

FQH8N100C

1000V N-Channel MOSFET

Features

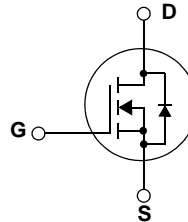
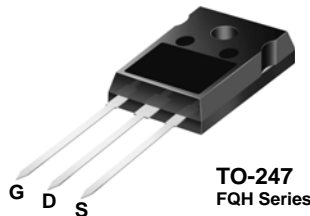
- 8A, 1000V, $R_{DS(on)} = 1.45\Omega @ V_{GS} = 10V$
- Low gate charge (typical 53nC)
- Low C_{rss} (typical 16pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant



Description

These N-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, planar stripe, DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficient switched mode power supplies, active power factor correction, electronic lamp ballast based on half bridge topology.



Absolute Maximum Ratings

Symbol	Parameter	FQH8N100C	Units
V_{DSS}	Drain-Source Voltage	1000	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	8.0	A
		5.0	A
I_{DM}	Drain Current - Pulsed (Note 1)	32	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	850	mJ
I_{AR}	Avalanche Current (Note 1)	8.0	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	22	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.0	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	225	W
	- Derate above 25°C	1.79	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	0.56	$^\circ\text{C}/\text{W}$
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	0.24	--	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	40	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FQH8N100C	FQH8N100C	TO-247	--	--	30

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	1000	--	--	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C	--	1.4	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 1000 V, V _{GS} = 0 V	--	--	10	μA
		V _{DS} = 800 V, T _C = 125°C	--	--	100	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	3.0	--	5.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 4.0A	--	1.2	1.45	Ω
g _{FS}	Forward Transconductance	V _{DS} = 50 V, I _D = 4.0 A (Note 4)	--	8.0	--	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	2475	3220	pF
C _{oss}	Output Capacitance		--	195	255	pF
C _{rss}	Reverse Transfer Capacitance		--	16	21	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 500 V, I _D = 8.0A, R _G = 25 Ω (Note 4, 5)	--	50	110	ns
t _r	Turn-On Rise Time		--	95	200	ns
t _{d(off)}	Turn-Off Delay Time		--	122	254	ns
t _f	Turn-Off Fall Time		--	80	170	ns
Q _g	Total Gate Charge	V _{DS} = 800 V, I _D = 8.0A, V _{GS} = 10 V (Note 4, 5)	--	53	70	nC
Q _{gs}	Gate-Source Charge		--	13	--	nC
Q _{gd}	Gate-Drain Charge		--	23	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	8.0	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	32.0	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 8.0 A	--	--	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 8.0 A, dI _F / dt = 100 A/μs (Note 4)	--	620	--	ns
Q _{rr}	Reverse Recovery Charge		--	5.2	--	μC

NOTES:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 25mH, I_{AS} = 8.0A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ 8.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. On-Region Characteristics

