

# EcoSPARK<sup>®</sup> 2 N-Channel Ignition IGBT

## FGD3325G2-F085V

**330 mJ, 250 V**

### Features

- SCIS Energy = 330 mJ at  $T_J = 25\text{ }^\circ\text{C}$
- Logic Level Gate Drive
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

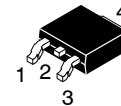
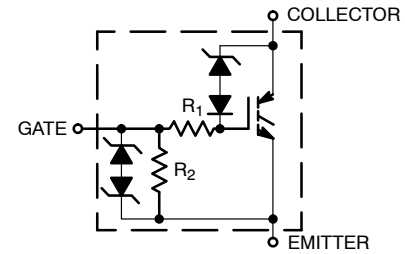
### Applications

- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications

### MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise stated)

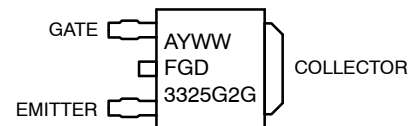
Symbol	Parameter	Value	Unit
$BV_{CER}$	Collector to Emitter Breakdown Voltage ( $I_C = 1\text{ mA}$ )	250	V
$BV_{ECS}$	Emitter to Collector Voltage – Reverse Battery Condition ( $I_C = 10\text{ mA}$ )	28	V
$E_{SCIS25}$	$I_{SCIS} = 14.8\text{ A}$ , $L = 3.0\text{ mHy}$ , $R_{GE} = 1\text{ K}\Omega$ , $T_C = 25\text{ }^\circ\text{C}$	330	mJ
$E_{SCIS150}$	$I_{SCIS} = 11.4\text{ A}$ , $L = 3.0\text{ mHy}$ , $R_{GE} = 1\text{ K}\Omega$ , $T_C = 150\text{ }^\circ\text{C}$	195	mJ
$I_{C25}$	Collector Current Continuous at $V_{GE} = 5.0\text{ V}$ , $T_C = 25\text{ }^\circ\text{C}$	41	A
$I_{C110}$	Collector Current Continuous at $V_{GE} = 5.0\text{ V}$ , $T_C = 110\text{ }^\circ\text{C}$	25	A
$V_{GEM}$	Gate to Emitter Voltage Continuous	$\pm 10$	V
$P_D$	Power Dissipation Total, $T_C = 25\text{ }^\circ\text{C}$	150	W
	Power Dissipation Derating, $T_C > 25\text{ }^\circ\text{C}$	1.0	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	$-55$ to $+175$	$^\circ\text{C}$
$T_L$	Max. Lead Temperature for Soldering (Leads at 1.6 mm from case for 10 s)	300	$^\circ\text{C}$
$T_{PKG}$	Reflow Soldering according to JESD020C	260	$^\circ\text{C}$
ESD	HBM–Electrostatic Discharge Voltage at 100 pF, 1500 $\Omega$	4	kV
	CDM–Electrostatic Discharge Voltage at 1 $\Omega$	2	kV

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.



DPAK (SINGLE GAUGE)  
CASE 369C

### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
FGD3325G2 = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# FGD3325G2-F085V

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### OFF STATE CHARACTERISTICS

$BV_{\text{CER}}$	Collector to Emitter Breakdown Voltage	$I_{\text{CE}} = 2\text{ mA}$ , $V_{\text{GE}} = 0\text{ V}$ , $R_{\text{GE}} = 1\text{ k}\Omega$ , $T_J = -40\text{ to }150\text{ }^\circ\text{C}$	225	-	275	V	
$BV_{\text{CES}}$	Collector to Emitter Breakdown Voltage	$I_{\text{CE}} = 10\text{ mA}$ , $V_{\text{GE}} = 0\text{ V}$ , $R_{\text{GE}} = 0$ , $T_J = -40\text{ to }150\text{ }^\circ\text{C}$	240	-	290	V	
$BV_{\text{ECS}}$	Emitter to Collector Breakdown Voltage	$I_{\text{CE}} = -75\text{ mA}$ , $V_{\text{GE}} = 0\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$	28	-	-	V	
$BV_{\text{GES}}$	Gate to Emitter Breakdown Voltage	$I_{\text{GES}} = \pm 2\text{ mA}$	$\pm 12$	$\pm 14$	-	V	
$I_{\text{CER}}$	Collector to Emitter Leakage Current	$V_{\text{CE}} = 175\text{ V}$ $R_{\text{GE}} = 1\text{ k}\Omega$	$T_J = 25\text{ }^\circ\text{C}$	-	-	25	$\mu\text{A}$
			$T_J = 150\text{ }^\circ\text{C}$	-	-	1	
$I_{\text{ECS}}$	Emitter to Collector Leakage Current	$V_{\text{EC}} = 24\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	-	1	mA
			$T_J = 150\text{ }^\circ\text{C}$	-	-	40	
$R_1$	Series Gate Resistance		-	120	-	$\Omega$	
$R_2$	Gate to Emitter Resistance		10K	-	30K	$\Omega$	

