

# MOSFET – N-Channel, QFET®

## 1000 V, 8.0 A, 1.45 Ω

### FQH8N100C

#### Description

This N-Channel enhancement mode power MOSFET is produced using ON Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and electronic lamp ballasts.

#### Features

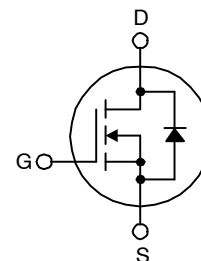
- 8 A, 1000 V,  $R_{DS(on)} = 1.45 \Omega$  (Max.) @  $V_{GS} = 10 V$
- Low Gate Charge (Typ. 53 nC)
- Low Crss (Typ. 16 pF)
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability
- This Device is Pb-Free and is RoHS Compliant



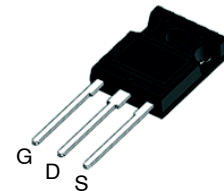
ON Semiconductor®

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$V_{DS}$	$R_{DS(on)} MAX$	$I_D MAX$
1000 V	1.45 Ω @ 10 V	8 A

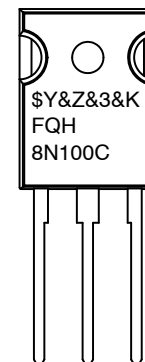


N-CHANNEL MOSFET



TO-247-3LD  
CASE 340CK

#### MARKING DIAGRAM



\$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
FQH8N100C	= Specific Device Code

#### ORDERING INFORMATION

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

# FQH8N100C

## ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	FQH8N100C	Unit
V <sub>DSS</sub>	Drain–Source Voltage	1000	V
I <sub>D</sub>	Drain Current:	Continuous (T <sub>C</sub> = 25°C)	8.0
		Continuous (T <sub>C</sub> = 100°C)	5.0
I <sub>DM</sub>	Drain Current:	Pulsed (Note 1)	32
V <sub>GSS</sub>	Gate–Source Voltage	±30	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy (Note 2)	850	mJ
I <sub>AR</sub>	Avalanche Current (Note 1)	8.0	A
E <sub>AR</sub>	Repetitive Avalanche Energy (Note 1)	22	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.0	V/ns
P <sub>D</sub>	Power Dissipation	T <sub>C</sub> = 25°C	225
		Derate Above 25°C	1.79
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	–55 to + 150	°C
T <sub>L</sub>	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 seconds	300	°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.

1. Repetitive rating: Pulse–width limited by maximum junction temperature.
2. L = 25 mH, I<sub>AS</sub> = 8.0 A, V<sub>DD</sub> = 50 V, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25°C
3. I<sub>SD</sub> ≤ 8.0 A, di/dt ≤ 200 A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25 °C.

## PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
FQH8N100C	FQH8N100C	TO–247	Tube	N/A	N/A	30 Units

## THERMAL CHARACTERISTICS

Symbol	Parameter	FQH8N100C	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction to Case, Max.	0.56	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient, Max.	40	

# FQH8N100C

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
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### OFF CHARACTERISTICS

BV <sub>DSS</sub>	Drain–Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	1000	–	–	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> = 250 μA, Referenced to 25°C	–	1.4	–	V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 1000 V, V <sub>GS</sub> = 0 V	–	–	10	μA
		V <sub>DS</sub> = 800 V, T <sub>C</sub> = 125 °C	–	–	100	μA
I <sub>GSSF</sub>	Gate–Body Leakage Current, Forward	V <sub>GS</sub> = 30 V, V <sub>DS</sub> = 0 V	–	–	100	nA
I <sub>GSSR</sub>	Gate–Body Leakage Current, Reverse	V <sub>GS</sub> = –30 V, V <sub>DS</sub> = 0 V	–	–	–100	nA

### ON CHARACTERISTICS

V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	3.0	–	5.0	V
R <sub>DS(on)</sub>	Static Drain–Source On–Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.0 A	–	1.2	1.45	Ω
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 4.0 A	–	8.0	–	S

### DYNAMIC CHARACTERISTICS

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz	–	2475	3220	pF
C <sub>oss</sub>	Output Capacitance		–	195	255	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		–	16	21	pF

