C = 4\text{ Adc}$)		40	–	–	

DYNAMIC CHARACTERISTICS

Collector Capacitance ($V_{CB} = 10\text{ Vdc}$, $f_{\text{test}} = 1\text{ MHz}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11	C_{cb}	– –	130 230	– –	pF
Gain Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11	f_T	– –	50 40	– –	MHz

SWITCHING TIMES

Delay and Rise Times ($I_C = 5\text{ Adc}$, $I_{B1} = 0.5\text{ Adc}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11	$t_d + t_r$	– –	300 135	– –	ns
Storage Time ($I_C = 5\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11	t_s	– –	500 500	– –	ns
Fall Time ($I_C = 5\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) MJB44H11, NJVMJB44H11 MJB45H11, NJVMJB45H11	t_f	– –	140 100	– –	ns

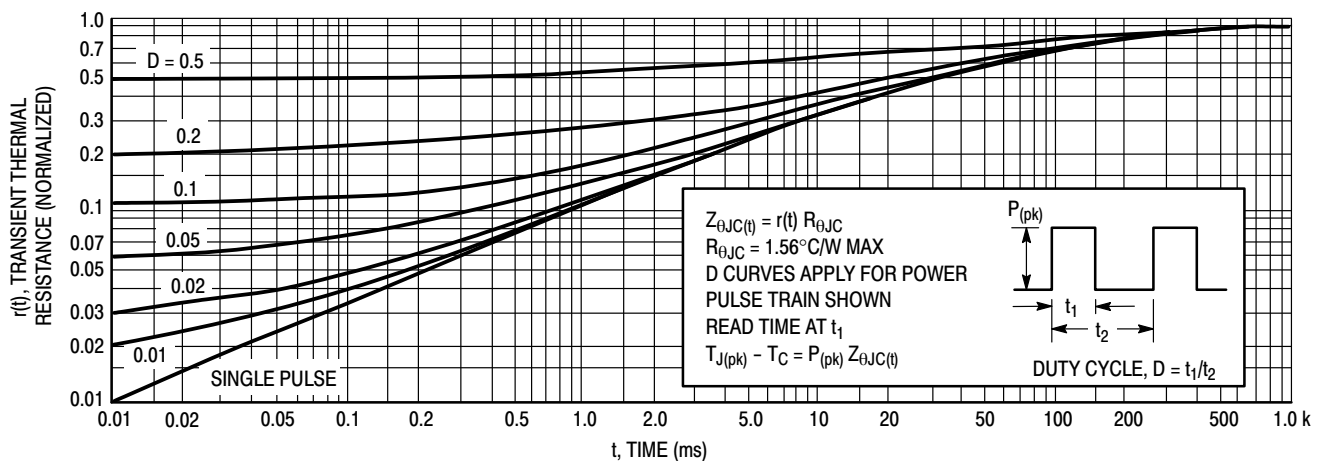


Figure 1. Thermal Response

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

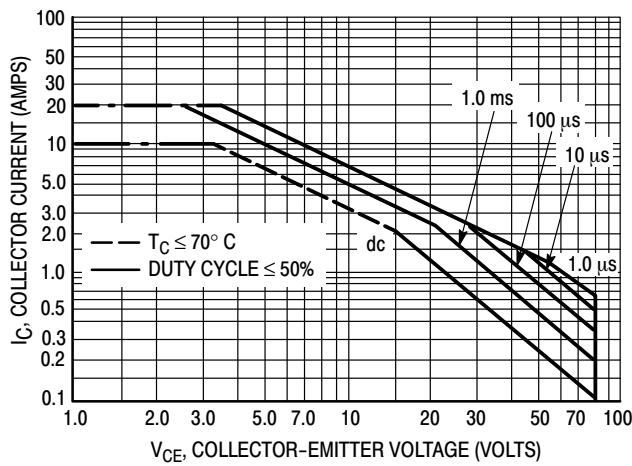


Figure 2. Maximum Rated Forward Bias Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 2 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 1. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

