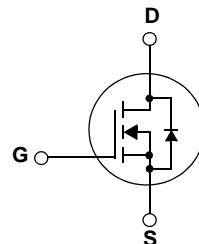
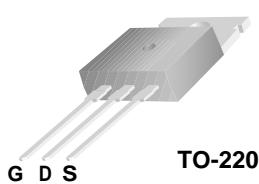


FDP80N06 N-Channel MOSFET 60V, 80A, 10mΩ

Features

- $R_{DS(on)} = 8.5\text{m}\Omega$ (Typ.) @ $V_{GS} = 10\text{V}$, $I_D = 40\text{A}$
- Low gate charge (Typ. 57nC)
- Low C_{rss} (Typ. 145pF)
- Fast switching
- 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.

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

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain to Source Voltage		60	V
V_{GSS}	Gate to Source Voltage		± 20	V
I_D	Drain Current	-Continuous ($T_C = 25^\circ\text{C}$)	80	A
		-Continuous ($T_C = 100^\circ\text{C}$)	65	
I_{DM}	Drain Current	- Pulsed	(Note 1)	A
E_{AS}	Single Pulsed Avalanche Energy		(Note 2)	mJ
I_{AR}	Avalanche Current		(Note 1)	A
E_{AR}	Repetitive Avalanche Energy		(Note 1)	mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	V/ns
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	176	W
		- Derate above 25°C	1.17	W/ $^\circ\text{C}$
T_J , T_{STG}	Operating and Storage Temperature Range		-55 to +175	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds		300	$^\circ\text{C}$

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.85	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	

Package Marking and Ordering Information $T_C = 25^\circ\text{C}$ unless otherwise noted

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDP80N06	FDP80N06	TO-220	-	-	50

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$	60	-	-	V
$\Delta \text{BV}_{\text{DSS}} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu\text{A}, \text{Referenced to } 25^\circ\text{C}$	-	0.075	-	$^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$	-	-	1	μA
		$V_{DS} = 48\text{V}, T_C = 150^\circ\text{C}$	-	-	10	
I_{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	-	-	± 100	nA

On Characteristics

$\text{V}_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2.0	--	4.0	V
$\text{R}_{\text{DS(on)}}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{V}, I_D = 40\text{A}$	-	8.5	10	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 25\text{V}, I_D = 40\text{A}$ (Note 4)	-	67	-	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	2450	3190	pF
C_{oss}	Output Capacitance		-	910	1190	pF
C_{rss}	Reverse Transfer Capacitance		-	145	190	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 30\text{V}, I_D = 80\text{A}$ $R_G = 25\Omega$	-	32	75	ns
t_r	Turn-On Rise Time		-	259	528	ns
$t_{d(off)}$	Turn-Off Delay Time		-	136	282	ns
t_f	Turn-Off Fall Time		-	113	236	ns
$Q_{g(\text{tot})}$	Total Gate Charge at 10V	$V_{DS} = 48\text{V}, I_D = 80\text{A}$ $V_{GS} = 10\text{V}$	-	57	74	nC
	Gate to Source Gate Charge		-	15	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	24	-	nC

Drain-Source Diode Characteristics

I_S	Maximum Continuous Drain to Source Diode Forward Current	-	-	80	A	
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current	-	-	320	A	
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_{SD} = 80\text{A}$	-	-	1.4	
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{V}, I_{SD} = 80\text{A}$	-	64	ns	
Q_{rr}	Reverse Recovery Charge	$dl_F/dt = 100\text{A}/\mu\text{s}$	(Note 4)	-	127	nC

Notes:

- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2: $L = 0.15\text{mH}, I_{AS} = 80\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- 3: $I_{SD} \leq 80\text{A}, dV/dt \leq 200\text{V}/\mu\text{s}, V_{DD} \leq \text{BV}_{\text{DSS}}$, Starting $T_J = 25^\circ\text{C}$
- 4: Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- 5: Essentially Independent of Operating Temperature Typical Characteristics

