

FDP2614

N-Channel PowerTrench® MOSFET

200 V, 62 A, 27 mΩ

Features

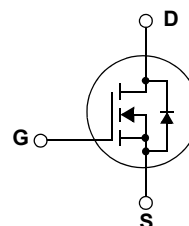
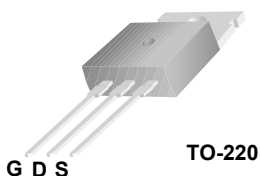
- $R_{DS(on)} = 22.9 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 31 \text{ A}$
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench® process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Applications

- Consumer Appliances
- Synchronous Rectification
- Battery Protection Circuit
- Motor Drives and Uninterruptible Power Supplies



Absolute Maximum Ratings

Symbol	Parameter	FDP2614	Unit
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	62 39.3	A A
I_{DM}	Drain Current - Pulsed (Note 1)	see Figure 9	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	145	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$) - Derate above 25°C	260 2.1	W W/°C
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	°C

Thermal Characteristics

Symbol	Parameter	FDP2614	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	0.48	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDP2614	FDP2614	TO-220	-	-	50

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
Off Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$	200	--	--	V	
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$, Referenced to 25°C	--	0.2	--	V/°C	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200V, V_{GS} = 0V$ $V_{DS} = 200V, V_{GS} = 0V, T_J = 125^\circ C$	--	--	10 500	μA μA	
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30V, V_{DS} = 0V$	--	--	100	nA	
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30V, V_{DS} = 0V$	--	--	-100	nA	
On Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	4.0	5.0	V	
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 31A$	--	22.9	27	m Ω	
g_{FS}	Forward Transconductance	$V_{DS} = 10V, I_D = 31A$	--	72	--	S	
Dynamic Characteristics							
C_{iss}	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V$ $f = 1.0MHz$	--	5435	7230	pF	
C_{oss}	Output Capacitance		--	505	675	pF	
C_{rss}	Reverse Transfer Capacitance		--	110	165	pF	
Switching Characteristics							
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 100V, I_D = 62A$ $V_{GS} = 10V, R_{GEN} = 25\Omega$	--	77	165	ns	
t_r	Turn-On Rise Time		--	284	560	ns	
$t_{d(off)}$	Turn-Off Delay Time		(Note 4)	--	103	220	ns
t_f	Turn-Off Fall Time		(Note 4)	--	162	335	ns
Q_g	Total Gate Charge	$V_{DS} = 100V, I_D = 62A$ $V_{GS} = 10V$	--	76	99	nC	
Q_{gs}	Gate-Source Charge		(Note 4)	--	35	--	nC
Q_{gd}	Gate-Drain Charge		(Note 4)	--	18	--	nC
Drain-Source Diode Characteristics and Maximum Ratings							
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	62	A	
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	186	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 62A$	--	--	1.2	V	
t_{rr}	Reverse Recovery Time	$V_{GS} = 0V, I_S = 62A$	--	145	--	ns	
Q_{rr}	Reverse Recovery Charge	$di_f/dt = 100A/\mu s$	--	0.81	--	μC	

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 1mH, I_{AS} = 17A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C
3. I_{SD} \leq 62A, di/dt \leq 100A/ μs , V_{DD} \leq BV_{DSS}, Starting T_J = 25°C
4. Essentially Independent of Operating Temperature Typical Characteristics