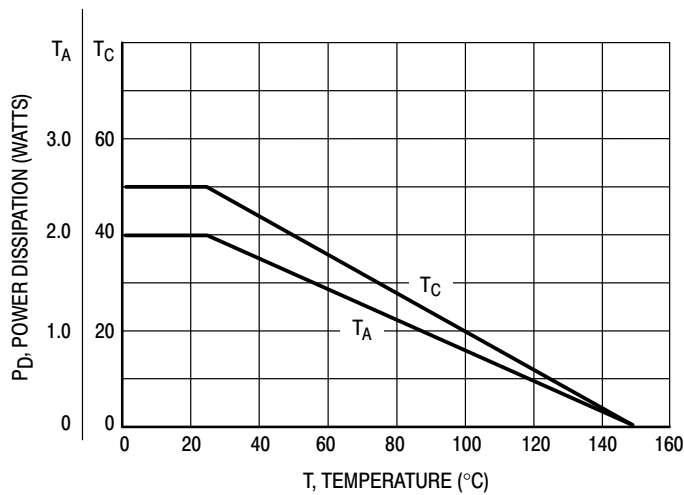


Figure 3. Power Derating

MJB44H11 (NPN), NJVMJB44H11 (NPN), MJB45H11 (PNP), NJVMJB45H11 (PNP)