Typical Performance Characteristics

Figure 1. On-Region Characteristics

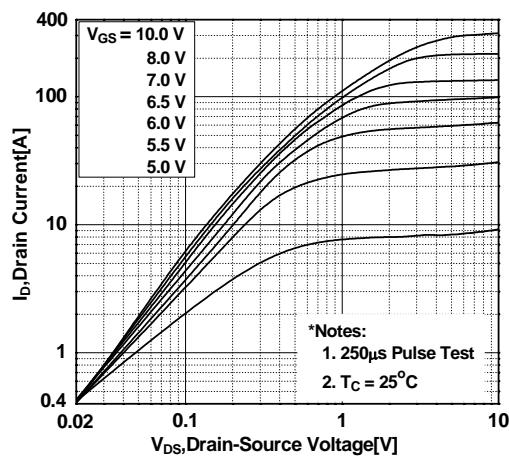


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

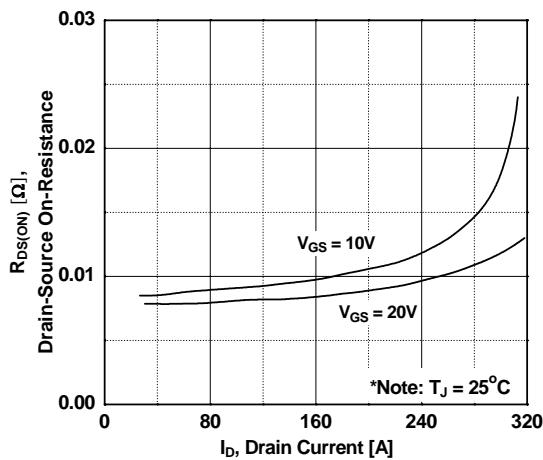


Figure 5. Capacitance Characteristics

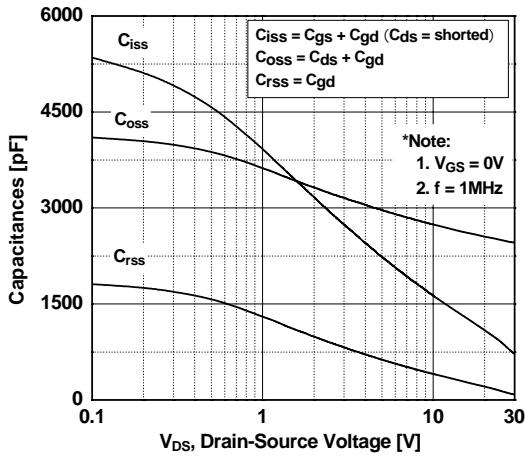


Figure 2. Transfer Characteristics

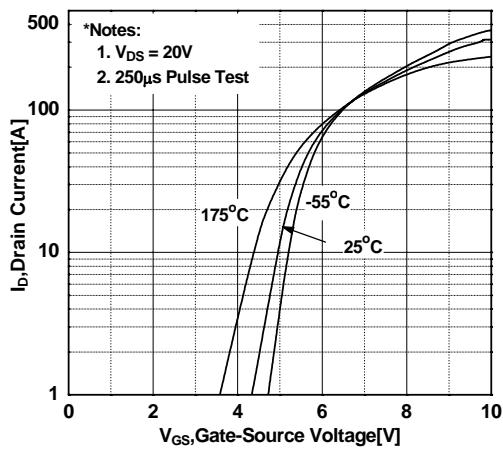


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

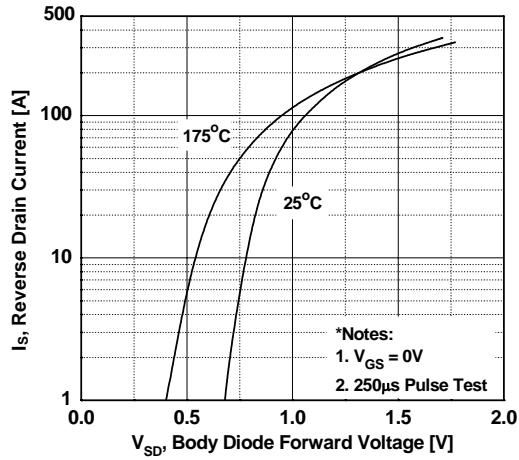
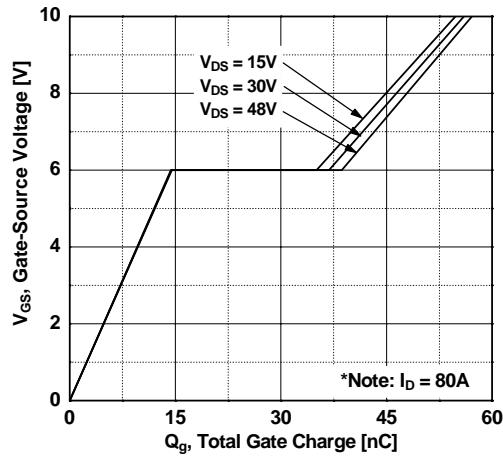


