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November 2013

FDT1600N10ALZ N-Channel PowerTrench[®] MOSFET 100 V, 5.6 A, 160 m Ω

Features

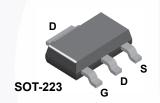
- $R_{DS(on)}$ = 121 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 2.8 A
- $R_{DS(on)}$ = 156 m Ω (Typ.) @ V_{GS} = 5 V, I_D = 1.8 A
- Low Gate Charge (Typ. 2.9 nC)
- Low C_{rss} (Typ. 2.04 pF)
- Fast Switching
- 100% Avalanche Tested
- · Improved dv/dt Capability
- RoHS Compliant

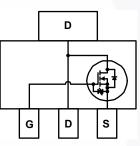
Description

This N-Channel MOSFET is produced using Fairchld Semiconductor's advanced PowerTrench[®] process that has been tailored to minimize the on-state resistance and maintain superior switching performance.

Application

- Consumer Appliances
- LED TV and Monitor
- Synchronous Rectification
- Uninterruptible Power Supply
- Micro Solar Inverter





MOSFET Maximum Ratings T_C = 25 °C unless otherwise noted.

Symbol		Parameter		FDT1600N10ALZ	Unit
V _{DSS}	Drain to Source Voltage			100	V
V _{GSS}	Gate to Source Voltage			±20	V
	Drain Current	- Continuous (T _C = 25 °C)		5.6	^
I _D Drain Current		- Continuous (T _C = 100 °C)	- Continuous (T _C = 100 °C)		- A
I _{DM}	Drain Current	- Pulsed	(Note 2)	11.2	А
E _{AS}	Single Pulse Avalanche Energy (Note 3)		9.2	mJ	
dv/dt	Peak Diode Recovery dv/dt		(Note 4)	6.0	V/ns
		(T _C = 25 °C)	(T _C = 25 °C)		W
P _D Power Dissipation	Power Dissipation	- Derate Above 25 °C		0.083	°C
T _J , T _{STG}	Operating and Storage Junction Temperature Range		-55 to +150	°C	
TL	Maximum Lead Temperature	e for Soldering, 1/8" from Case for 5 Se	conds	300	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	(Note 1)	12	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	(Note 1a)	60	C/W

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FDT1600N10ALZ	16010ALZ	SOT-223	Tape and Reel	13"	12 mm	4000 units

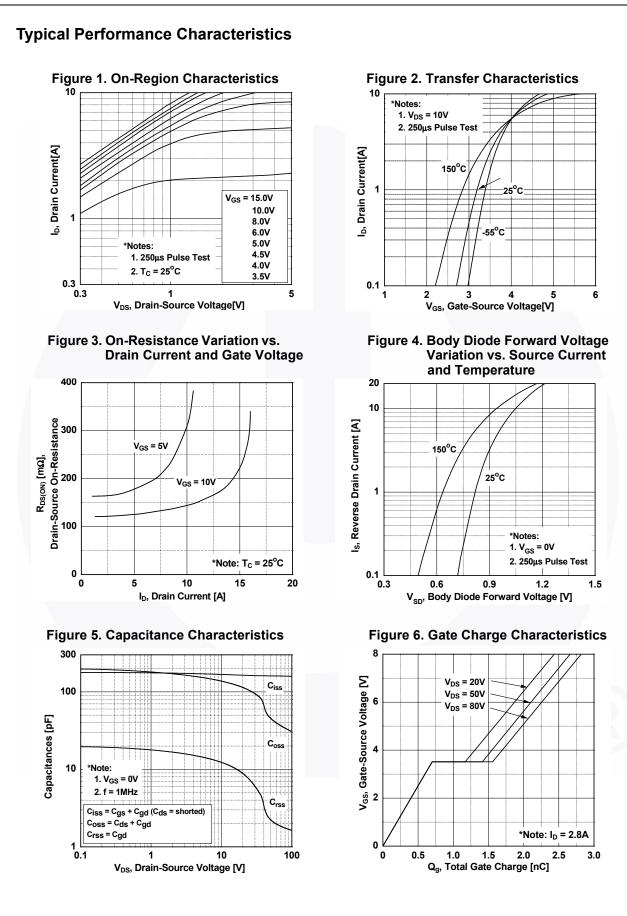
FDT1600N10/
0ALZ – N
N-Channel
PowerTrench [®]
[®] MOSFET