Figure 1. On-Region Characteristics

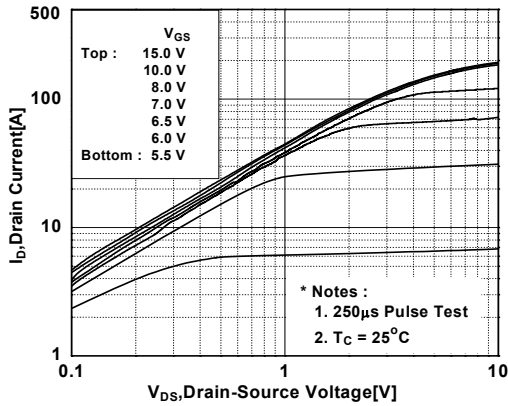


Figure 2. Transfer Characteristics

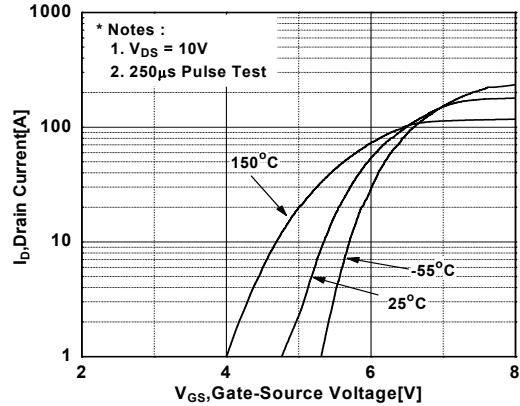


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

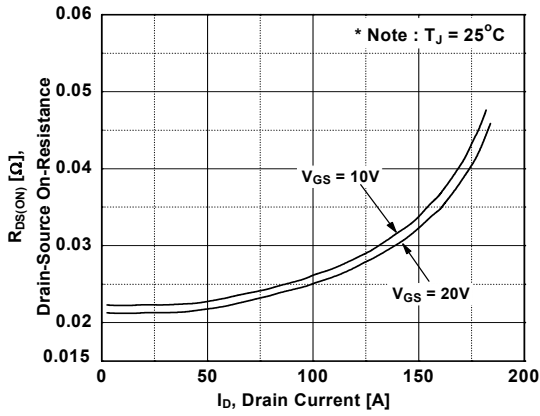


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

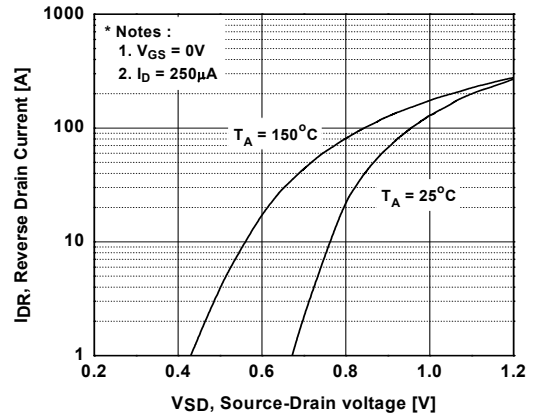


Figure 5. Capacitance Characteristics

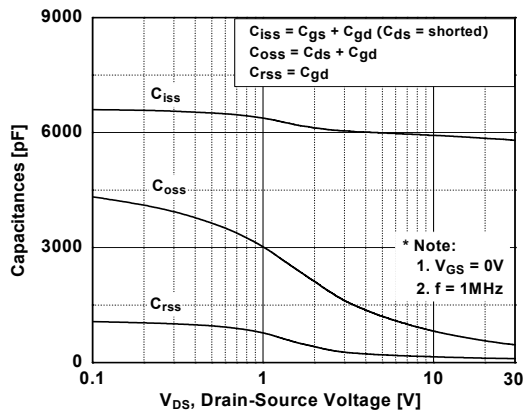