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

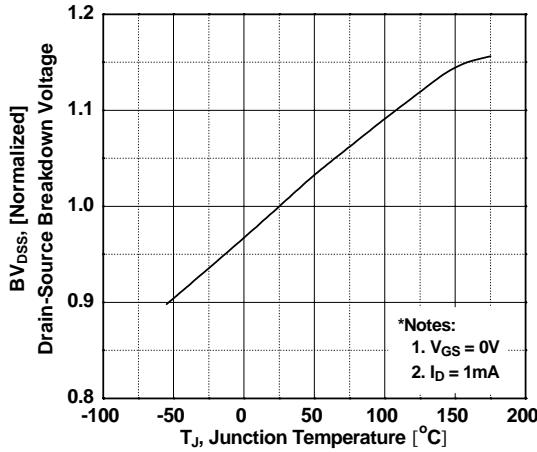


Figure 8. On-Resistance Variation vs. Temperature

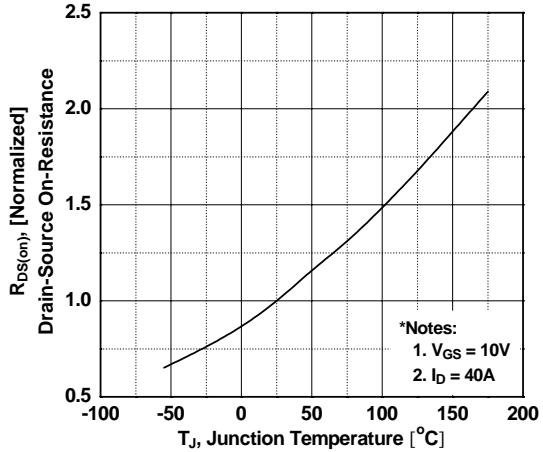


Figure 9. Maximum Safe Operating Area

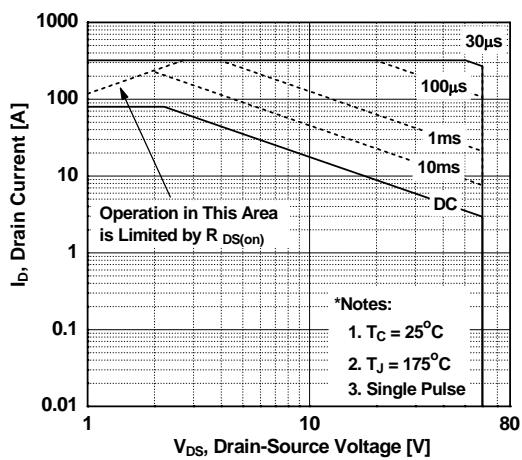


