

FDB3682 / FDP3682

N-Channel PowerTrench[®] MOSFET

100V, 32A, 36mΩ

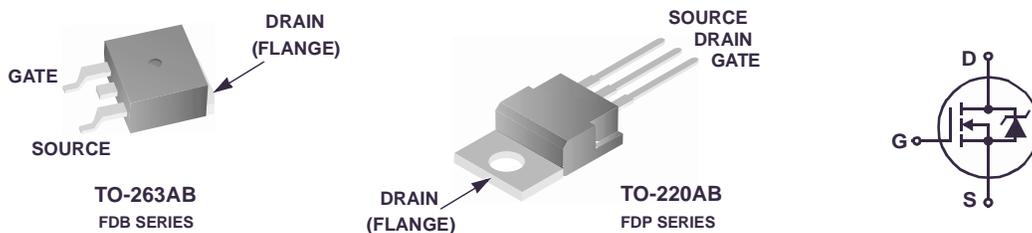
Features

- $r_{DS(ON)} = 32m\Omega$ (Typ.), $V_{GS} = 10V$, $I_D = 32A$
- $Q_g(tot) = 18.5nC$ (Typ.), $V_{GS} = 10V$
- Low Miller Charge
- Low Q_{RR} Body Diode
- UIS Capability (Single Pulse and Repetitive Pulse)
- Qualified to AEC Q101

Formerly developmental type 82755

Applications

- DC/DC converters and Off-Line UPS
- Distributed Power Architectures and VRMs
- Primary Switch for 24V and 48V Systems
- High Voltage Synchronous Rectifier
- Direct Injection / Diesel Injection System
- 42V Automotive Load Control
- Electronic Valve Train System



MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	100	V
V_{GS}	Gate to Source Voltage	± 20	V
I_D	Drain Current		
	Continuous ($T_C = 25^\circ C$, $V_{GS} = 10V$)	32	A
	Continuous ($T_C = 100^\circ C$, $V_{GS} = 10V$)	23	A
	Continuous ($T_{amb} = 25^\circ C$, $V_{GS} = 10V$, $R_{\theta JA} = 43^\circ C/W$)	6	A
	Pulsed	Figure 4	A
E_{AS}	Single Pulse Avalanche Energy (Note 1)	55	mJ
P_D	Power dissipation	95	W
	Derate above $25^\circ C$	0.63	W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Temperature	-55 to 175	$^\circ C$

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case TO-220, TO-263	1.58	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-220, TO-263 (Note 2)	62	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-263, 1in ² copper pad area	43	$^\circ C/W$

This product has been designed to meet the extreme test conditions and environment demanded by the automotive industry. For a copy of the requirements, see AEC Q101 at: <http://www.aecouncil.com/>

Reliability data can be found at: <http://www.fairchildsemi.com/products/discrete/reliability/index.html>.

All Fairchild Semiconductor products are manufactured, assembled and tested under ISO9000 and QS9000 quality systems certification.

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDB3682	FDB3682	TO-263AB	330mm	24mm	800 units
FDP3682	FDP3682	TO-220AB	Tube	N/A	50 units

Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

B_{VDSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{V}$ $V_{GS} = 0\text{V}$ $T_C = 150^\circ\text{C}$	-	-	1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	± 100	nA

On Characteristics

$V_{GS(TH)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2	-	4	V
$r_{DS(ON)}$	Drain to Source On Resistance	$I_D = 32\text{A}, V_{GS} = 10\text{V}$	-	0.032	0.036	Ω
		$I_D = 16\text{A}, V_{GS} = 6\text{V}$	-	0.040	0.060	
		$I_D = 32\text{A}, V_{GS} = 10\text{V}, T_C = 175^\circ\text{C}$	-	0.080	0.090	

Dynamic Characteristics

C_{ISS}	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1\text{MHz}$	-	1250	-	pF
C_{OSS}	Output Capacitance		-	190	-	pF
C_{RSS}	Reverse Transfer Capacitance		-	45	-	pF
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{GS} = 0\text{V to } 10\text{V}$	-	18.5	28	nC
$Q_{g(TH)}$	Threshold Gate Charge	$V_{GS} = 0\text{V to } 2\text{V}$	-	2.4	3.6	nC
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 50\text{V}$ $I_D = 32\text{A}$ $I_g = 1.0\text{mA}$	-	6.5	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	4.1	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	4.6	-	nC

Resistive Switching Characteristics ($V_{GS} = 10\text{V}$)

t_{ON}	Turn-On Time	$V_{DD} = 50\text{V}, I_D = 32\text{A}$ $V_{GS} = 10\text{V}, R_{GS} = 16\Omega$	-	-	83	ns
$t_{d(ON)}$	Turn-On Delay Time		-	9	-	ns
t_r	Rise Time		-	46	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	26	-	ns
t_f	Fall Time		-	32	-	ns
t_{OFF}	Turn-Off Time		-	-	87	ns

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 32\text{A}$	-	-	1.25	V
		$I_{SD} = 16\text{A}$	-	-	1.0	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 32\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	55	ns
Q_{RR}	Reverse Recovery Charge	$I_{SD} = 32\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	90	nC

Notes:

- Starting $T_J = 25^\circ\text{C}$, $L = 0.27\text{mH}$, $I_{AS} = 20\text{A}$.
- Pulse Width = 100s