



Is Now Part of



**ON Semiconductor®**

To learn more about ON Semiconductor, please visit our website at

[www.onsemi.com](http://www.onsemi.com)

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor 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 ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.



## FGB3236\_F085 / FGI3236\_F085

### EcoSPARK™ 320mJ, 360V, N-Channel Ignition IGBT

#### Features

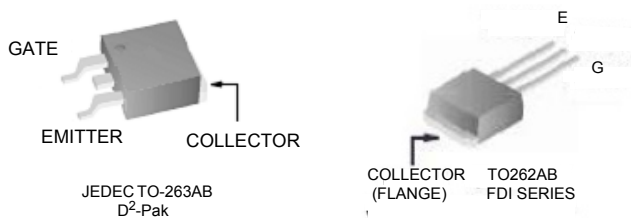
- Industry Standard D<sup>2</sup>-Pak package
- SCIS Energy = 320mJ at T<sub>J</sub> = 25°C
- Logic Level Gate Drive
- Qualified to AEC Q101
- RoHS Compliant

#### Applications

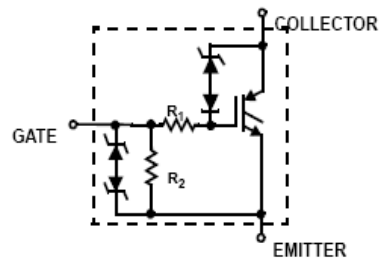
- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications



#### Package



#### Symbol



FGB3236\_F085 / FGI3236\_F085 320mJ, 360V, N-Channel Ignition IGBT

**Device Maximum Ratings**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Ratings	Units
$BV_{CER}$	Collector to Emitter Breakdown Voltage ( $I_C = 1\text{mA}$ )	360	V
$BV_{ECS}$	Emitter to Collector Voltage - Reverse Battery Condition ( $I_C = 10\text{mA}$ )	24	V
$E_{SCIS25}$	Self Clamping Inductive Switching Energy ( $I_{SCIS} = 14.7\text{A}$ , $L = 3.0\text{mH}$ , $T_J = 25^\circ\text{C}$ )	320	mJ
$E_{SCIS150}$	Self Clamping Inductive Switching Energy ( $I_{SCIS} = 10.4\text{A}$ , $L = 3.0\text{mH}$ , $T_J = 150^\circ\text{C}$ )	160	mJ
$I_{C25}$	Collector Current Continuous, at $V_{GE} = 4.0\text{V}$ , $T_C = 25^\circ\text{C}$	44	A
$I_{C110}$	Collector Current Continuous, at $V_{GE} = 4.0\text{V}$ , $T_C = 110^\circ\text{C}$	27	A
$V_{GEM}$	Gate to Emitter Voltage Continuous	$\pm 10$	V
$P_D$	Power Dissipation Total, at $T_C = 25^\circ\text{C}$	187	W
	Power Dissipation Derating, for $T_C > 25^\circ\text{C}$	1.25	W/ $^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-40 to +175	$^\circ\text{C}$
$T_{STG}$	Storage Junction Temperature Range	-40 to +175	$^\circ\text{C}$
$T_L$	Max. Lead Temp. for Soldering (Leads at 1.6mm from case for 10s)	300	$^\circ\text{C}$
$T_{PKG}$	Max. Lead Temp. for Soldering (Package Body for 10s)	260	$^\circ\text{C}$
ESD	Electrostatic Discharge Voltage at 100pF, 1500 $\Omega$	4	kV

**Package Marking and Ordering Information**

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGB3236	FGB3236_F085	TO263	330mm	24mm	800 units
FGI3236	FGI3236_F085	TO262	Tube	NA	50 units

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
--------	-----------	-----------------	-----	-----	-----	-------

**Off State Characteristics**

$BV_{CER}$	Collector to Emitter Breakdown Voltage	$I_{CE} = 2\text{mA}$ , $V_{GE} = 0$ , $R_{GE} = 1\text{K}\Omega$ , See Fig. 15 $T_J = -40$ to $150^\circ\text{C}$	330	363	390	V	
$BV_{CES}$	Collector to Emitter Breakdown Voltage	$I_{CE} = 10\text{mA}$ , $V_{GE} = 0\text{V}$ , $R_{GE} = 0$ , $T_J = -40$ to $150^\circ\text{C}$	350	378	410	V	
$BV_{ECS}$	Emitter to Collector Breakdown Voltage	$I_{CE} = -75\text{mA}$ , $V_{GE} = 0\text{V}$ , $T_C = 25^\circ\text{C}$	30	-	-	V	
$BV_{GES}$	Gate to Emitter Breakdown Voltage	$I_{GES} = \pm 2\text{mA}$	$\pm 12$	$\pm 14$	-	V	
$I_{CES}$	Collector to Emitter Leakage Current	$V_{CES} = 250\text{V}$ , See Fig. 11	$T_C = 25^\circ\text{C}$	-	-	25	$\mu\text{A}$
			$T_C = 150^\circ\text{C}$	-	-	1	mA
$I_{ECS}$	Emitter to Collector Leakage Current	$V_{EC} = 24\text{V}$ , See Fig. 11	$T_C = 25^\circ\text{C}$	-	-	1	mA
			$T_C = 150^\circ\text{C}$	-	-	40	
$R_1$	Series Gate Resistance		-	100	-	$\Omega$	
$R_2$	Gate to Emitter Resistance		10K	-	30K	$\Omega$	