Figure 10. Maximum Drain Current vs. Case Temperature

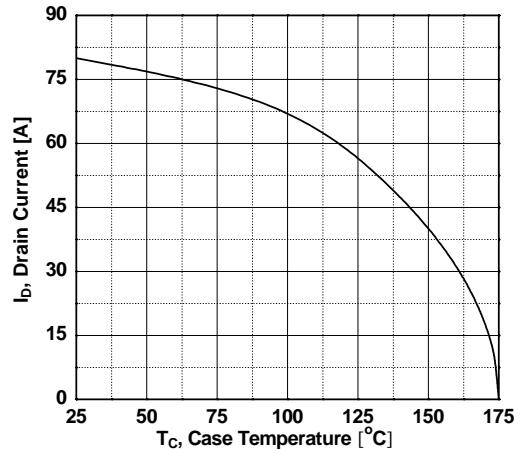
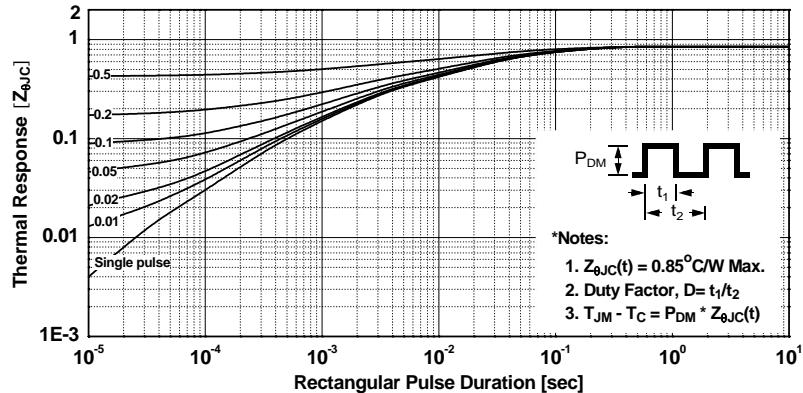
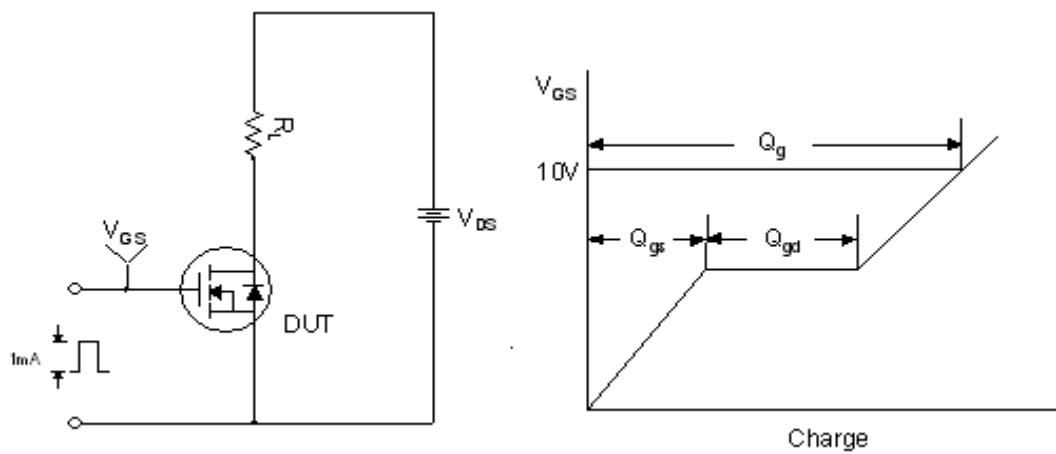


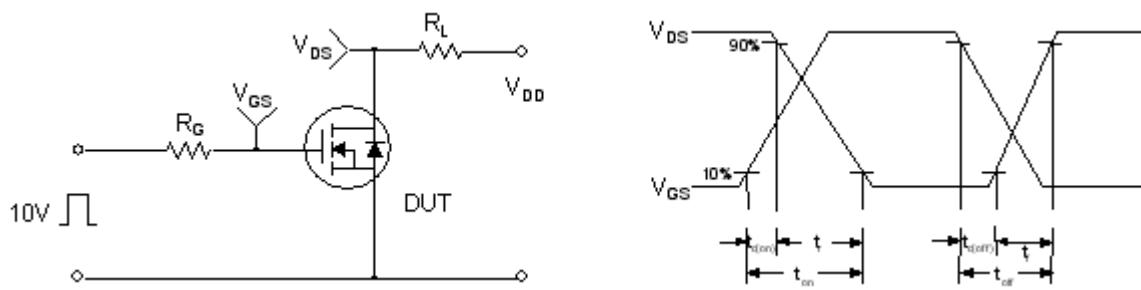
Figure 11. Transient Thermal Response Curve