### ON STATE CHARACTERISTICS

$V_{\text{CE(SAT)}}$	Collector to Emitter Saturation Voltage	$I_{\text{CE}} = 6\text{ A}$ , $V_{\text{GE}} = 4\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$	-	1.15	1.25	V
		$I_{\text{CE}} = 10\text{ A}$ , $V_{\text{GE}} = 4.5\text{ V}$ , $T_J = 150\text{ }^\circ\text{C}$	-	1.35	1.50	
		$I_{\text{CE}} = 15\text{ A}$ , $V_{\text{GE}} = 4.5\text{ V}$ , $T_J = 150\text{ }^\circ\text{C}$	-	1.68	1.85	

### DYNAMIC CHARACTERISTICS

$Q_{\text{G(ON)}}$	Gate Charge	$I_{\text{CE}} = 10\text{ A}$ , $V_{\text{CE}} = 12\text{ V}$ , $V_{\text{GE}} = 5\text{ V}$	-	21	-	nC	
$V_{\text{GE(TH)}}$	Gate to Emitter Threshold Voltage	$I_{\text{CE}} = 1\text{ mA}$ $V_{\text{CE}} = V_{\text{GE}}$	$T_J = 25\text{ }^\circ\text{C}$	1.3	1.5	2.2	V
			$T_J = 150\text{ }^\circ\text{C}$	0.75	1.1	1.8	
$V_{\text{GEP}}$	Gate to Emitter Plateau Voltage	$V_{\text{CE}} = 12\text{ V}$ , $I_{\text{CE}} = 10\text{ A}$	-	2.7	-	V	

### SWITCHING CHARACTERISTICS

$t_{\text{d(ON)R}}$	Current Turn-On Delay Time-Resistive	$V_{\text{CE}} = 14\text{ V}$ , $R_L = 1\text{ }\Omega$ , $V_{\text{GE}} = 5\text{ V}$ , $R_G = 1\text{ k}\Omega$ , $T_J = 25\text{ }^\circ\text{C}$	-	0.8	4	$\mu\text{s}$
$t_{\text{rR}}$	Current Rise Time-Resistive		-	1.2	7	
$t_{\text{d(OFF)L}}$	Current Turn-Off Delay Time-Inductive	$V_{\text{CE}} = 190\text{ V}$ , $L = 1\text{ mH}$ , $V_{\text{GE}} = 5\text{ V}$ , $R_G = 1\text{ k}\Omega$ , $I_{\text{CE}} = 6.5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$	-	5.1	15	
$t_{\text{fL}}$	Current Fall Time-Inductive		-	2.2	15	

### THERMAL CHARACTERISTICS

$R_{\theta\text{JC}}$	Thermal Resistance Junction to Case		-	-	1	$^\circ\text{C/W}$
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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.

### PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Reel Diameter	Tape Width	Shipping <sup>†</sup>
FGD3325G2	FGD3325G2-F085V	DPAK (Pb-Free)	330 mm	16 mm	2500 / Tape & Reel

<sup>†</sup> 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](#).