Figure 6. Gate Charge Characteristics

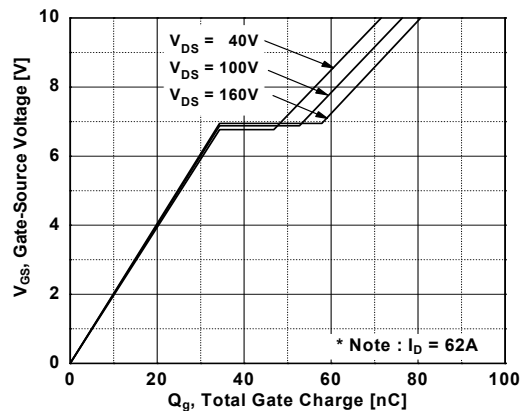


Figure 7. Breakdown Voltage Variation vs. Temperature

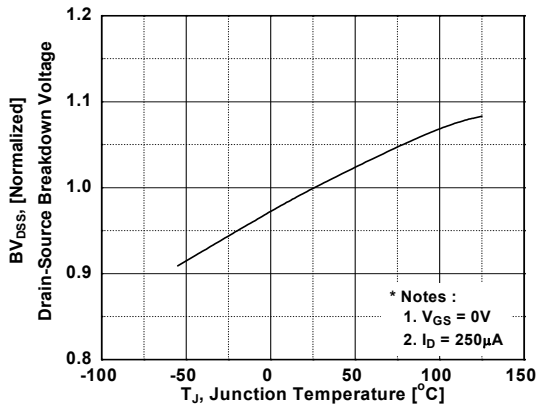


Figure 8. On-Resistance Variation vs. Temperature

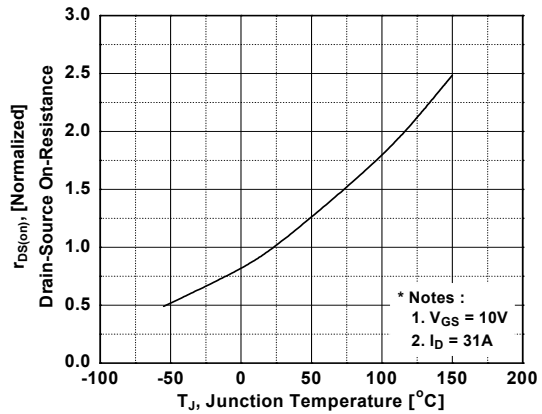


Figure 9. Maximum Safe Operating Area

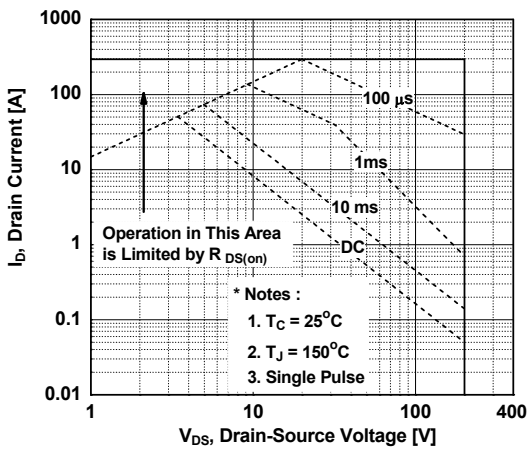


Figure 10. Maximum Drain Current vs. Case Temperature