**On State Characteristics**

$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_{CE} = 6\text{A}$ , $V_{GE} = 4\text{V}$ ,	$T_C = 25^\circ\text{C}$ , See Fig. 3	-	1.14	1.4	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_{CE} = 10\text{A}$ , $V_{GE} = 4.5\text{V}$ ,	$T_C = 150^\circ\text{C}$ , See Fig. 4	-	1.32	1.7	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	$I_{CE} = 15\text{A}$ , $V_{GE} = 4.5\text{V}$ ,	$T_C = 150^\circ\text{C}$	-	1.61	2.05	V
$I_{CE(ON)}$	Collector to Emitter On State Current	$V_{GE} = 5\text{V}$ , $V_{CE} = 5\text{V}$		50	-	-	A

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
--------	-----------	-----------------	-----	-----	-----	-------

**Dynamic Characteristics**

$Q_{G(ON)}$	Gate Charge	$I_{CE} = 10\text{A}$ , $V_{CE} = 12\text{V}$ , $V_{GE} = 5\text{V}$ , See Fig.14	-	20	-	nC		
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	$I_{CE} = 1\text{mA}$ , $V_{CE} = V_{GE}$ , See Fig. 10	$T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$		1.3 0.75	1.6 1.1	2.2 1.8	V
$V_{GEP}$	Gate to Emitter Plateau Voltage	$V_{CE} = 12\text{V}$ , $I_{CE} = 10\text{A}$	-	2.6	-	V		

**Switching Characteristics**

$t_{d(ON)R}$	Current Turn-On Delay Time-Resistive	$V_{CE} = 14\text{V}$ , $R_L = 1\Omega$	-	0.65	4	$\mu\text{s}$
$t_{rR}$	Current Rise Time-Resistive	$V_{GE} = 5\text{V}$ , $R_G = 1\text{K}\Omega$ $T_J = 25^\circ\text{C}$ , See Fig.12	-	1.7	7	$\mu\text{s}$
$t_{d(OFF)L}$	Current Turn-Off Delay Time-Inductive	$V_{CE} = 300\text{V}$ , $L = 500\mu\text{Hy}$ , $V_{GE} = 5\text{V}$ , $R_G = 1\text{K}\Omega$	-	5.4	15	$\mu\text{s}$
$t_{fL}$	Current Fall Time-Inductive	$T_J = 25^\circ\text{C}$ , See Fig.12	-	1.64	15	$\mu\text{s}$
SCIS	Self Clamped inductive Switching	$T_J = 25^\circ\text{C}$ , $L = 3.0\text{mHy}$ , $I_{CE} = 14.7\text{A}$ , $R_G = 1\text{K}\Omega$ , $V_{GE} = 5\text{V}$ , See Fig.1&2	-	-	320	mJ

**Thermal Characteristics**

$R_{\theta JC}$	Thermal Resistance Junction to Case	All Packages	-	-	0.8	$^\circ\text{C/W}$
-----------------	-------------------------------------	--------------	---	---	-----	--------------------