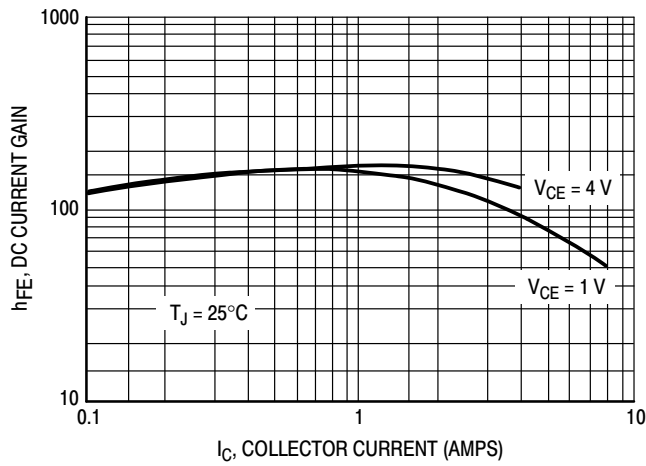


Figure 4. MJB44H11 DC Current Gain

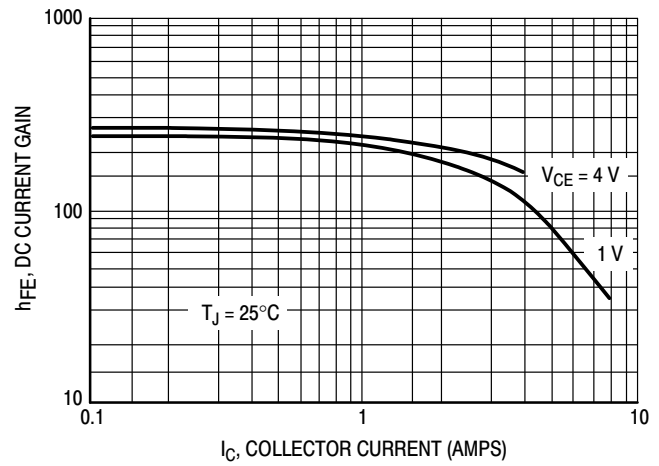


Figure 5. MJB45H11 DC Current Gain

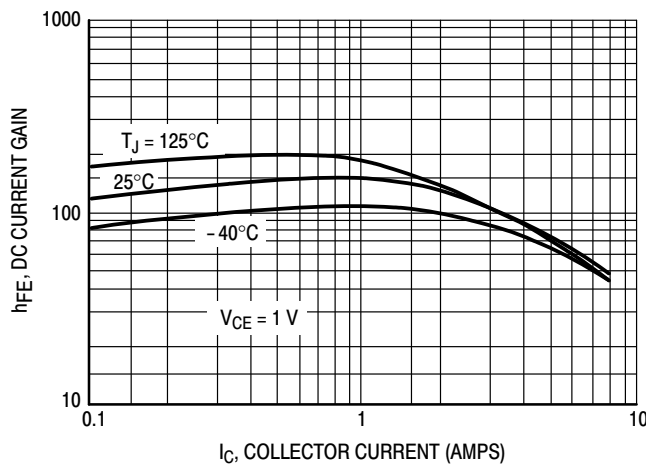


Figure 6. MJB44H11 Current Gain versus Temperature

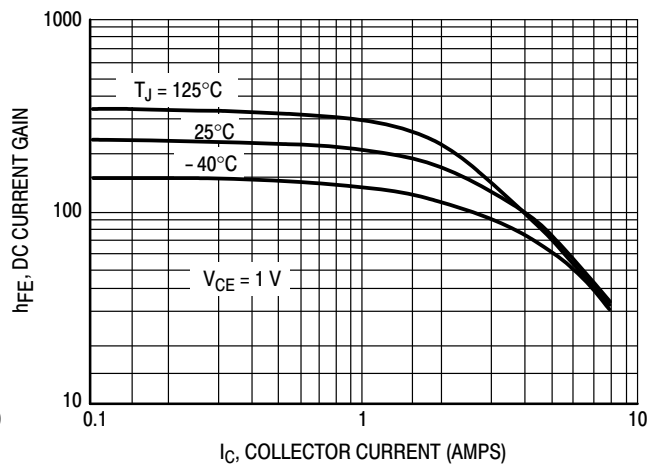


Figure 7. MJB45H11 Current Gain versus Temperature

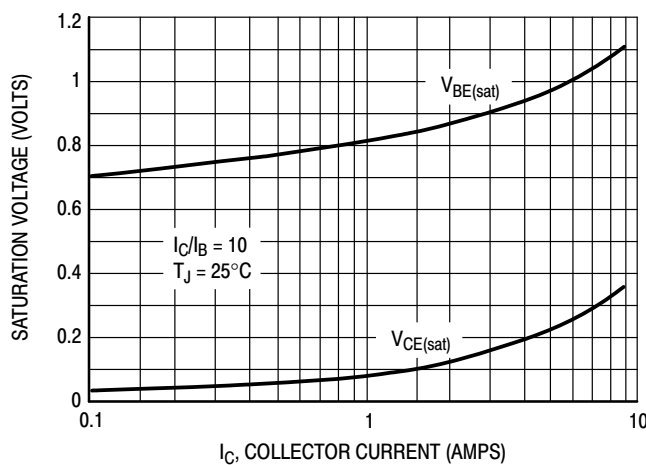


Figure 8. MJB44H11 On-Voltages

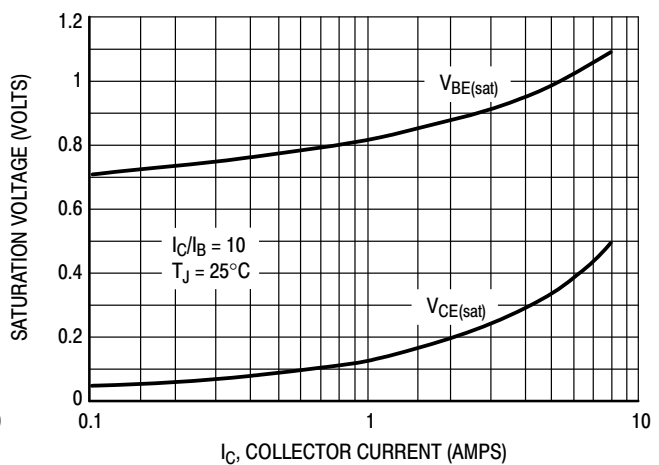


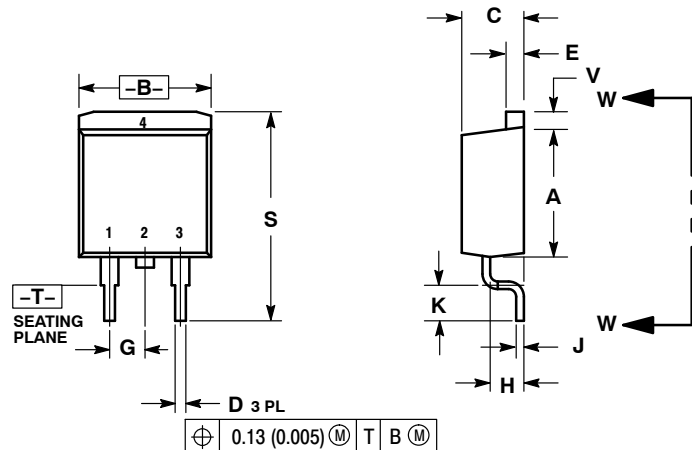
Figure 9. MJB45H11 On-Voltages



D²PAK 3
CASE 418B-04
ISSUE L

DATE 17 FEB 2015

SCALE 1:1

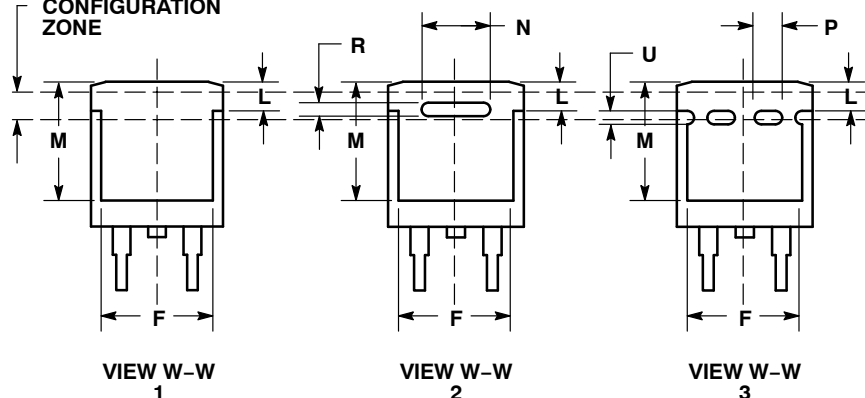


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100	BSC	2.54	BSC
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197	REF	5.00	REF
P	0.079	REF	2.00	REF
R	0.039	REF	0.99	REF
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40

VARIABLE
CONFIGURATION
ZONE



STYLE 1:

- PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:

- PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 3:

- PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 4:

- PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 5:

- PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 6:

- PIN 1. NO CONNECT
2. CATHODE
3. ANODE
4. CATHODE

MARKING INFORMATION AND FOOTPRINT ON PAGE 2

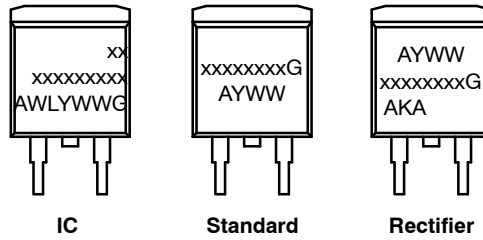
DOCUMENT NUMBER:	98ASB42761B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	D ² PAK 3	PAGE 1 OF 2

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.

D²PAK 3
CASE 418B-04
ISSUE L

DATE 17 FEB 2015

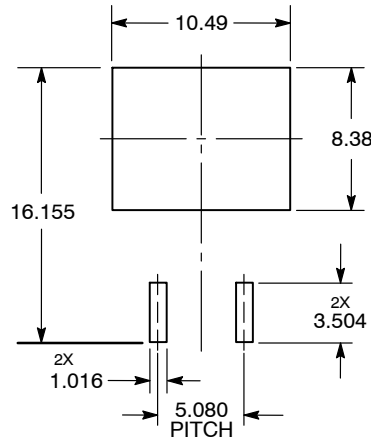
**GENERIC
MARKING DIAGRAM***



xx = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
WW = Work Week
G = Pb-Free Package
AKA = Polarity Indicator

*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.

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

DOCUMENT NUMBER:	98ASB42761B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	D²PAK 3	PAGE 2 OF 2

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