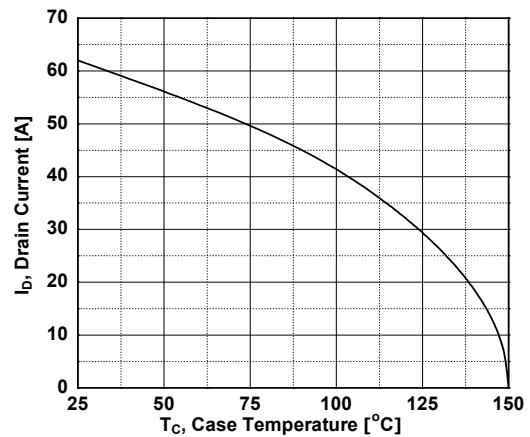
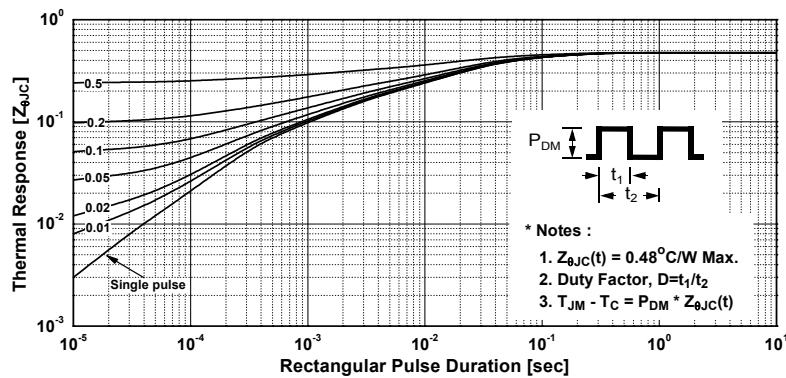
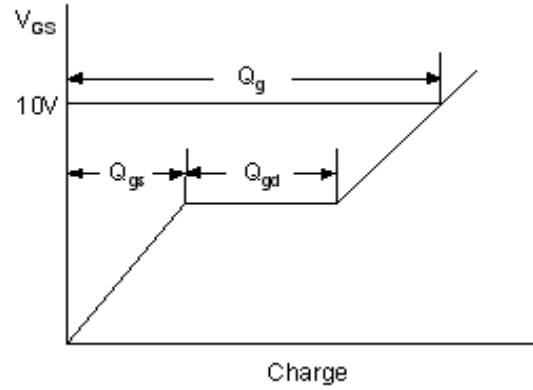
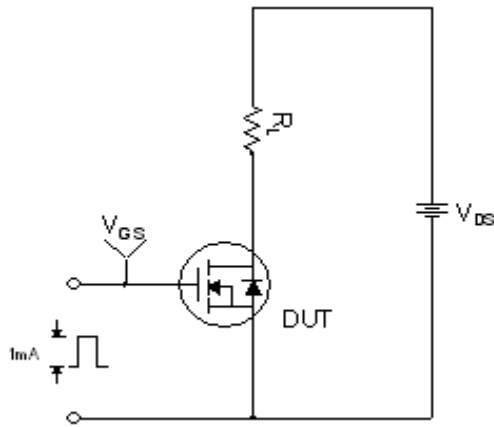


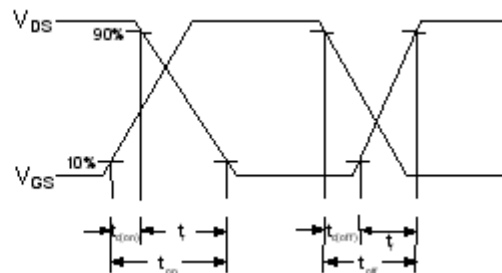
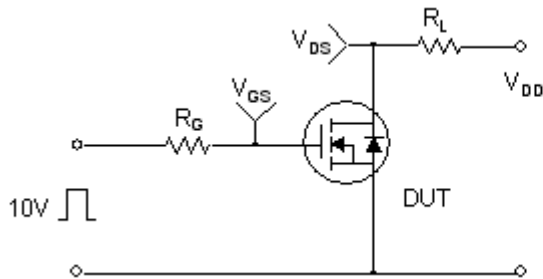
Figure 11. Transient Thermal Response Curve



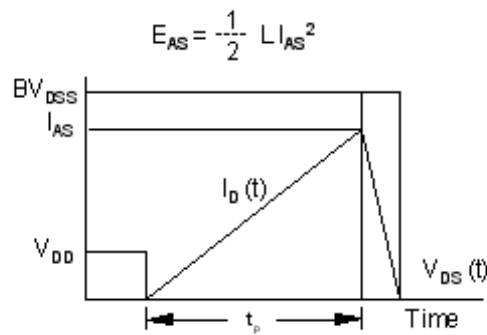
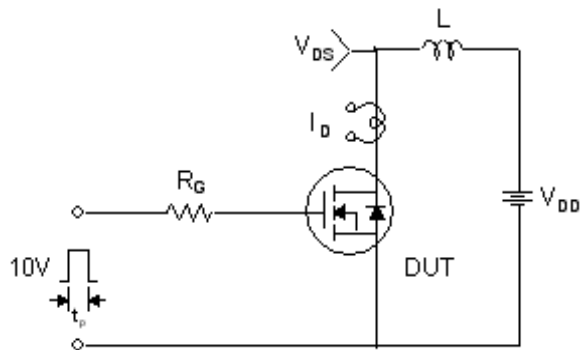
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