### Typical Performance Curves

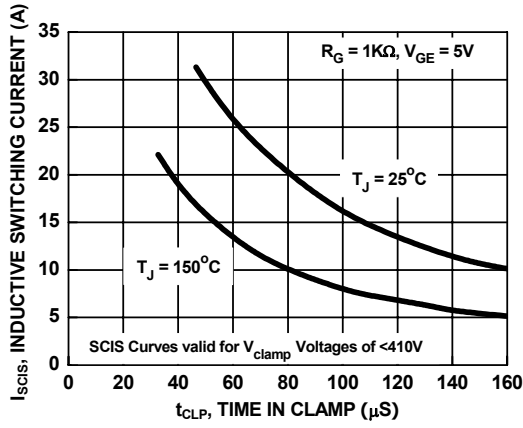


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

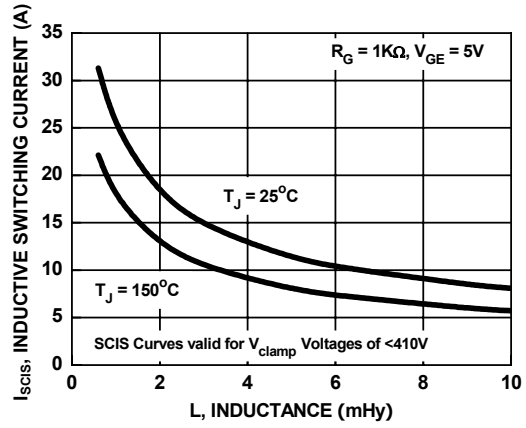


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

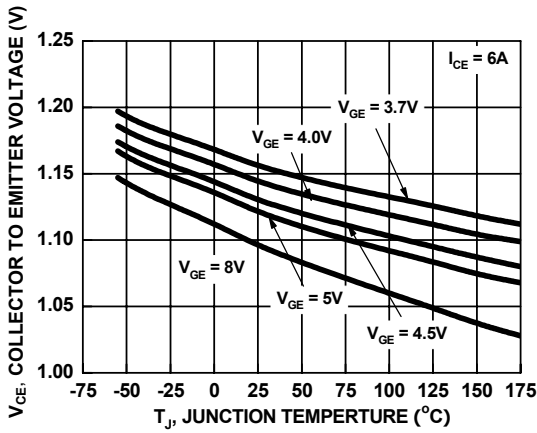


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

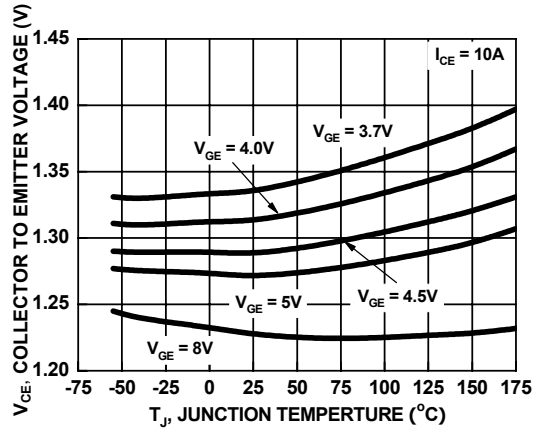


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

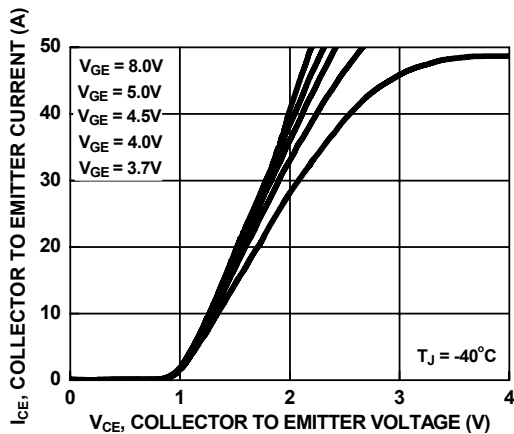


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

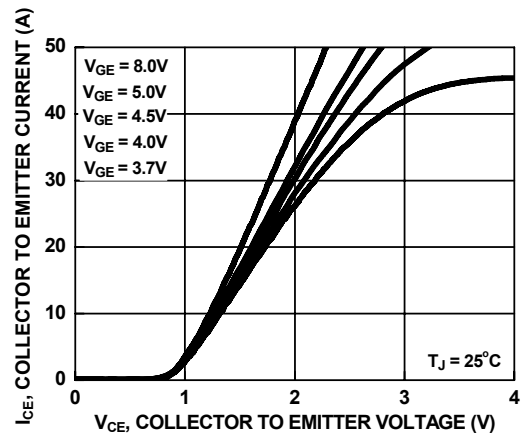


Figure 6. Collector to Emitter On-State Voltage vs. Collector Current

Typical Performance Curves (Continued)