TYPICAL CHARACTERISTICS

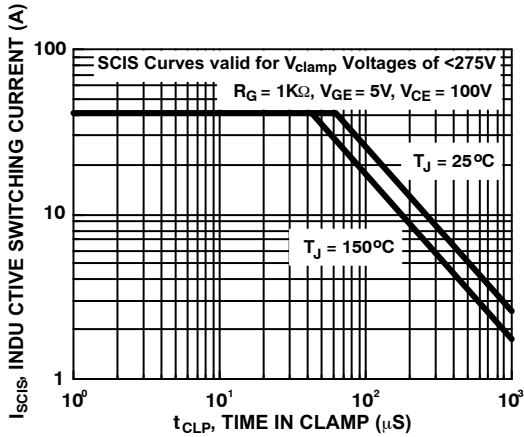


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

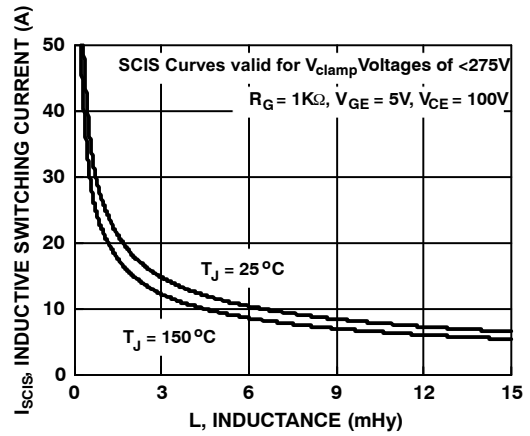


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

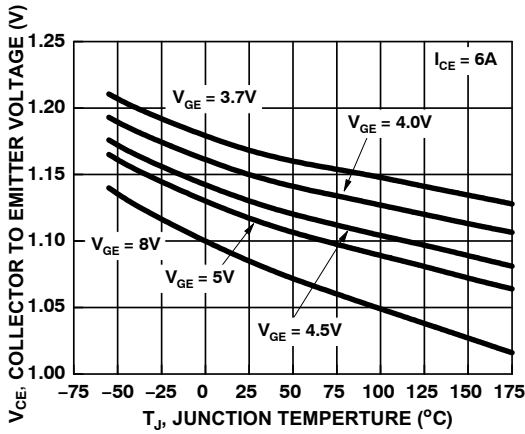


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

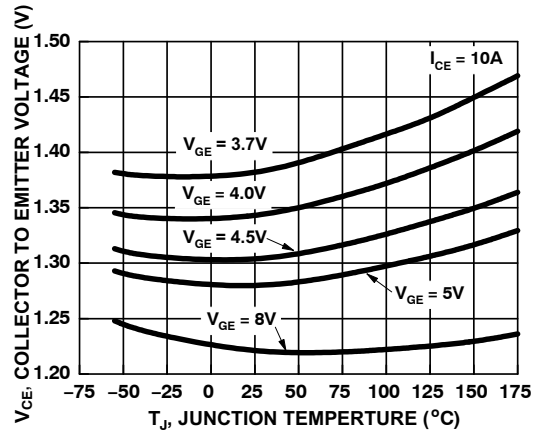


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

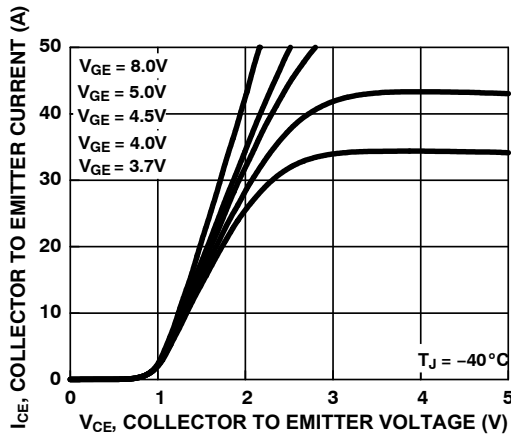


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

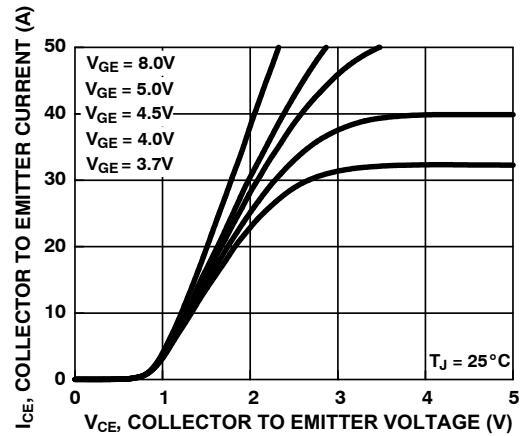