### SWITCHING CHARACTERISTICS

t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 500 V, I <sub>D</sub> = 8.0 A, R <sub>G</sub> = 25 Ω (Note 4)	–	50	110	ns
t <sub>r</sub>	Turn–On Rise Time		–	95	200	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		–	122	254	ns
t <sub>f</sub>	Turn–Off Fall Time		–	80	170	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 800 V, I <sub>D</sub> = 8.0 A, V <sub>GS</sub> = 10 V (Note 4)	–	53	70	nC
Q <sub>gs</sub>	Gate–Source Charge		–	13	–	nC
Q <sub>gd</sub>	Gate–Drain Charge		–	23	–	nC

### DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

I <sub>S</sub>	Maximum Continuous Source–Drain Diode Forward Current	–	–	8.0	A	
I <sub>SM</sub>	Maximum Pulsed Drain–Source Diode Forward Current	–	–	32.0	A	
V <sub>SD</sub>	Drain–Source Diode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 8.0 A	–	–	1.4	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 8.0 A, dI <sub>F</sub> /dt = 100 A/μs	–	620	–	ns
Q <sub>rr</sub>	Reverse Recovery Charge		–	5.2	–	μC

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. Essentially independent of operating temperature.

TYPICAL PERFORMANCE CHARACTERISTICS

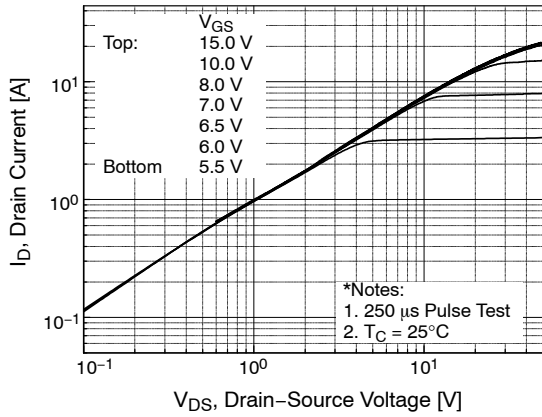


Figure 1. On-Region Characteristics