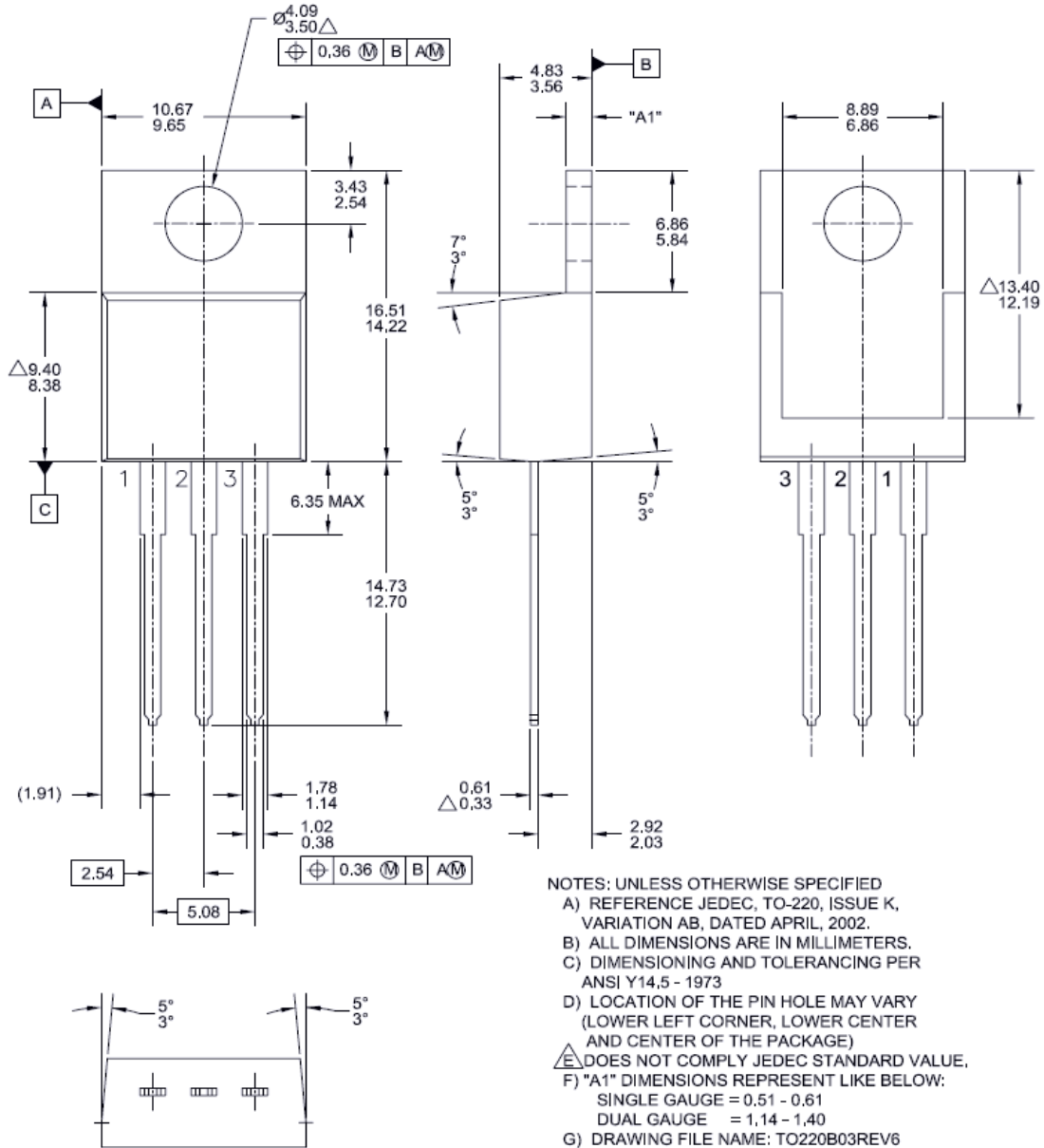


Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions

TO-220B03





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