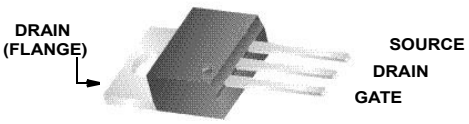
FDP3651U
N-Channel PowerTrench® MOSFET
100V, 80A, 15mΩ

Features

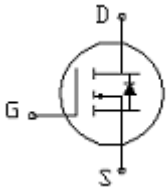
- $r_{DS(on)}$=13 mΩ(Typ.), V_{GS} = 10V, I_D = 40A
- $Q_{g(TOT)}$=49 nc(Typ.), V_{GS} = 10 V
- Low Miller Charge
- Low Q_{rr} Body Diode
- UIS Capability (Single Pulse/Repetitive Pulse)

Applications

- DC/DC converters and Off-Line UPS
- Distributed Power Architectures and VRMs
- Primary Switch for 24V and 48V Systems
- High Voltage Synchronous Rectifier



TO-220AB
FDP SERIES



MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	100	V
V_{GSS}	Gate to Source Voltage	±20	V
I_D	Drain Current -Continuous	80	A
	-Pulsed (Note 1)	220	
P_D	Power Dissipation	255	W
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	266	mJ
T_J, T_{STG}	Operating and Storage Temperature	-55 to 175	°C
T_L	Maximum lead temperature soldering purposes, 1/8" from case for 5 seconds	300	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance , Junction to Ambient	62	°C/W
$R_{\theta JC}$	Thermal Resistance , Junction to Case	0.59	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
FDP3651U	FDP3651U	Tube	N/A	50 units

Electrical Characteristics T_J = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 80V, V_{GS} = 0V, T_C=150°C	-	-	250	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	3.5	4.5	5.5	V
$r_{DS(on)}$	Drain to Source On Resistance	V_{GS} = 10V , I_D = 80A	-	15	18	mΩ
		V_{GS} = 10V , I_D = 40A	-	13	15	
		V_{GS}=10V, I_D=40A,T_J=175°C	-	32	37	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V,V_{GS} = 0V f=1MHz	-	4152	5522	pF
C_{oss}	Output Capacitance		-	485	728	pF
C_{rss}	Reverse Transfer Capacitance		-	89	118	pF
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0V to 10V; V_{DD} = 50V I_D = 80A	-	49	69	nC
$Q_{g(TH)}$	Threshold Gate Charge	V_{GS} = 0V to 2V	-	7	9.8	nC
Q_{gs}	Gate to Source Gate Charge		-	23	-	nC
Q_{gd}	Gate to Drain Charge		-	16	-	nC
Resistive Switching Characteristics						
$t_{(on)}$	Turn-On Time	V_{DD} = 50V, I_D = 80A V_{GS} = 10V, R_{GS} = 5.0Ω	-	-	64	ns
$t_{d(on)}$	Turn-On Delay Time		-	15	27	ns
t_r	Rise Time		-	16	29	ns
$t_{d(off)}$	Turn-Off Delay Time		-	32	52	ns
t_f	Fall Time		-	14	26	ns
$t_{(off)}$	Turn-Off Time		-	-	78	ns
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	I_{SD} = 80A	-	0.99	1.25	V
		I_{SD} = 40A	-	0.88	1.0	V
t_{rr}	Reverse Recovery Time	I_s = 40 A, di/dt = 100A/μs	-	70	105	ns
Q_{rr}	Reverse Recovery Charge		-	202	303	nC

Notes:
1. Pulse Test:Pulse Width<300us,Duty Cycle<2.0%
2. L=0.13mH, I_{AS} = 64A, V_{DD}=50V, R_G=25 Ω , Starting T_J=25°C