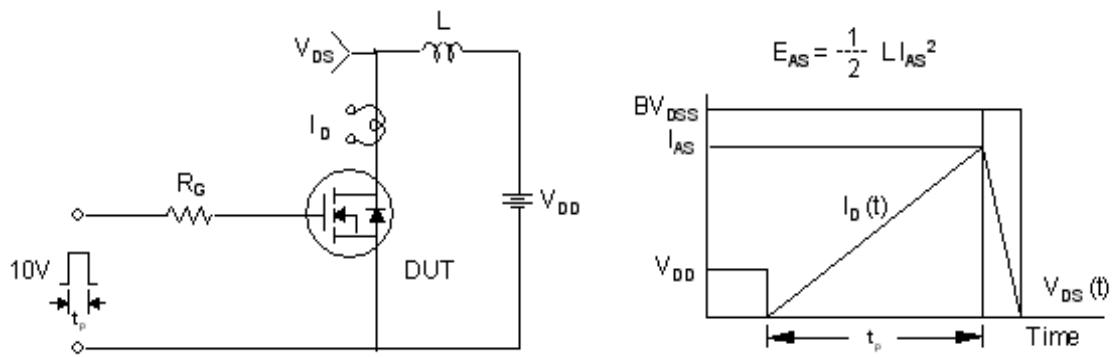
Gate Charge Test Circuit & Waveform



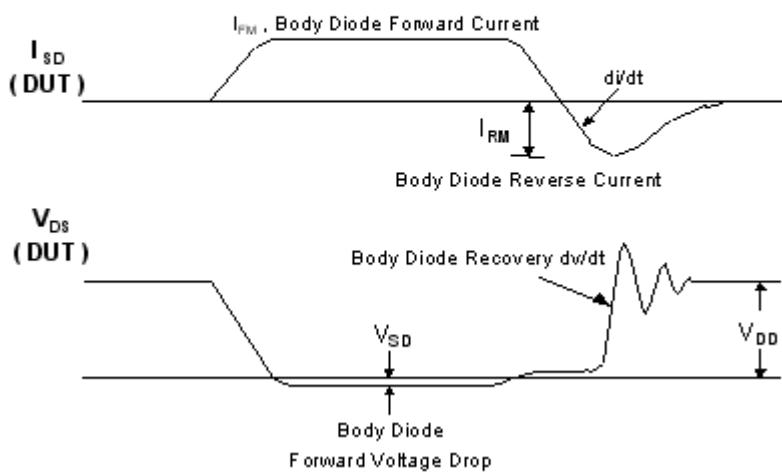
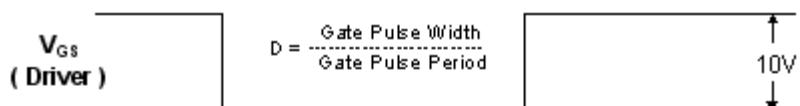
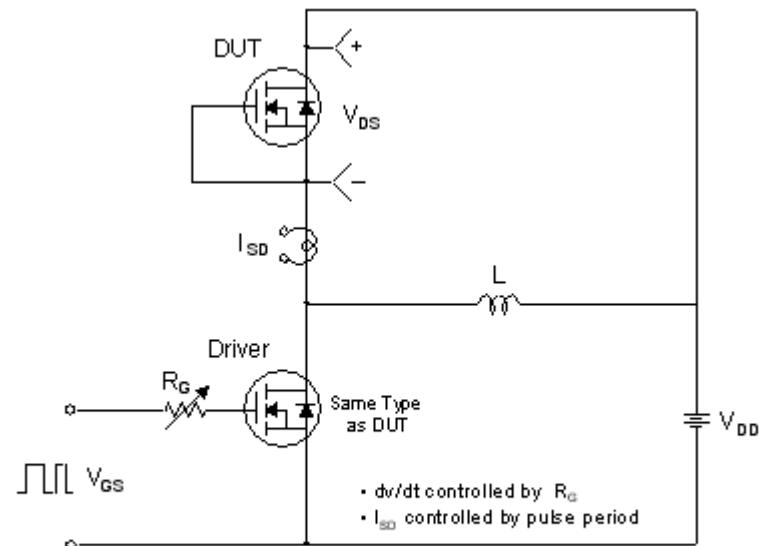
Resistive Switching Test Circuit & Waveforms