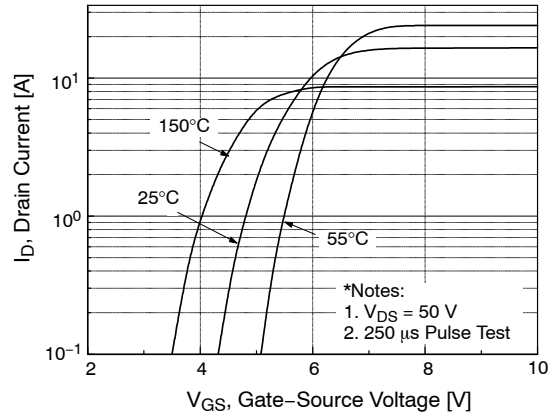


Figure 2. Transfer Characteristics

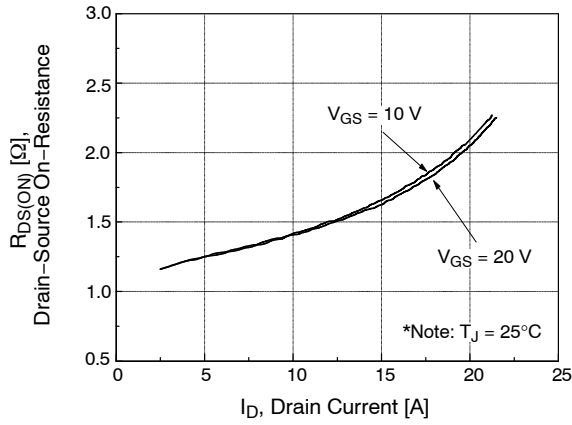


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

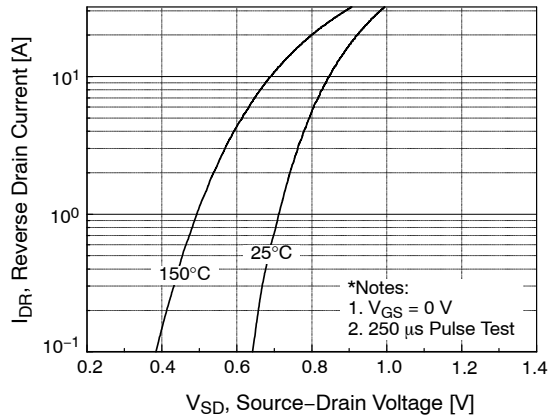


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

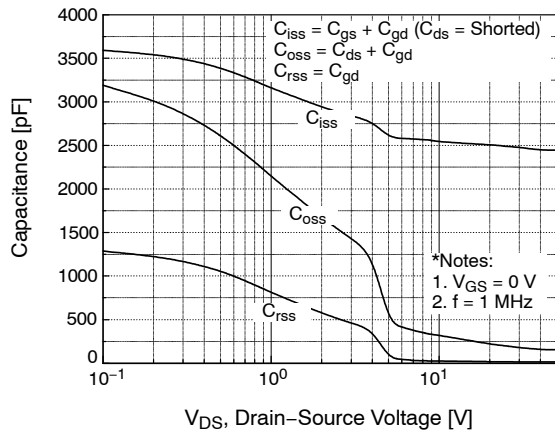


Figure 5. Capacitance Characteristics

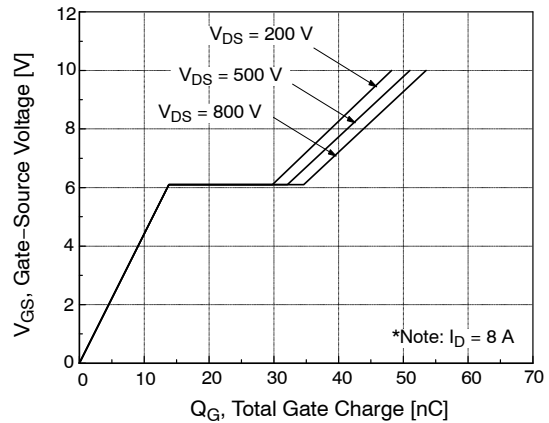


Figure 6. Gate Charge Characteristics

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

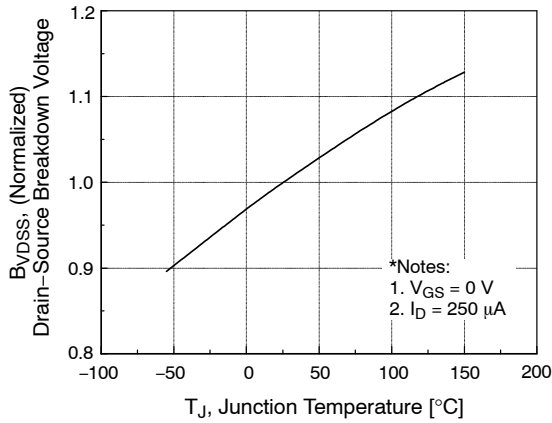


Figure 7. Breakdown Voltage Variation vs. Temperature

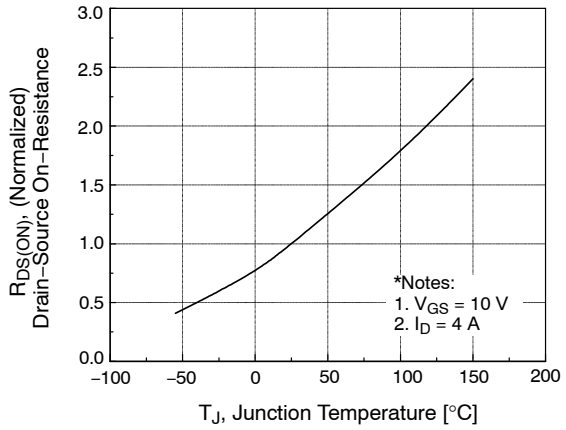