Typical Characteristics T_J = 25°C unless otherwise noted

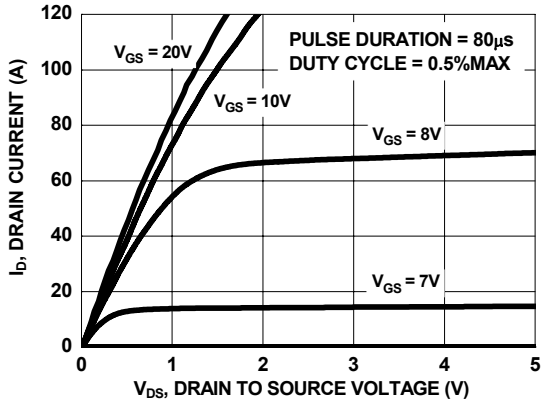


Figure 1. On Region Characteristics

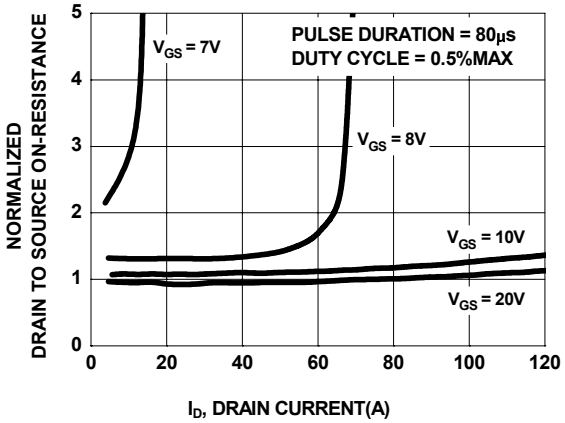


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

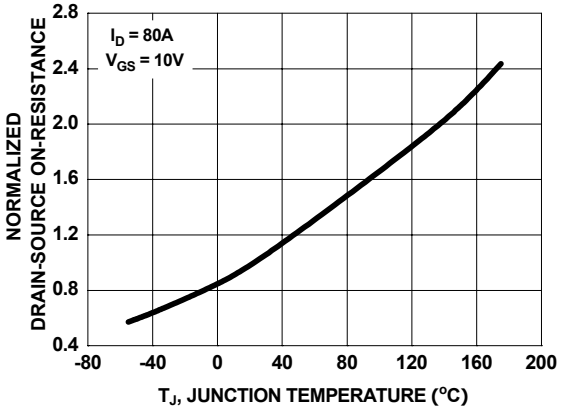


Figure 3. Normalized On Resistance vs Junction Temperature

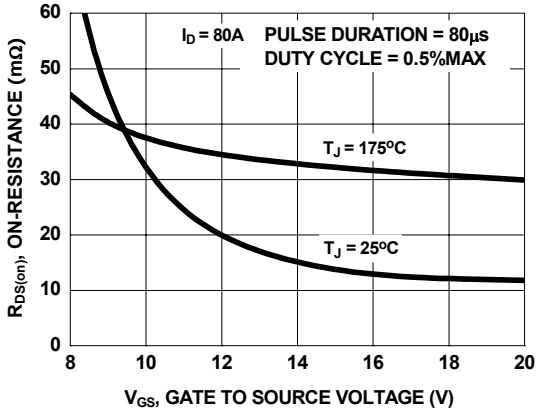


Figure 4. On-Resistance vs Gate to Source Voltage

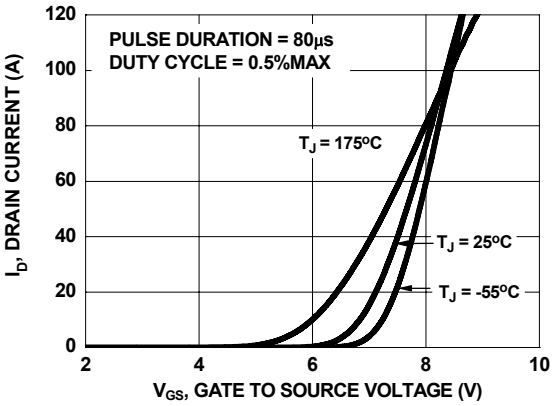


Figure 5. Transfer Characteristics

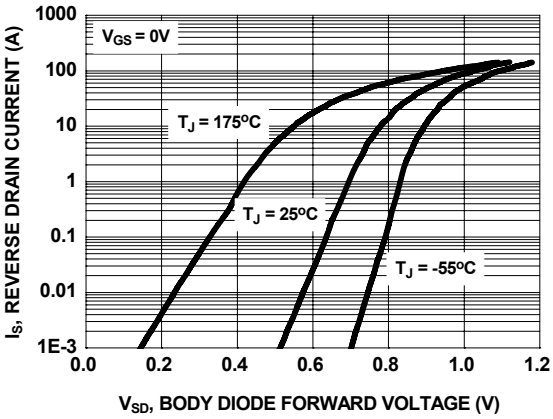


Figure 6. Source to Drain Diode Forward Voltage vs Source Current