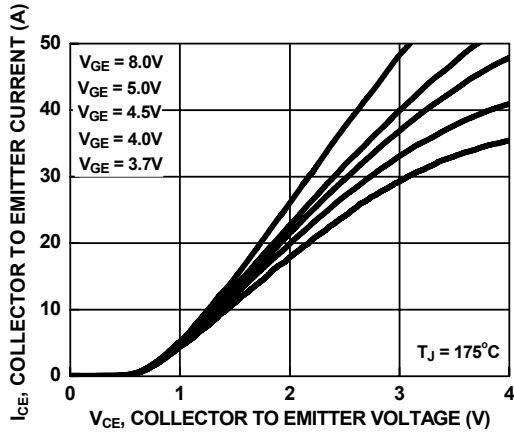


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

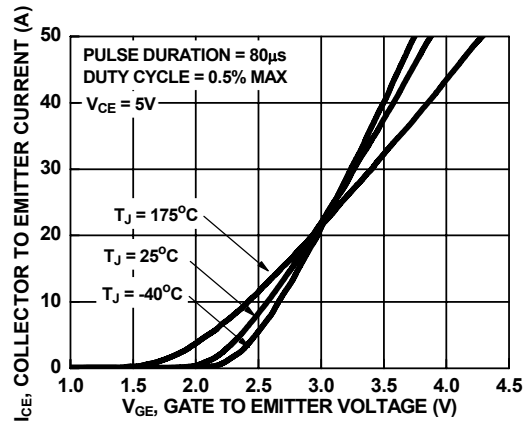


Figure 8. Transfer Characteristics

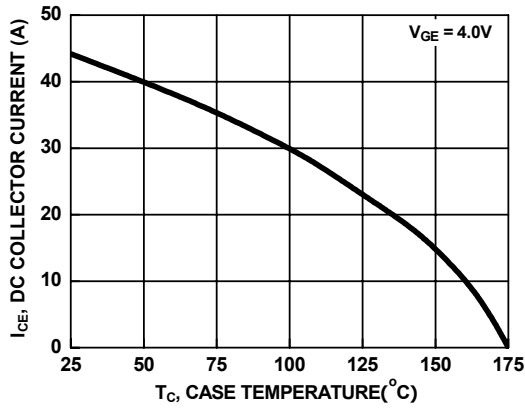


Figure 9. DC Collector Current vs. Case Temperature

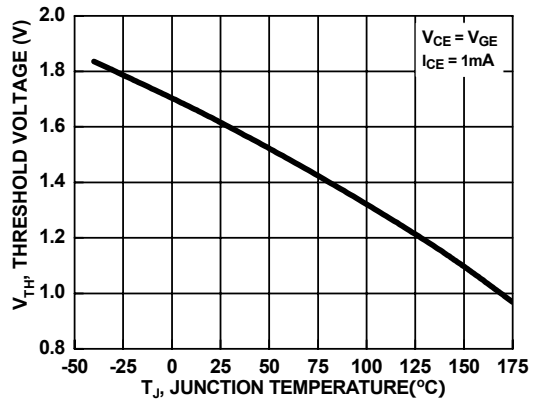


Figure 10. Threshold Voltage vs. Junction Temperature

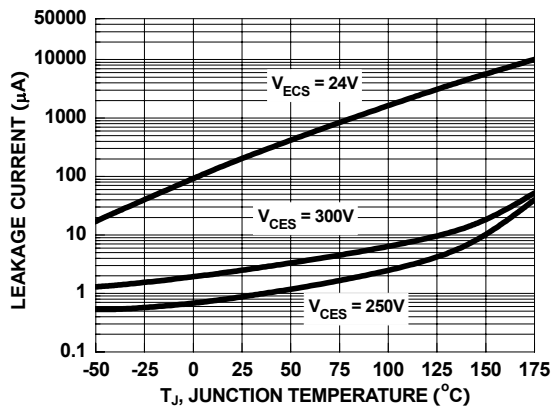


Figure 11. Leakage Current vs. Junction Temperature

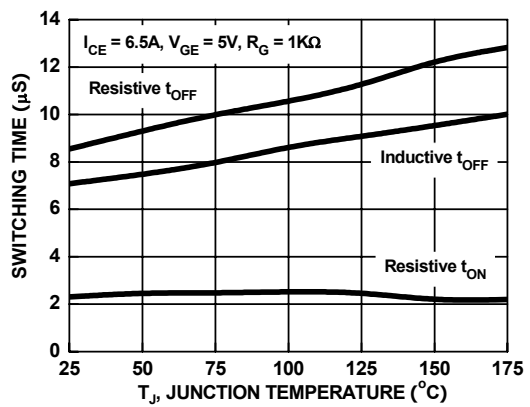


Figure 12. Switching Time vs. Junction Temperature

Typical Performance Curves (Continued)