Figure 8. On-Resistance Variation vs. Temperature

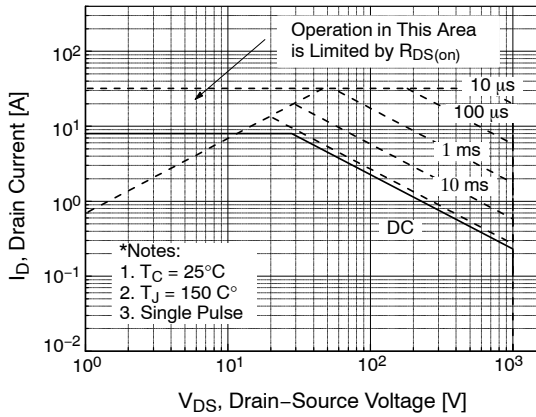


Figure 9. Maximum Safe Operating Area

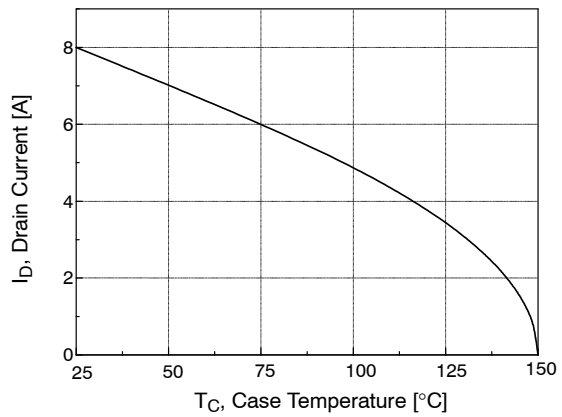


Figure 10. Maximum Drain Current vs. Case Temperature

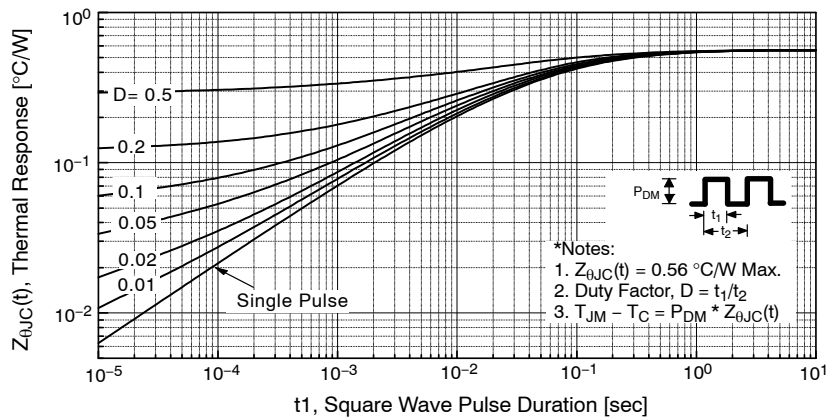


Figure 11. Transient Thermal Response Curve

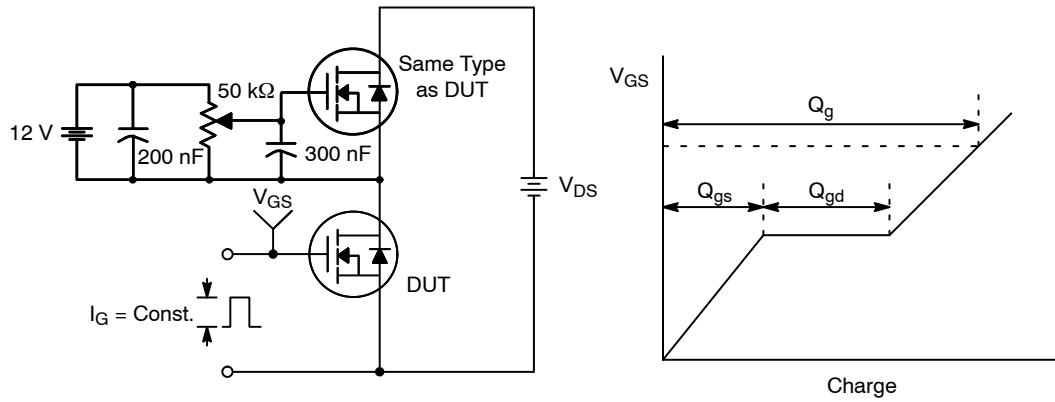


Figure 12. Gate Charge Test Circuit & Waveform

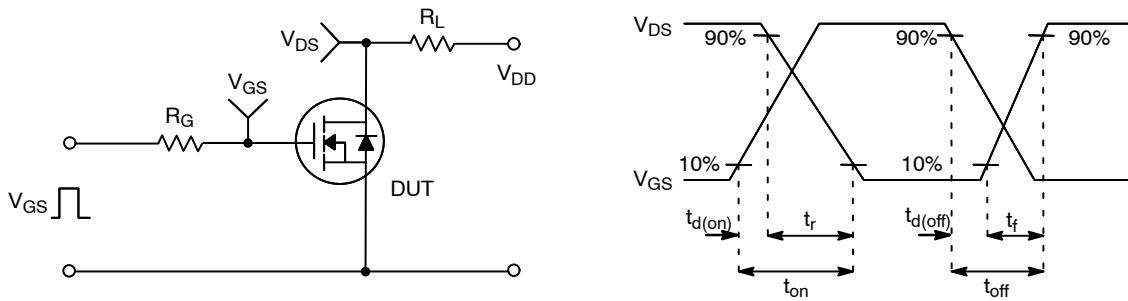


Figure 13. Resistive Switching Test Circuit & Waveforms

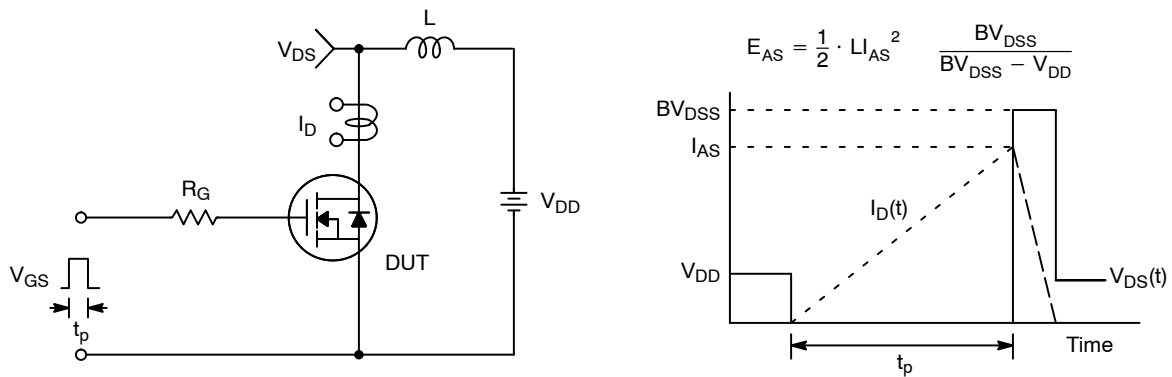
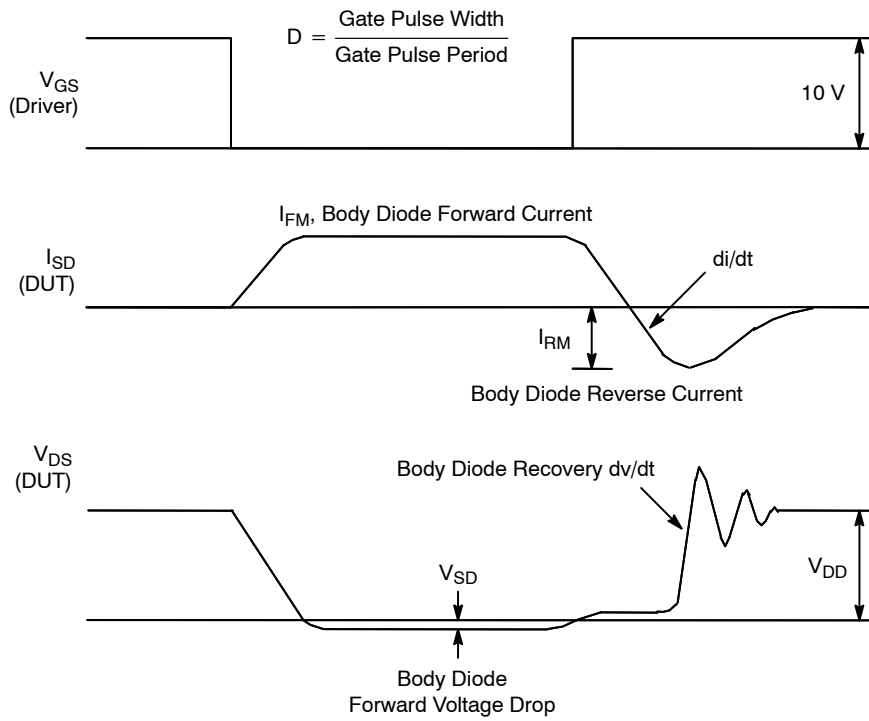
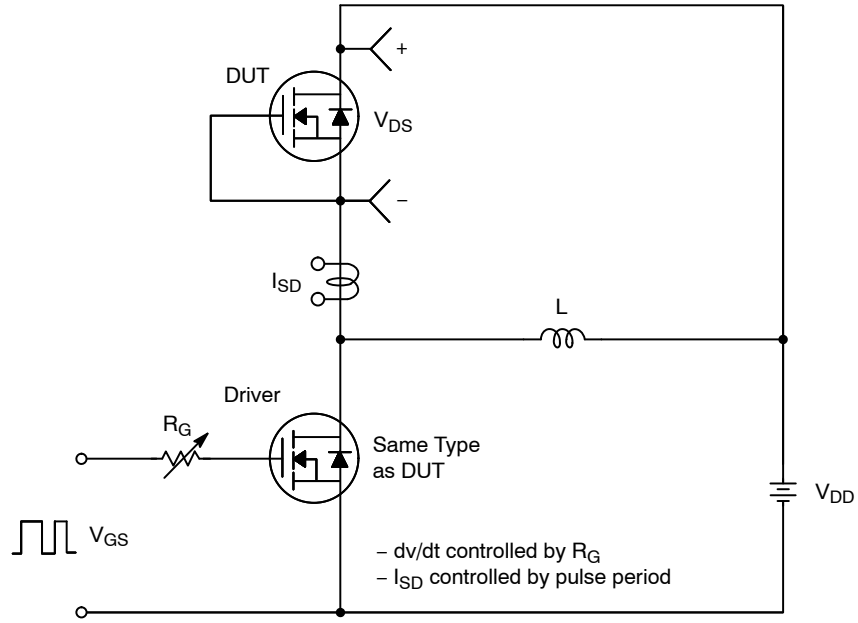


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

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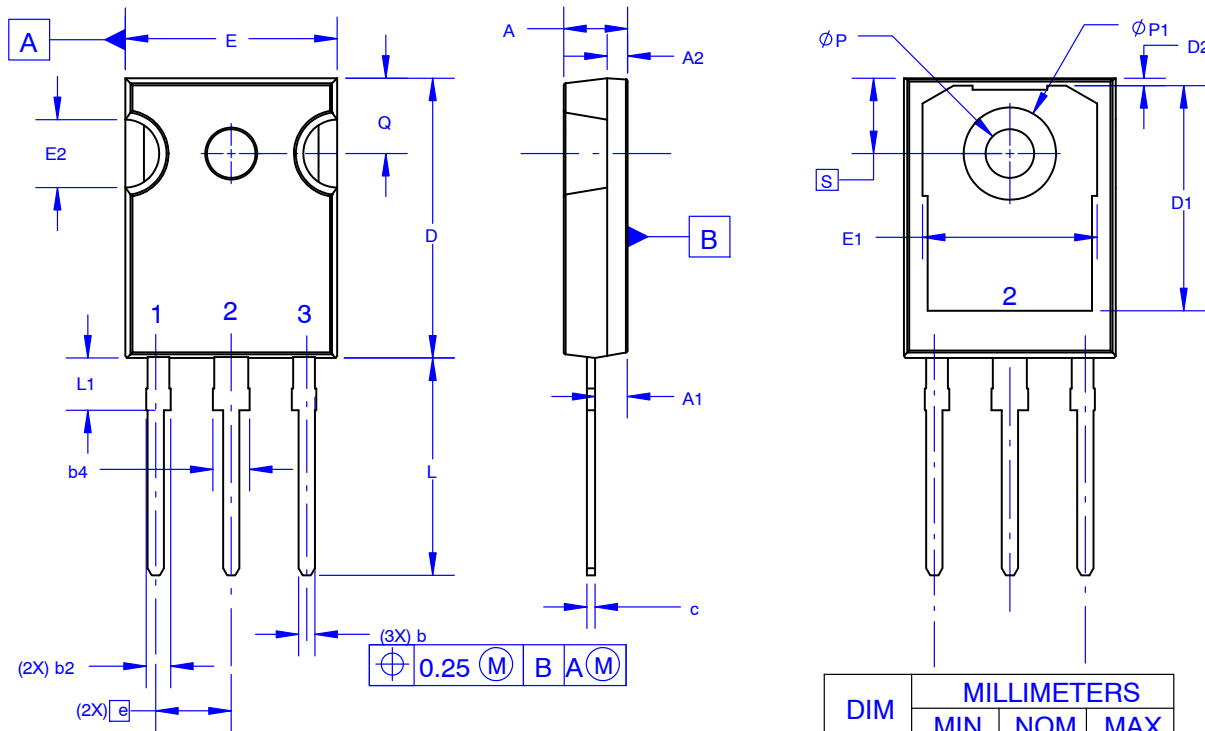


**Figure 15. Peak Diode Recovery  $dv/dt$  Test Circuit & Waveforms**

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**TO-247-3LD SHORT LEAD  
CASE 340CK  
ISSUE A**

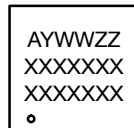
DATE 31 JAN 2019



NOTES: UNLESS OTHERWISE SPECIFIED.

- A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
- D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
- E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

**GENERIC  
MARKING DIAGRAM\***



- XXXX = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- ZZ = Assembly Lot Code

\*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.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	5.56	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
∅P	3.51	3.58	3.65
∅P1	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

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