Figure 6. Collector to Emitter On-State Voltage vs. Collector Current

TYPICAL CHARACTERISTICS

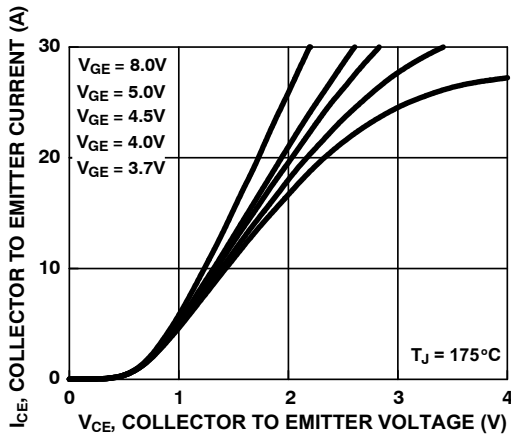


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

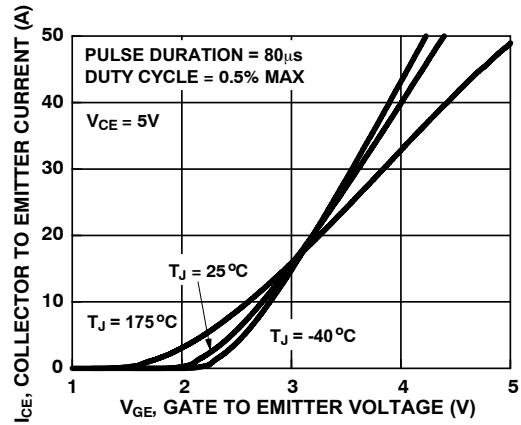


Figure 8. Transfer Characteristics

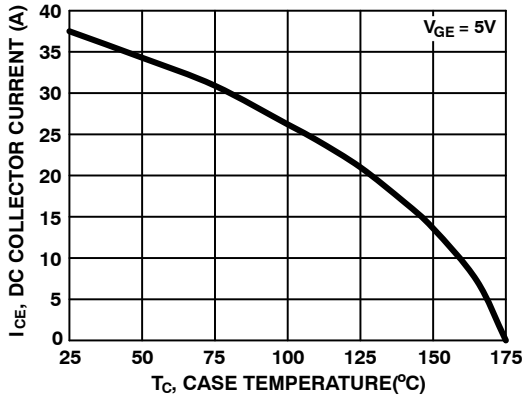


Figure 9. DC Collector Current vs. Case Temperature

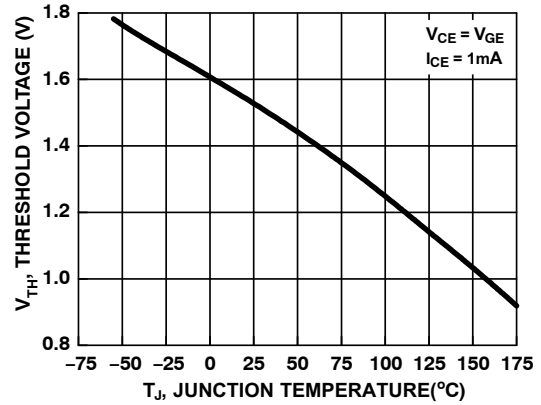


Figure 10. Threshold Voltage vs. Junction Temperature

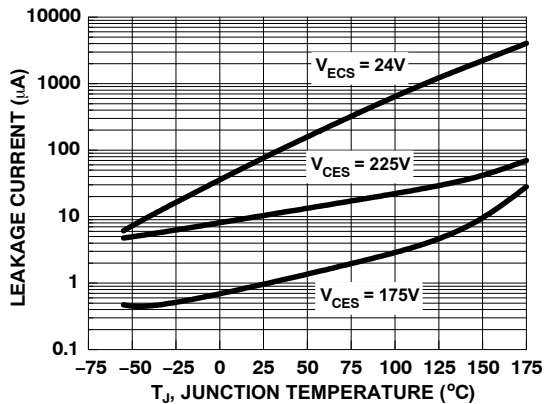


Figure 11. Leakage Current vs. Junction Temperature