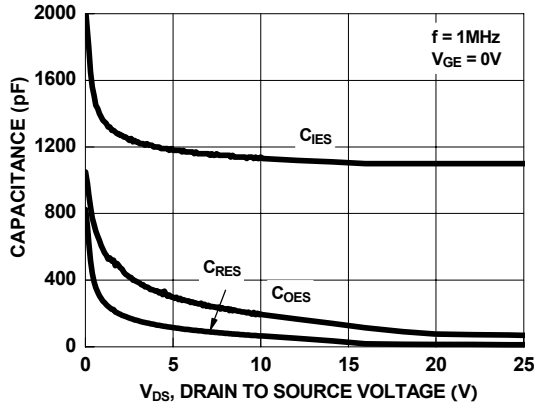


Figure 13. Capacitance vs. Collector to Emitter Voltage

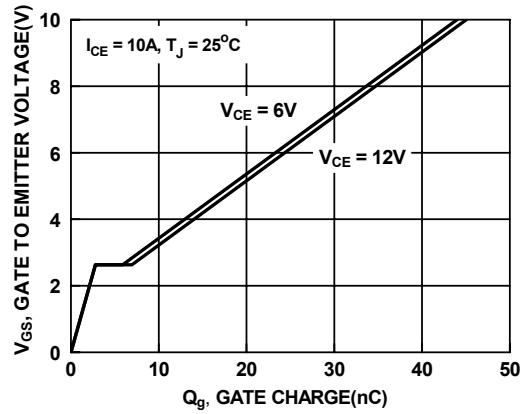


Figure 14. Gate Charge

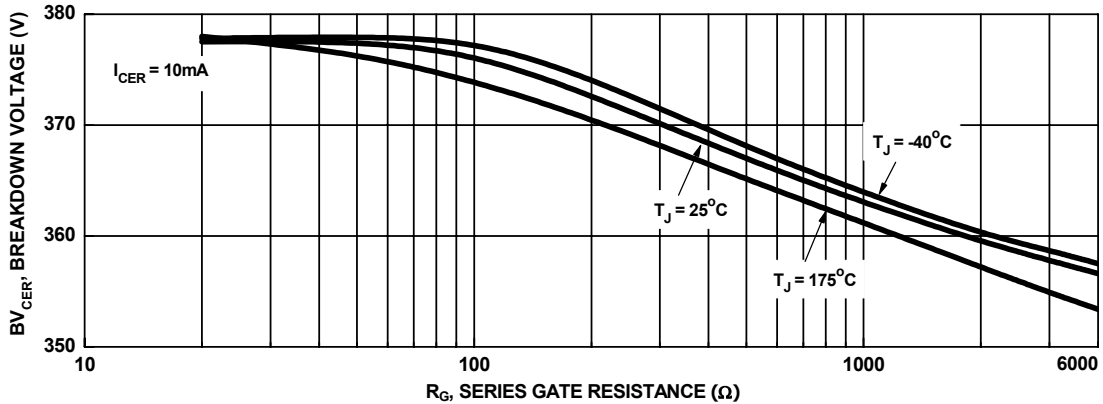


Figure 15. Break Down Voltage vs. Series Gate Resistance

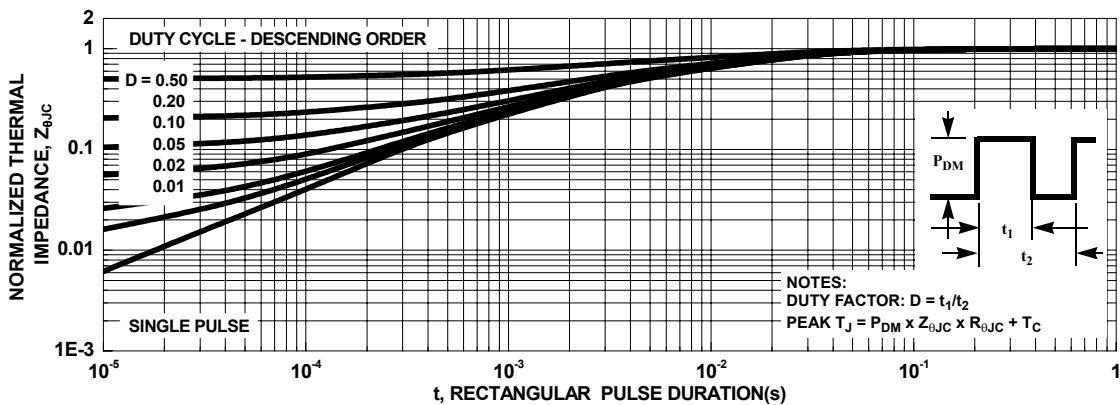


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

## Test Circuit and Waveforms

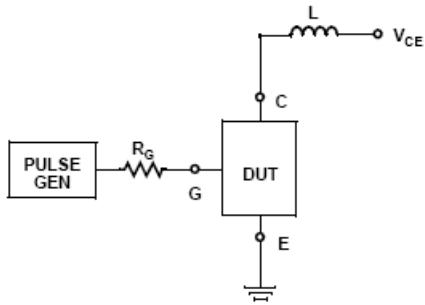


Figure 17. Inductive Switching Test Circuit

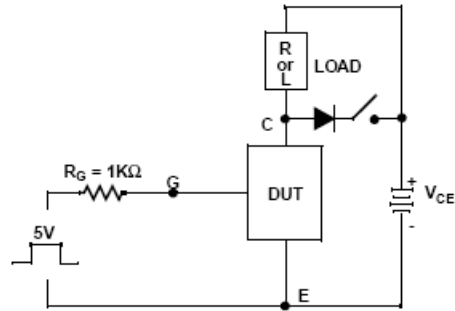


Figure 18.  $t_{ON}$  and  $t_{OFF}$  Switching Test Circuit

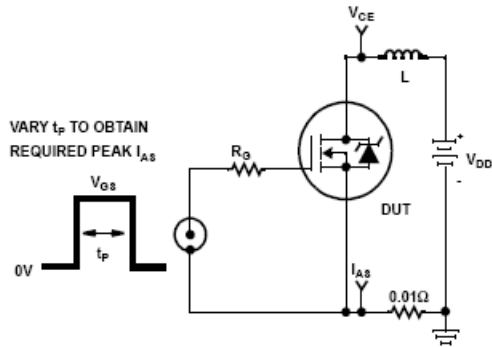


Figure 19. Energy Test Circuit

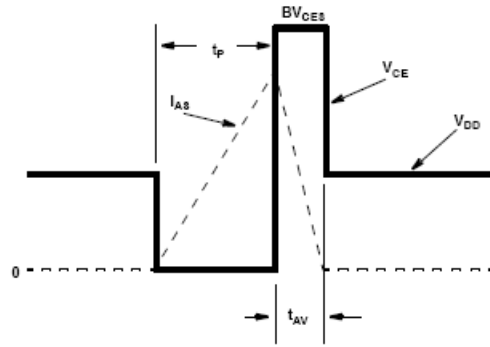
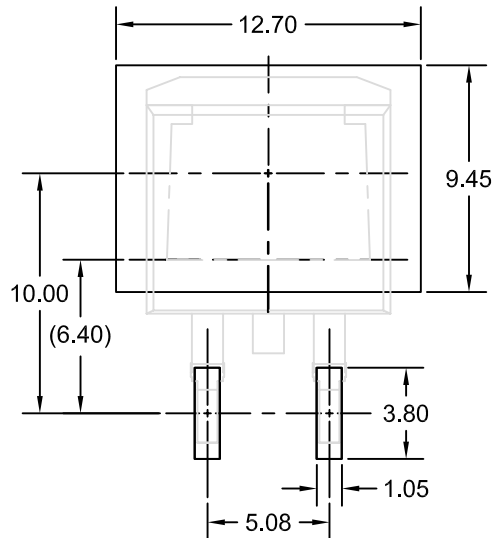
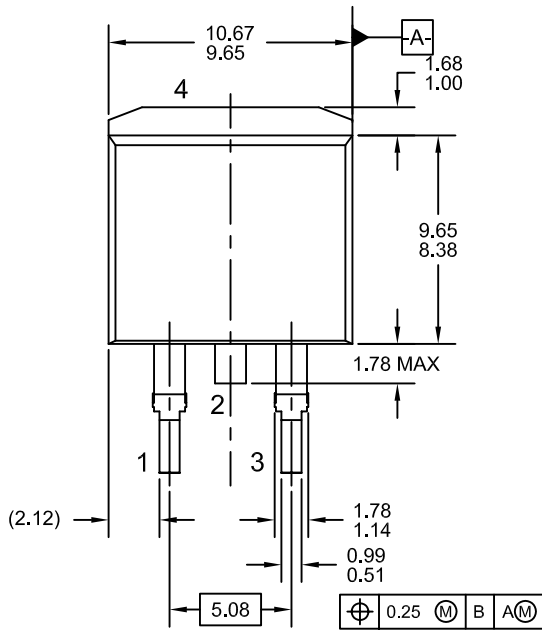


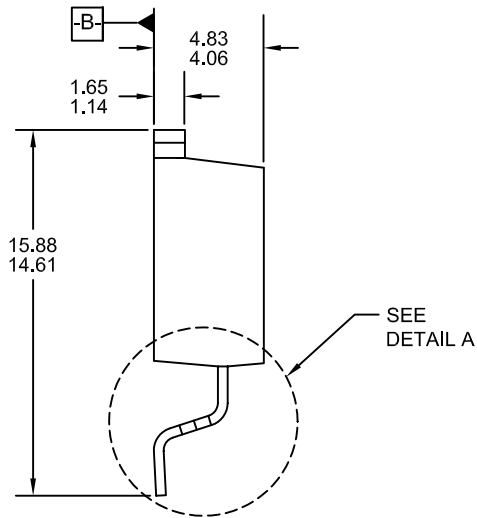
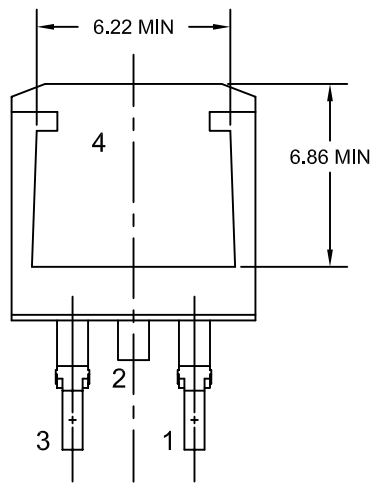
Figure 20. Energy Waveforms



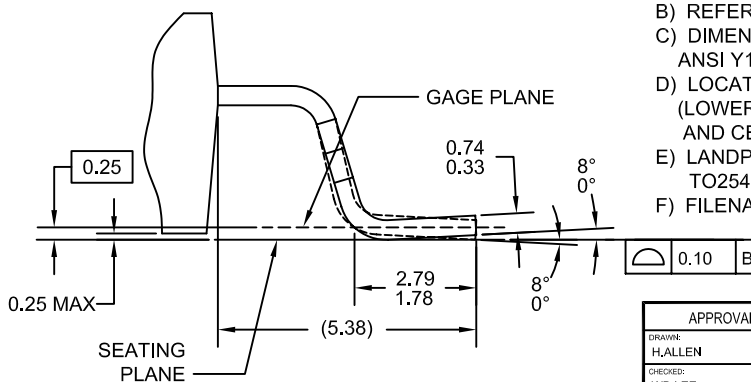
REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APPD
A	RELEASE TO DOCUMENT CONTROL	CB/085/99	08NOV1999	MRG