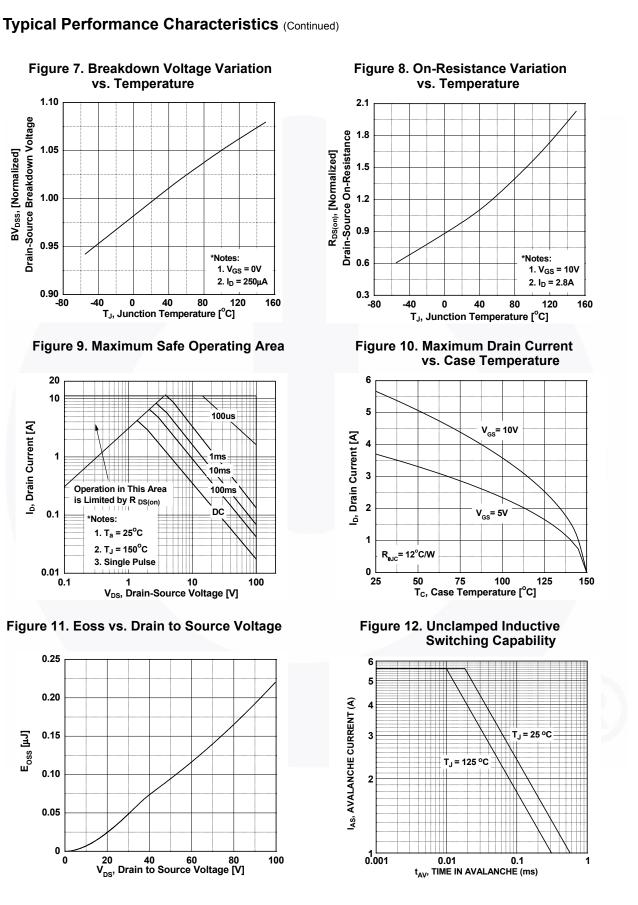
Symbol	Parameter	Test Conditions	Min	Тур	Max	Unit
Off Chara	cteristics					
BV _{DSS}	Drain to Source Breakdown Voltage	I _D = 250 μA, V _{GS} = 0 V	100	-	-	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu$ A, referenced to 25 °C	-	0.1	-	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80 V, V_{GS} = 0V$ $V_{DS} = 80 V, V_{GS} = 0V, T_{C} = 125 °C$	-	-	1 500	μA
I _{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	±10	μA
	cteristics					
	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 250 μA	1.4	-	2.8	V
V _{GS(th)}		$V_{GS} = V_{DS}, I_D = 2.00 \mu A$ $V_{GS} = 10 V, I_D = 2.8 A$	-	121	160	ν mΩ
R _{DS(on)}	Static Drain to Source On Resistance	$V_{GS} = 5 V, I_D = 1.8 A$	-	156	375	mΩ
9 _{FS}	Forward Transconductance	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 5.6 \text{ A}$	-	26.1	-	S
						0
-	Characteristics			100	005	
C _{iss}	Input Capacitance		-	169	225	pF
C _{oss}	Output Capacitance	f = 1 MHz	-	43	55	pF
C _{rss}	Reverse Transfer Capacitance		-	2.04	-	pF
C _{oss(er)}	Energy Related Output Capacitance	$V_{DS} = 50 \text{ V}, V_{GS} = 0 \text{ V}$	-	85	-	pF
Q _{g(tot)}	Total Gate Charge at 10V	V _{GS} = 10 V V _{DD} = 50 V,	-	2.9	3.77	nC
Q _{g(tot)}	Total Gate Charge at 5V	$V_{GS} = 5 V$ $I_D = 5.6 A$	-	1.6	2.08	nC
Q _{gs}	Gate to Source Gate Charge		-	0.7	-	nC
Q _{gd}	Gate to Drain "Miller" Charge		-	0.64	-	nC
V _{plateau}	Gate Plateau Volatge	(Note 5)	-	3.81	-	V
Q _{sync}	Total Gate Charge Sync.	V _{DS} = 0 V, I _D = 2.8 A	-	2.45	-	nC
Q _{oss}	Output Charge	V _{DS} = 50 V, V _{GS} = 0 V	-	5.2	-	nC
ESR	Equivalent Series Resistance(G-S)	f = 1 MHz	-	2.1	-	Ω
Switching	g Characteristics					
t _{d(on)}	Turn-On Delay Time		-	7.4	24.8	ns
t _r	Rise Time	V_{DD} = 50 V, I _D = 5.6 A, V _{GS} = 10 V, R _G = 4.7 Ω	-	2.5	15	ns
t _{d(off)}	Turn-Off Delay Time		1	13.5	37	ns
t _f	Turn-Off Fall Time	(Note 5)	/	2.4	14.8	ns
	urce Diode Characteristics	, ,			_	
		ode Forward Current		-	5.6	A
I _S	Maximum Continous Drain to Source Diode Forward Current		-	-	11.2	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current Source to Drain Diode Forward Voltage $V_{GS} = 0 V$, $I_{SD} = 5.6A$				1.3	V
V _{SD}	Reverse Recovery Time	$V_{GS} = 0 V, I_{SD} = 5.6A, V_{DD} = 50V,$	-	- 34.1	-	
$\frac{t_{rr}}{0}$	Reverse Recovery Charge	dl _F /dt = 100A/μs			-	ns
Q _{rr} NOTES:	Reverse Recovery Charge	0.p. 0. 100, 140	-	32.7	-	nC



2. Repetitive rating: pulse-width limited by maximum junction temperature. 3. Starting T_J = 25 °C, L = 3 mH, I_{AS} = 2.47 A. 4. I_{SD} \leq 5.6 A, di/dt \leq 200 A/µs, V_{DD} \leq BV_{DSS}, starting T_J = 25°C. 5. Essentially independent of operating temperature typical characteristics.







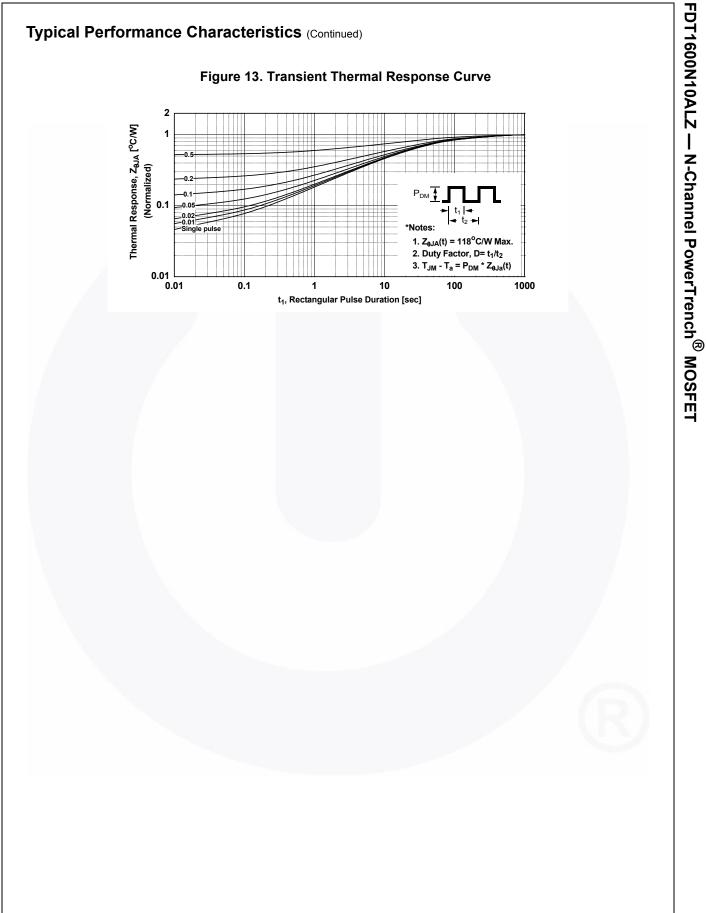
©2012 Fairchild Semiconductor Corporation FDT1600N10ALZ Rev. C2

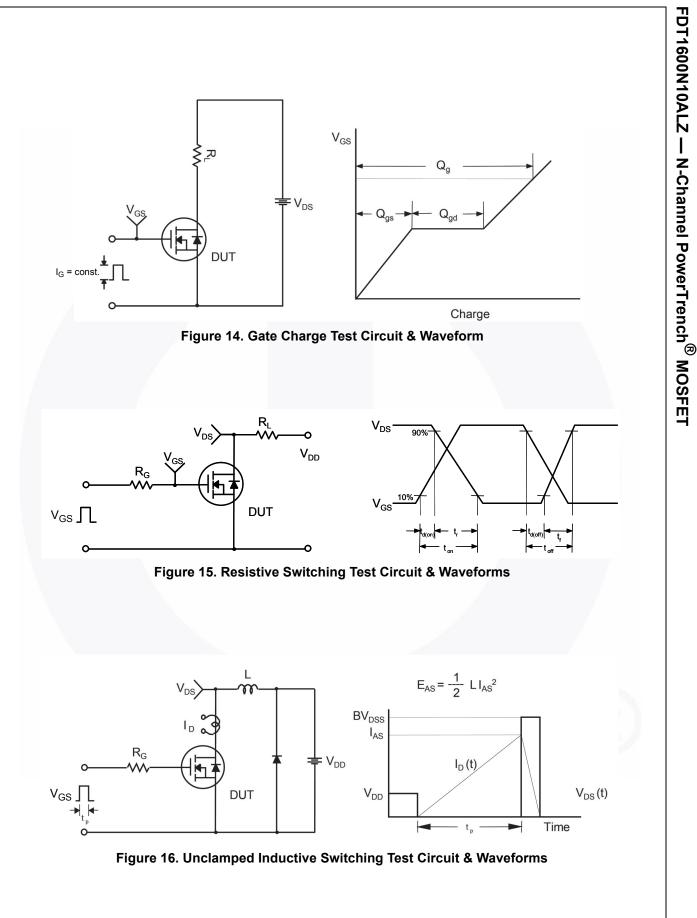
Drain-Source Breakdown Voltage

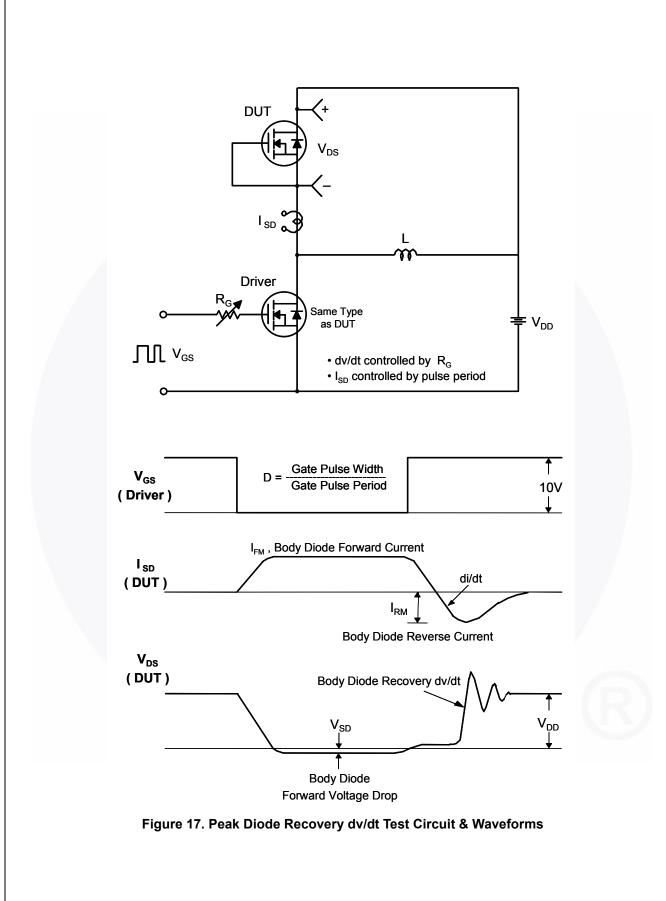
I_D, Drain Current [A]

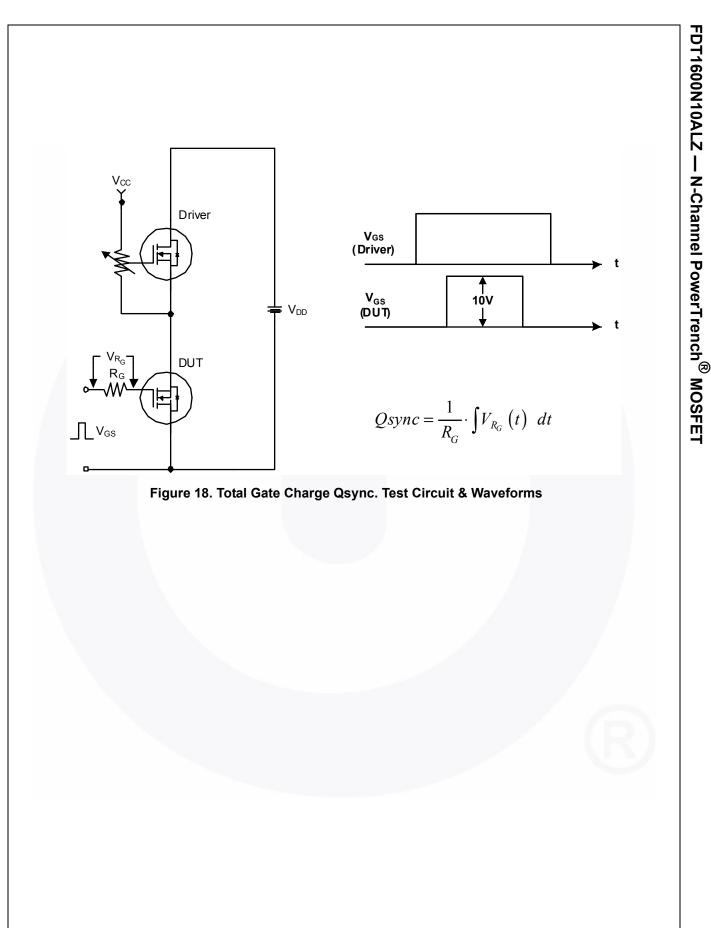
E_{oss} [µJ]

BV_{DSS}, [Normalized]

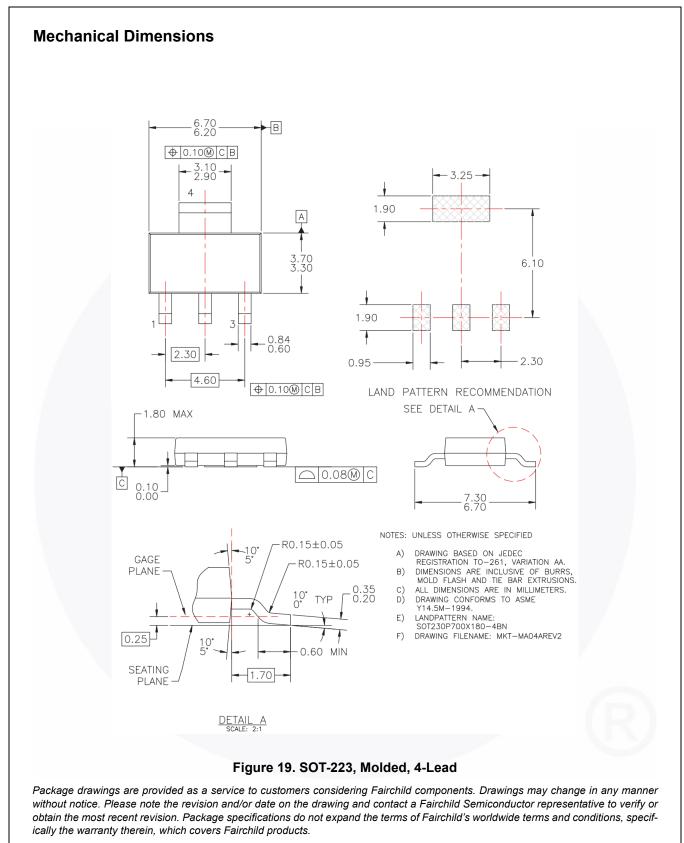








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http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TTE23-C04

FDT1600N10ALZ — N-Channel PowerTrench[®] MOSFET



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