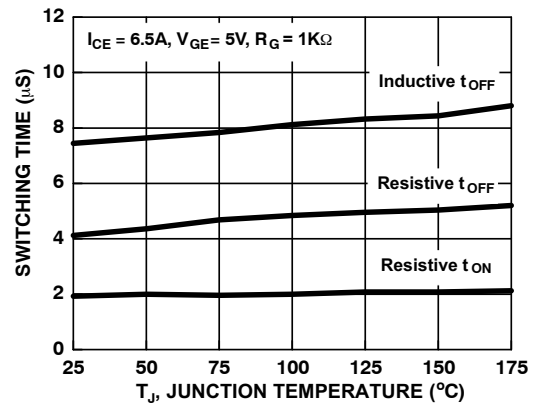


Figure 12. Switching Time vs. Junction Temperature

TYPICAL CHARACTERISTICS

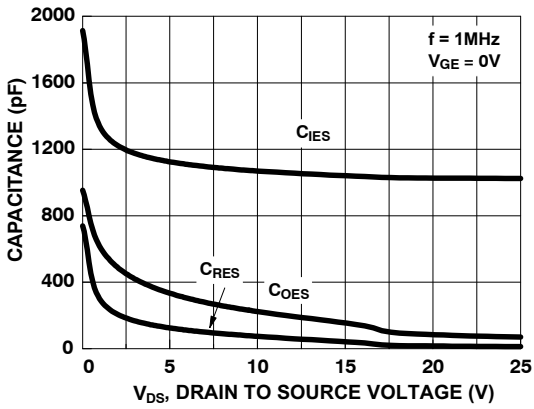


Figure 13. Capacitance vs. Collector to Emitter

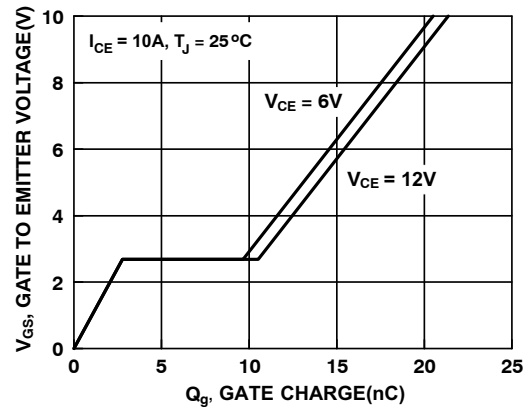


Figure 14. Gate Charge

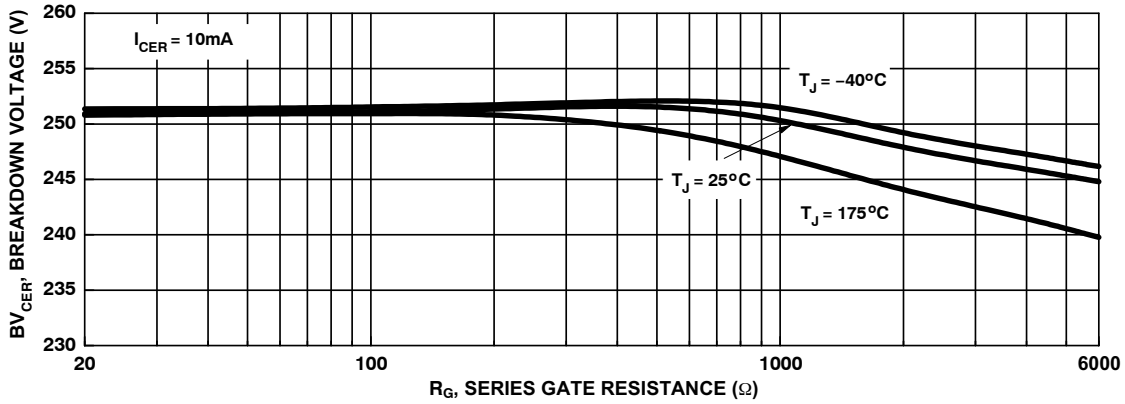


Figure 15. Break Down Voltage vs. Series Gate Resistance

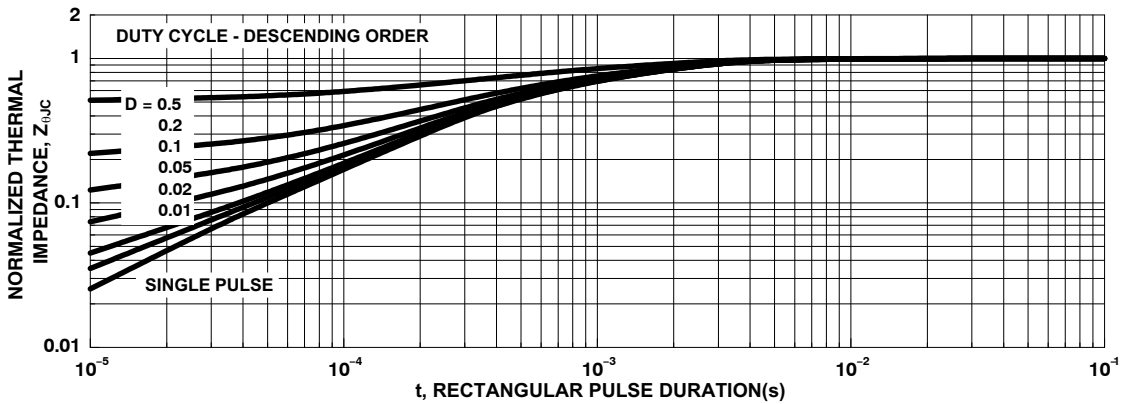


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

# FGD3325G2-F085V

## TYPICAL CHARACTERISTICS

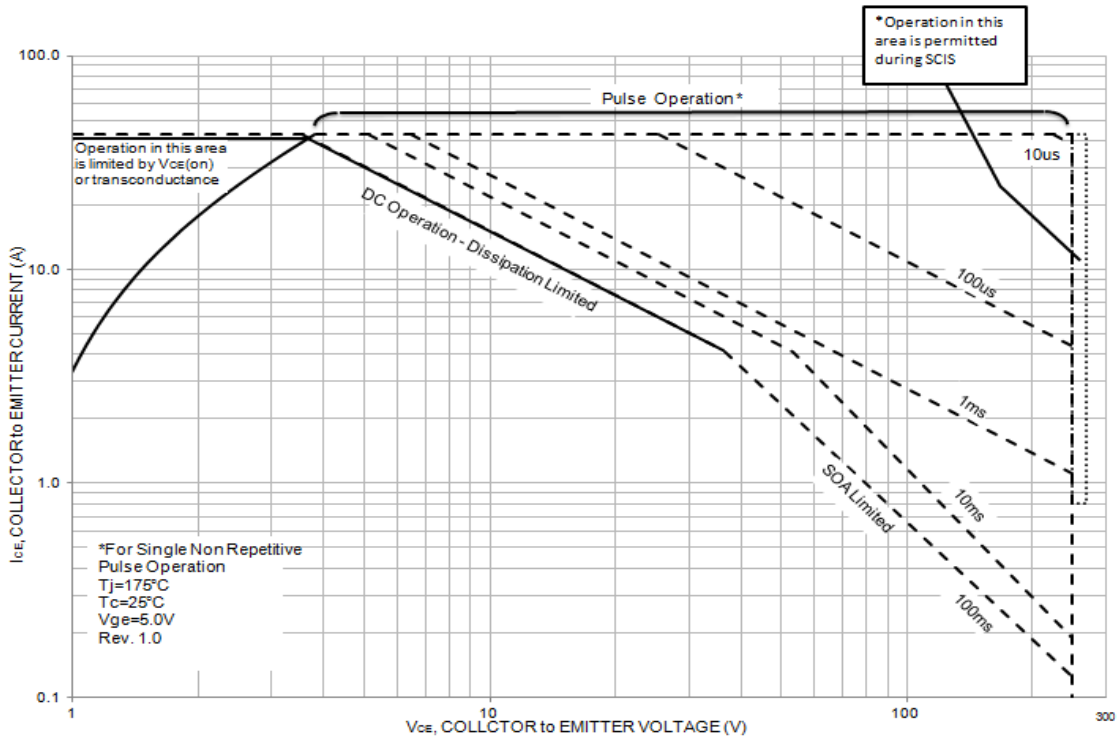