B	CHG HEATSNK DIM FR 1.25 TO 1.50; INK DIM FR 1.25 TO 1.50; LD OUT FR 1.25 TO 1.50; ADD DIM 1.25; CHG THK FR 1.25 TO 1.50; CHG THK FR 1.25 TO 1.50; CHG THK FR 1.25 TO 1.50; ADD DETAIL A; CHG LD THK FR 1.25 TO 1.50; CHG FOOT LETH FR 1.25 TO 1.50; ADD DIM 1.50; CHG LAND PATTERN DIM FR 2.00 TO 3.00 MIN; FR FOOT TO 3.00 MIN; FR ADD TO 4.00 MIN; FR 1.25 TO 1.50 MIN; DEL NOTE C; D; AND ARRANGE; ADD NOTE E.	CB/044/00	28FEB2000	MRG
C	CHG ORDERED FR 1.25 TO 1.50; MAX LD THK FR 1.25 TO 1.50; INK THK FR 1.25 TO 1.50; HEAT SNK THK FR 1.25 TO 1.50; LD THK FR 1.25 TO 1.50; FOOT LANDING FR 1.25 TO 1.50; FOOT ANGLE FR 3 TO 5 DEG; PROFILE DIM FR 1.5 TO MAX TO 1.50; MAX BACK HEAT SNK W/FR BUS TO 1.50 MIN; LEN FR 1.25 TO 1.50 MIN; REMOVE EJECTOR PIN MARK; ADD NOTE E.	CB/254/04	7OCT2004	RCM
D	REMOVE NOTE B; ADD NOTE E	CB/043/05	30MAR2005	MRG
5	REMOVED SITE INFO AND ECN COLUMN. ADDED NOTE F. TITLE CHANGED	06AUG2007		H.ALLEN
6	UPDATED HEATSNK PER IPC STANDARD. NOTE E IPC REFERENCE. FONT TO ARIAL. UPDATED DRAWING TITLE TO REFLECT JEDEC STANDARD.		02 MAY 09	H.ALLEN