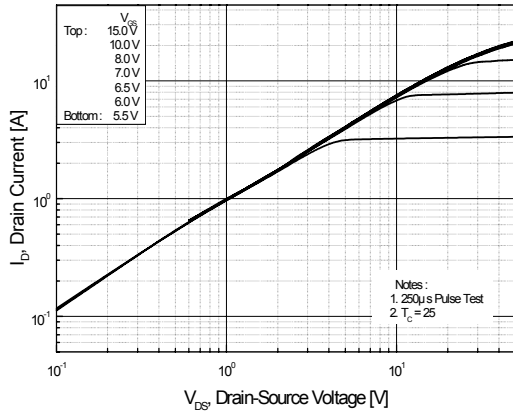


Figure 2. Transfer Characteristics

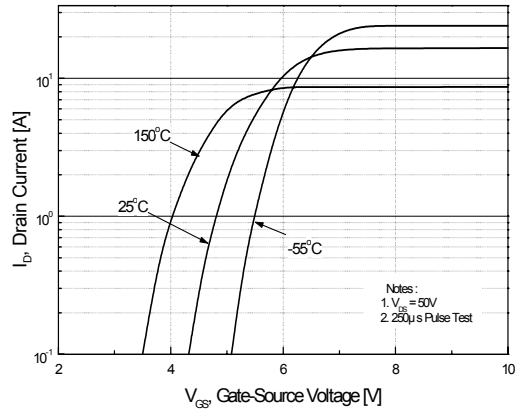


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

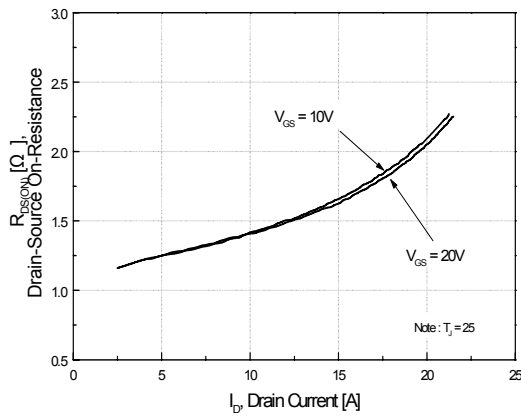


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

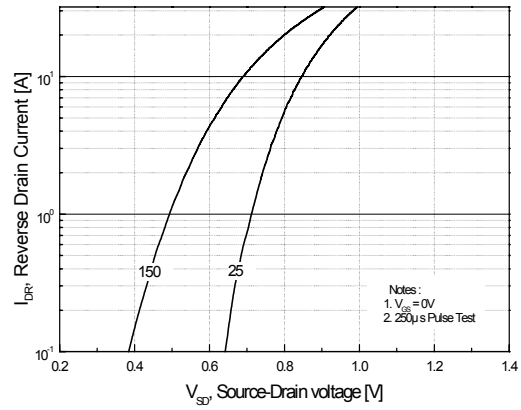


Figure 5. Capacitance Characteristics

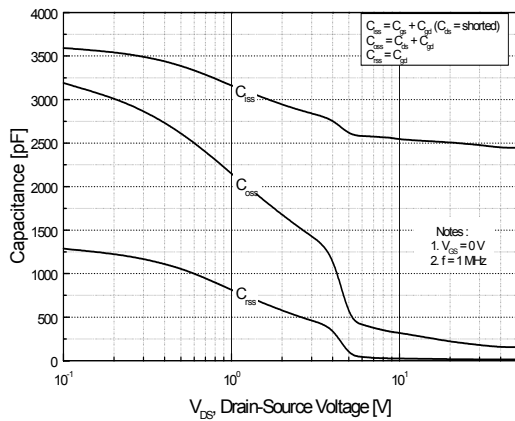
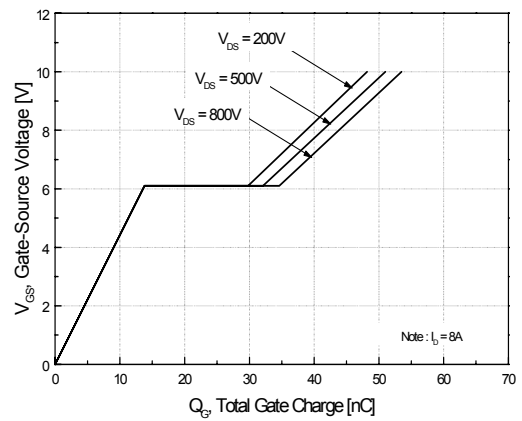


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

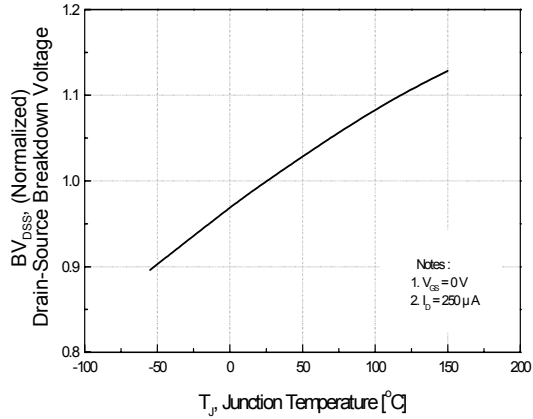


Figure 8. On-Resistance Variation vs. Temperature

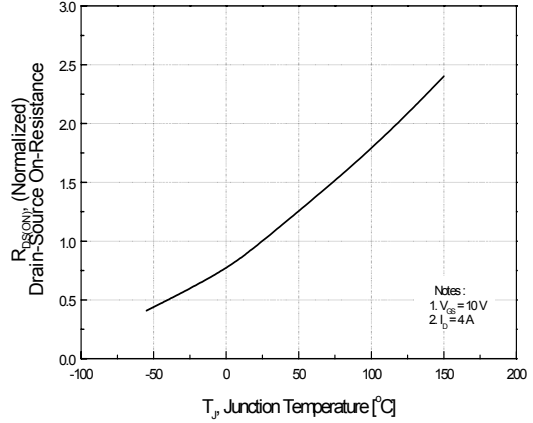


Figure 9. Maximum Safe Operating Area

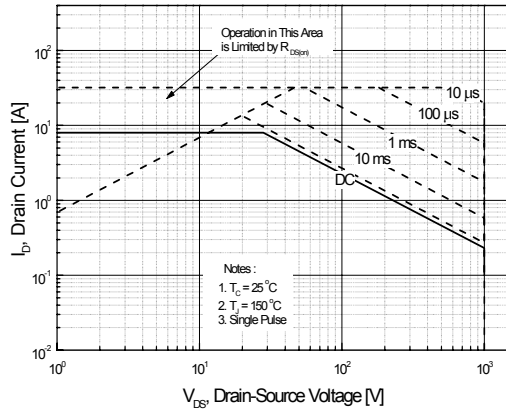


Figure 10. Maximum Drain Current vs. Case Temperature

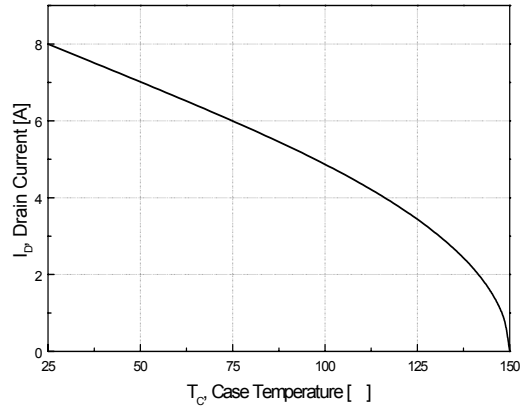
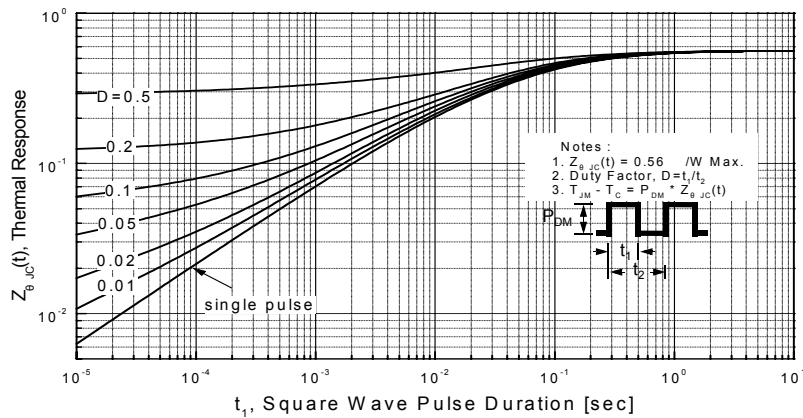
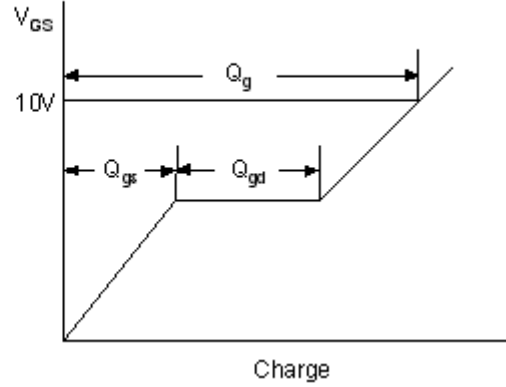
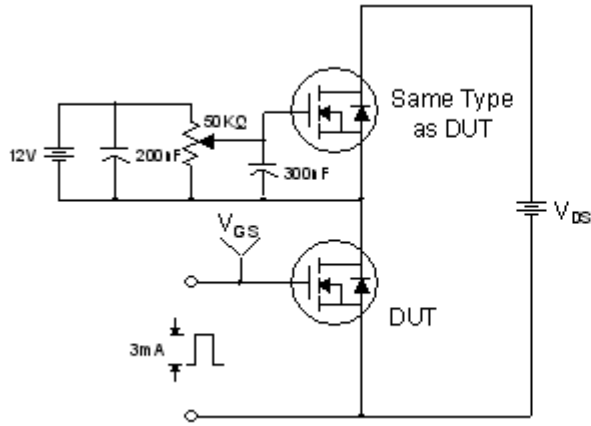


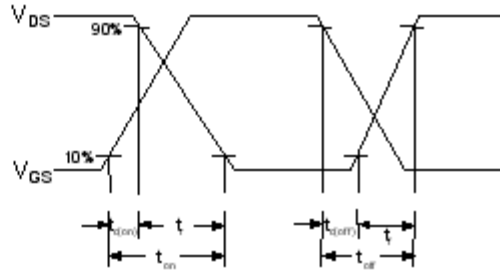
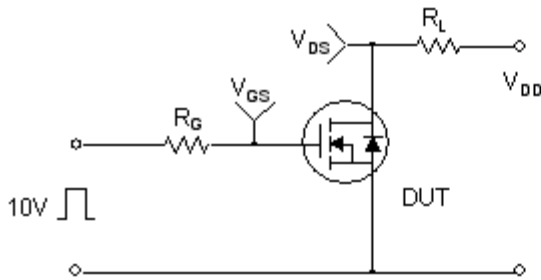
Figure 11. Transient Thermal Response Curve



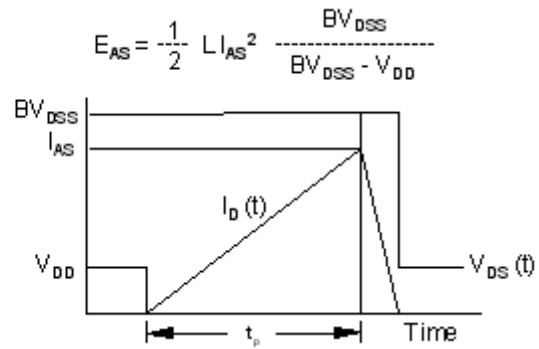
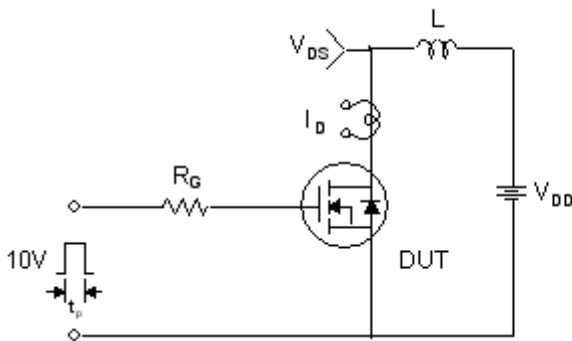
Gate Charge Test Circuit & Waveform



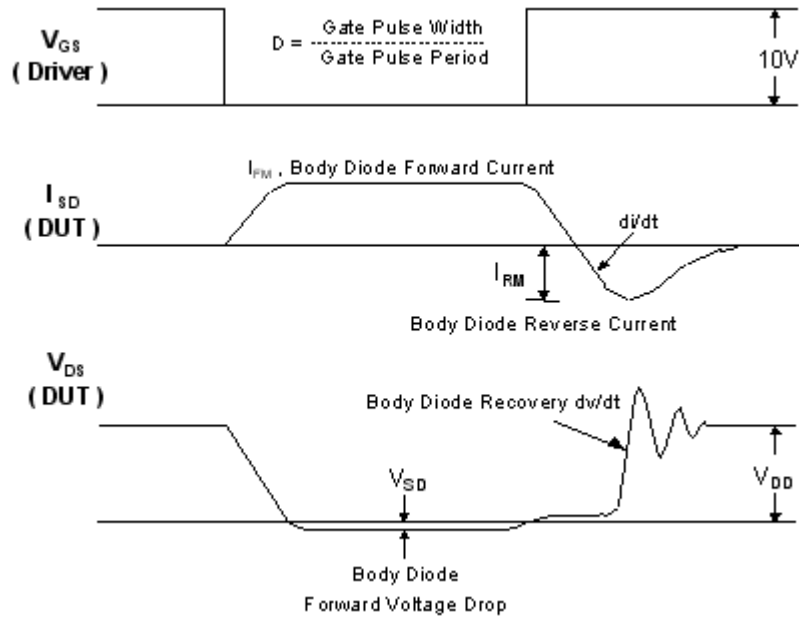
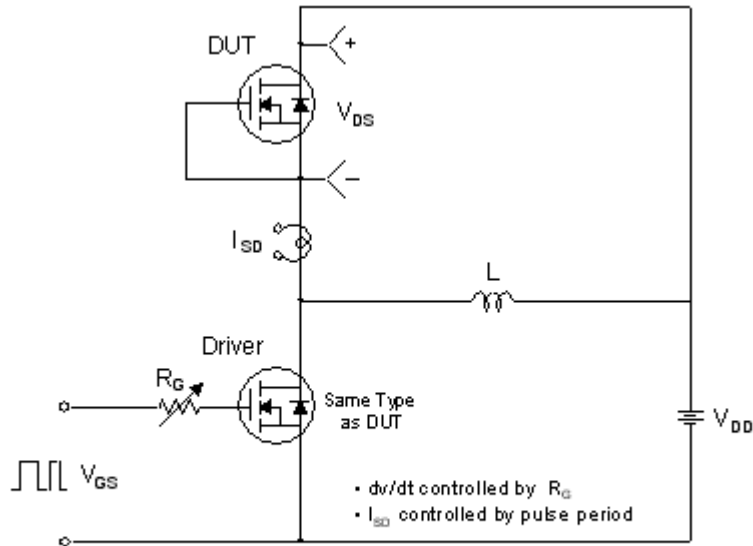
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