Figure 17. Forward Safe Operating Area

TEST CIRCUIT AND WAVEFORMS

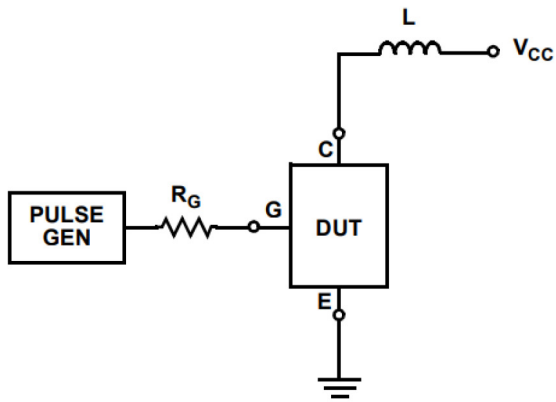


Figure 18. Inductive Switching Test Circuit

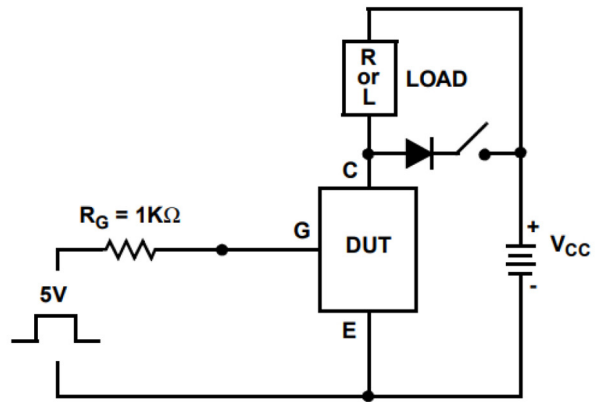


Figure 19.  $t_{ON}$  and  $t_{OFF}$  Switching Test Circuit

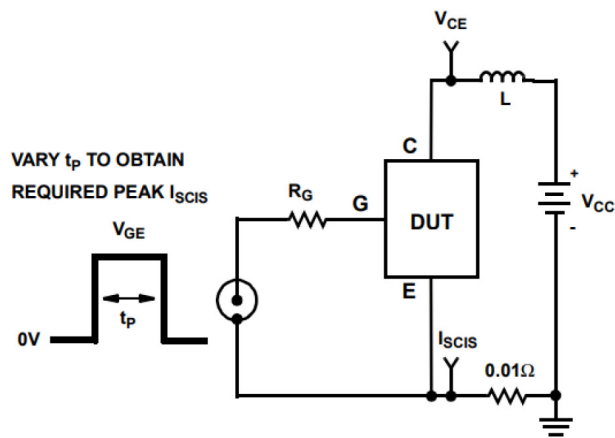


Figure 20. Energy Test Circuit

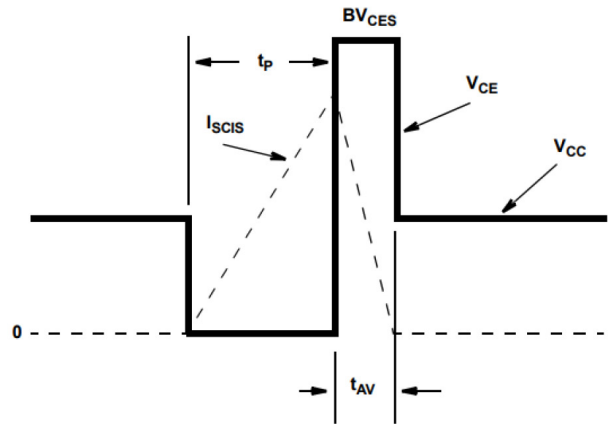


Figure 21. Energy Waveforms

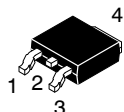
# FGD3325G2-F085V

## REVISION HISTORY

Revision	Description of Changes	Date
1	Rebranded the Data Sheet to onsemi format	9/15/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

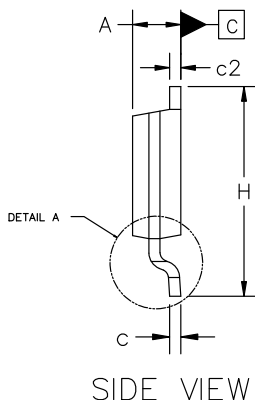
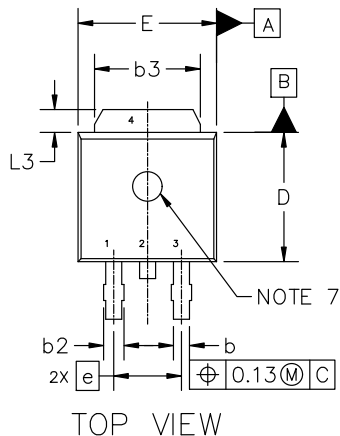
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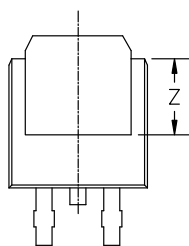
**DPAK-3 6.10x6.54x2.28, 2.29P**  
CASE 369C  
ISSUE K

DATE 14 MAY 2026

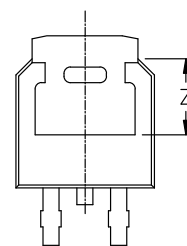
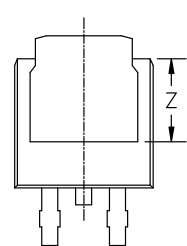
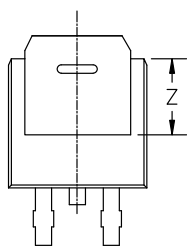
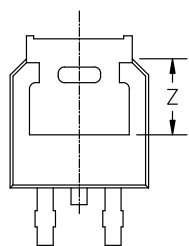
SCALE 1:1



MILLIMETERS			
DIM	MIN	NOM	MAX
A	2.18	2.28	2.38
A1	0.00	---	0.13
b	0.63	0.76	0.89
b2	0.72	0.93	1.14
b3	4.57	5.02	5.46
c	0.46	0.54	0.61
c2	0.46	0.54	0.61
D	5.97	6.10	6.22
E	6.35	6.54	6.73
e	2.29 BSC		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L1	2.90 REF		
L2	0.51 BSC		
L3	0.89	---	1.27
L4	---	---	1.01
Z	3.93	---	---



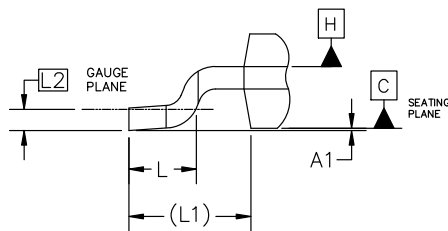
BOTTOM VIEW



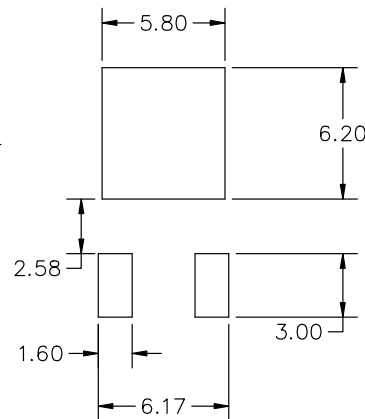
ALTERNATE CONSTRUCTIONS

NOTES:

1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.



DETAIL A  
ROTATED 90° CW



RECOMMENDED MOUNTING FOOTPRINT\*

\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

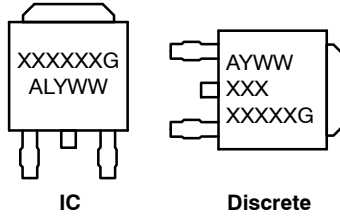
<b>DOCUMENT NUMBER:</b>	<b>98AON10527D</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>DPAK-3 6.10x6.54x2.28, 2.29P</b>	<b>PAGE 1 OF 2</b>

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**DPAK-3 6.10x6.54x2.28, 2.29P**  
**CASE 369C**  
**ISSUE K**

DATE 13 MAY 2026

**GENERIC  
MARKING DIAGRAM\***



- XXXXXX = Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- WW = Work Week
- G = 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.

- |  |  |   |   |  |
|--|--|---|---|--|
| <p>STYLE 1:<br/> PIN 1. BASE<br/> 2. COLLECTOR<br/> 3. EMITTER<br/> 4. COLLECTOR</p> | <p>STYLE 2:<br/> PIN 1. GATE<br/> 2. DRAIN<br/> 3. SOURCE<br/> 4. DRAIN</p>          | <p>STYLE 3:<br/> PIN 1. ANODE<br/> 2. CATHODE<br/> 3. ANODE<br/> 4. CATHODE</p> | <p>STYLE 4:<br/> PIN 1. CATHODE<br/> 2. ANODE<br/> 3. GATE<br/> 4. ANODE</p>              | <p>STYLE 5:<br/> PIN 1. GATE<br/> 2. ANODE<br/> 3. CATHODE<br/> 4. ANODE</p>     |
| <p>STYLE 6:<br/> PIN 1. MT1<br/> 2. MT2<br/> 3. GATE<br/> 4. MT2</p>                 | <p>STYLE 7:<br/> PIN 1. GATE<br/> 2. COLLECTOR<br/> 3. EMITTER<br/> 4. COLLECTOR</p> | <p>STYLE 8:<br/> PIN 1. N/C<br/> 2. CATHODE<br/> 3. ANODE<br/> 4. CATHODE</p>   | <p>STYLE 9:<br/> PIN 1. ANODE<br/> 2. CATHODE<br/> 3. RESISTOR ADJUST<br/> 4. CATHODE</p> | <p>STYLE 10:<br/> PIN 1. CATHODE<br/> 2. ANODE<br/> 3. CATHODE<br/> 4. ANODE</p> |

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<b>DESCRIPTION:</b>	<b>DPAK-3 6.10x6.54x2.28, 2.29P</b>	<b>PAGE 2 OF 2</b>

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