LAND PATTERN RECOMMENDATION  
UNLESS NOTED, ALL DIMS TYPICAL



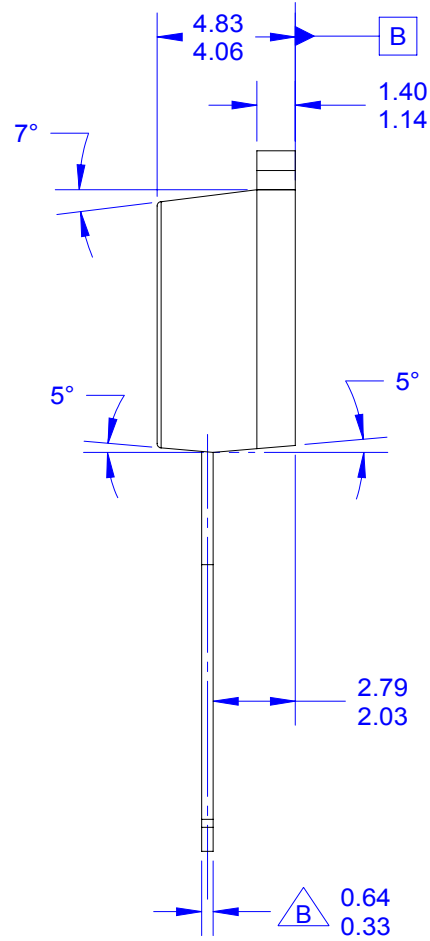
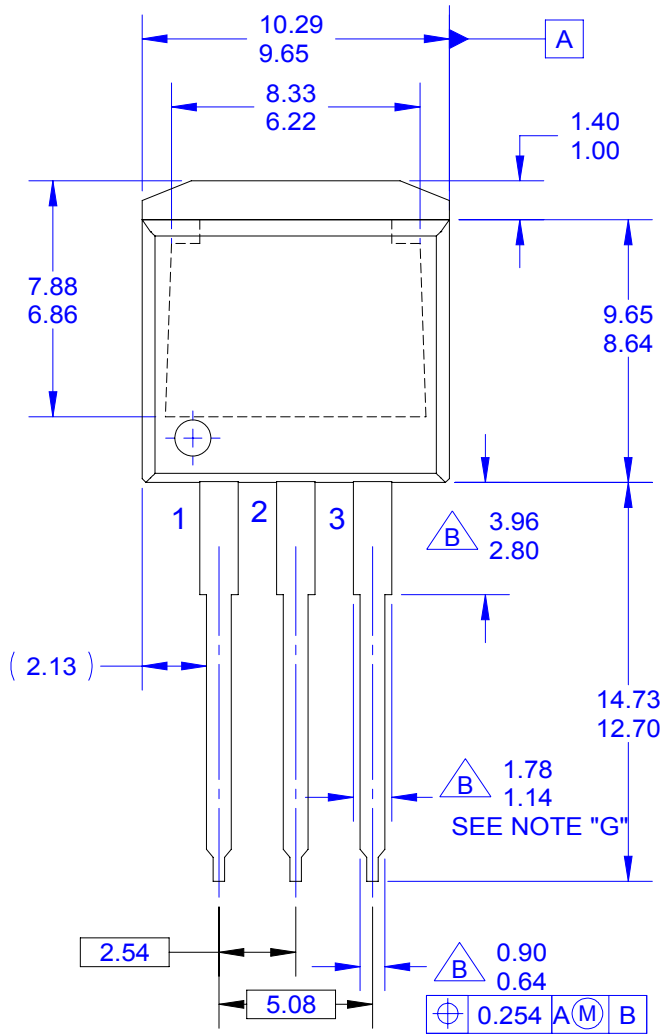
- NOTES: UNLESS OTHERWISE SPECIFIED
- A) ALL DIMENSIONS ARE IN MILLIMETERS.
  - B) REFERENCE JEDEC, TO-263, VARIATION AB.
  - C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M - 1994.
  - D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE).
  - E) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N
  - F) FILENAME: TO263A02REV6