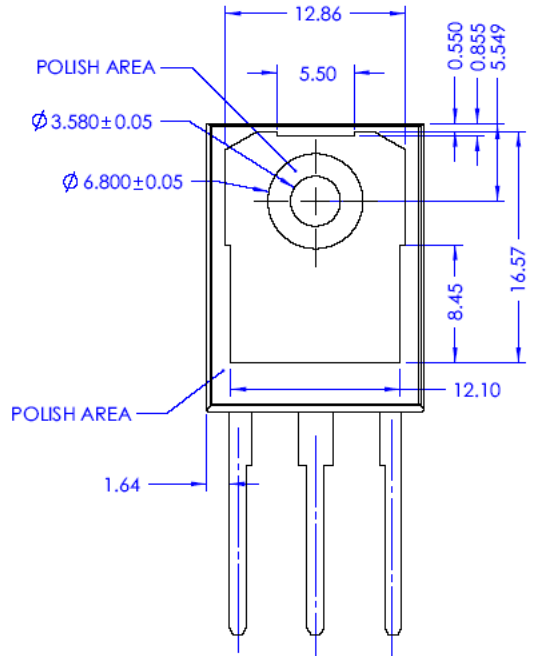
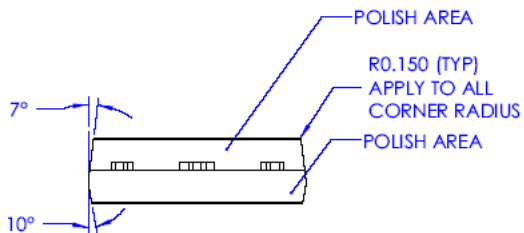
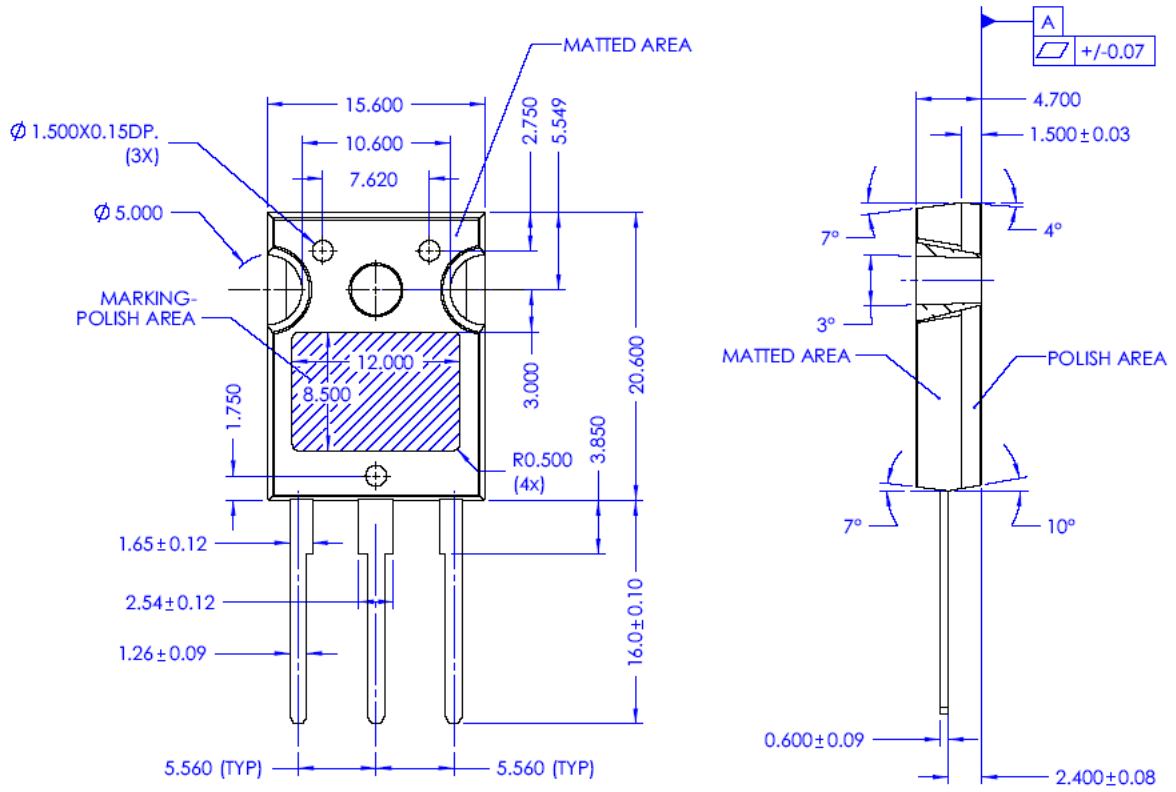


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimensions

TO-247AB



NOTES:
 MOLDED BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH.
 MOLD FLASH SHALL NOT EXCEED 0.025MM PER SIDE.
 THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.





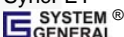
TO247AB 3L REV.A1

Dimensions in Millimeters



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No Identification Needed	Full Production	This 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	This datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I34