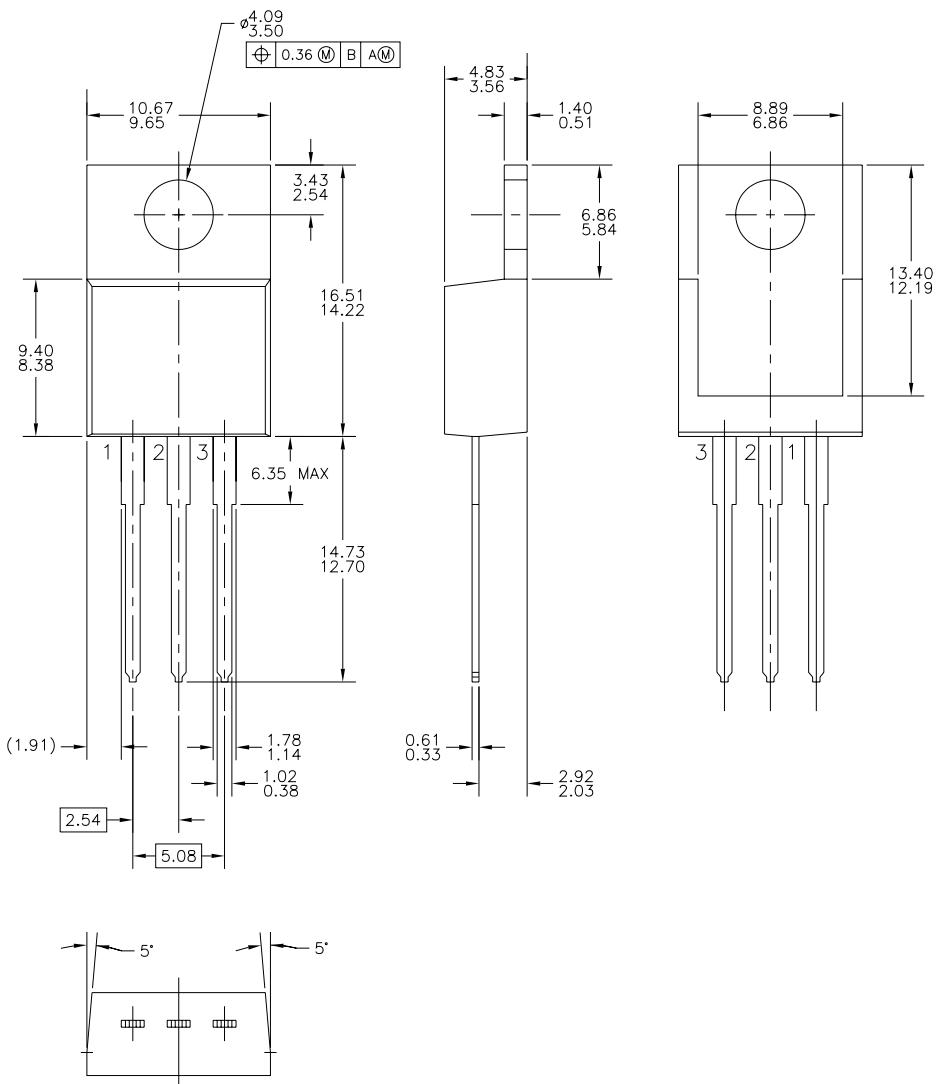


Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions**TO-220**

Dimensions in Millimeters


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