DETAIL A, ROTATED 90°  
SCALE: 2X

APPROVALS		DATE			
DRAWN:	H.ALLEN	2 MAY 09			
CHECKED:	WB LEE	2 MAY 09			
APPROVED:					
<b>2LD, JEDEC TO-263, VARIATION AB, SURFACE MOUNT</b>					
PROJECTION	INCH (MM)	SCALE	SIZE	DRAWING NUMBER	REV
		1:1	NA	MKT-TO263A02	6
FORMERLY: N/A			SHEET: 1 OF 1		

THIS DRAWING IS THE PROPERTY OF FAIRCHILD SEMICONDUCTOR CORPORATION. NO USE THEREOF SHALL BE MADE OTHER THAN AS A REFERENCE FOR PROPOSALS AS SUBMITTED TO FAIRCHILD SEMICONDUCTOR CORPORATION FOR JOBS TO BE EXECUTED IN CONFORMITY WITH SUCH PROPOSALS UNLESS THE CONSENT OF SAID FAIRCHILD SEMICONDUCTOR CORPORATION HAS PREVIOUSLY BEEN OBTAINED. NO PART OF THIS DRAWING SHALL BE COPIED OR DUPLICATED OR ITS CONTENTS DISCLOSED. THE INFORMATION CONTAINED ON THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY.



NOTES:






- A. EXCEPT WHERE NOTED CONFORMS TO TO262 JEDEC VARIATION AA.
- B. DOES NOT COMPLY JEDEC STD. VALUE.
- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DIMENSION AND TOLERANCE AS PER ANSI Y14.5-1994.
- F. LOCATION OF PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF PACKAGE)
- G. MAXIMUM WIDTH FOR F102 DEVICE = 1.35 MAX.
- H. DRAWING FILE NAME: TO262A03REV5

APPROVALS		DATE			
DRAWN: BOBOY MALDO		11FEB2010			
CHECKED: KH LEE					
APPROVED: BY HUANG			TO262 3LD JEDEC VARIATION AA		
APPROVED: HOWARD ALLEN					
PROJECTION		SCALE	SIZE	DRAWING NUMBER	REV
		1:1	N/A	MKT-TO262A03	5
		FORMERLY: N/A	SHEET: 1 OF 1		



**TRADEMARKS**

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- |                                                                                   |                                                |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| AccuPower™                                                                        | F-PFS™                                         |  | Sync-Lock™                                                                          |
| AX-CAP®*                                                                          | FRFET®                                         | PowerXS™                                                                          |  |
| BitSiC™                                                                           | Global Power Resource <sup>SM</sup>            | Programmable Active Droop™                                                        | TinyBoost®                                                                          |
| Build it Now™                                                                     | GreenBridge™                                   | QFET®                                                                             | TinyBuck®                                                                           |
| CorePLUS™                                                                         | Green FPS™                                     | QS™                                                                               | TinyCalc™                                                                           |
| CorePOWER™                                                                        | Green FPS™ e-Series™                           | Quiet Series™                                                                     | TinyLogic®                                                                          |
| CROSSVOLT™                                                                        | Gmax™                                          | RapidConfigure™                                                                   | TINYOPTO™                                                                           |
| CTL™                                                                              | GTO™                                           |  | TinyPower™                                                                          |
| Current Transfer Logic™                                                           | IntelliMAX™                                    | Saving our world, 1mW/W/kW at a time™                                             | TinyPWM™                                                                            |
| DEUXPEED®                                                                         | ISOPLANAR™                                     | SignalWise™                                                                       | TinyWire™                                                                           |
| Dual Cool™                                                                        | Making Small Speakers Sound Louder and Better™ | SmartMax™                                                                         | TranSiC™                                                                            |
| EcoSPARK®                                                                         | MegaBuck™                                      | SMART START™                                                                      | TriFault Detect™                                                                    |
| EfficientMax™                                                                     | MICROCOUPLER™                                  | Solutions for Your Success™                                                       | TRUECURRENT®*                                                                       |
| ESBC™                                                                             | MicroFET™                                      | SPM®                                                                              | μSerDes™                                                                            |
|  | MicroPak™                                      | STEALTH™                                                                          |  |
| Fairchild®                                                                        | MicroPak2™                                     | SuperFET®                                                                         | UHC®                                                                                |
| Fairchild Semiconductor®                                                          | MillerDrive™                                   | SuperSOT™-3                                                                       | Ultra FRFET™                                                                        |
| FACT Quiet Series™                                                                | MotionMax™                                     | SuperSOT™-6                                                                       | UniFET™                                                                             |
| FACT®                                                                             | mWSaver®                                       | SuperSOT™-8                                                                       | VcX™                                                                                |
| FAST®                                                                             | OptoHiT™                                       | SupreMOS®                                                                         | VisualMax™                                                                          |
| FastvCore™                                                                        | OPTOLOGIC®                                     | SyncFET™                                                                          | VoltagePlus™                                                                        |
| FETBench™                                                                         | OPTOPLANAR®                                    |                                                                                   | XS™                                                                                 |
| FPS™                                                                              |                                                |                                                                                   |                                                                                     |

\* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**ANTI-COUNTERFEITING POLICY**

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I66

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 owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor 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 ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor 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:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative