

FDB050AN06A0 / FDP050AN06A0

N-Channel PowerTrench® MOSFET 60V, 80A, 5mΩ

Features

- $r_{DS(ON)} = 4.3\text{m}\Omega$ (Typ.), $V_{GS} = 10\text{V}$, $I_D = 80\text{A}$
- $Q_g(\text{tot}) = 61\text{nC}$ (Typ.), $V_{GS} = 10\text{V}$
- Low Miller Charge
- Low Q_{RR} Body Diode
- UIS Capability (Single Pulse and Repetitive Pulse)
- Qualified to AEC Q101

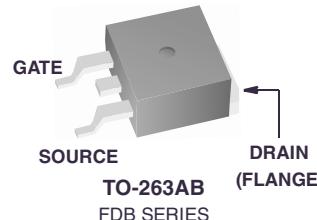
Formerly developmental type 82575

Applications

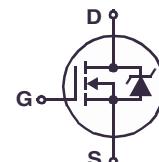
- Motor / Body Load Control
- ABS Systems
- Powertrain Management
- Injection Systems
- DC-DC converters and Off-line UPS
- Distributed Power Architectures and VRMs
- Primary Switch for 12V and 24V systems



TO-220AB
FDP SERIES



TO-263AB
FDB SERIES



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_{GS}	Gate to Source Voltage	± 20	V
I_D	Drain Current Continuous ($T_C < 135^\circ\text{C}$, $V_{GS} = 10\text{V}$)	80	A
	Continuous ($T_A = 25^\circ\text{C}$, $V_{GS} = 10\text{V}$, $R_{\theta JA} = 43^\circ\text{C/W}$)	18	A
	Pulsed	Figure 4	A
E_{AS}	Single Pulse Avalanche Energy (Note 1)	470	mJ
P_D	Power dissipation	245	W
	Derate above 25°C	1.63	$\text{W}/^\circ\text{C}$
T_J , T_{STG}	Operating and Storage Temperature	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case TO-220, TO-263	0.61	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-220, TO-263 (Note 2)	62	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-263, 1in ² copper pad area	43	$^\circ\text{C/W}$

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDB050AN06A0	FDB050AN06A0	TO-263AB	330mm	24mm	800 units
FDP050AN06A0	FDP050AN06A0	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	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 50\text{V}$	-	-	1	μA
		$V_{GS} = 0\text{V}$	$T_C = 150^\circ\text{C}$	-	-	
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	$I_D = 80\text{A}, V_{GS} = 10\text{V}$	-	0.0043	0.005	Ω
		$I_D = 40\text{A}, V_{GS} = 6\text{V}$	-	0.007	0.011	
		$I_D = 80\text{A}, V_{GS} = 10\text{V}, T_J = 175^\circ\text{C}$	-	0.0085	0.010	

Dynamic Characteristics

C_{ISS}	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	-	3900	-	pF
C_{OSS}	Output Capacitance		-	750	-	pF
C_{RSS}	Reverse Transfer Capacitance		-	270	-	pF
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{GS} = 0\text{V to } 10\text{V}$	-	61	80	nC
$Q_{g(TH)}$	Threshold Gate Charge		-	8	11	nC
Q_{gs}	Gate to Source Gate Charge		-	24	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	16	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	15	-	nC

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

t_{ON}	Turn-On Time	$V_{DD} = 30\text{V}, I_D = 80\text{A}$ $V_{GS} = 10\text{V}, R_{GS} = 4.3\Omega$	-	-	264	ns
$t_{d(ON)}$	Turn-On Delay Time		-	16	-	ns
t_r	Rise Time		-	160	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	28	-	ns
t_f	Fall Time		-	29	-	ns
t_{OFF}	Turn-Off Time		-	-	86	ns

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 80\text{A}$	-	-	1.25	V
		$I_{SD} = 40\text{A}$	-	-	1.0	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 75\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	34	ns
Q_{RR}	Reverse Recovered Charge	$I_{SD} = 75\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	25	nC

Notes:

1: Starting $T_J = 25^\circ\text{C}$, $L = 229\mu\text{H}$, $I_{AS} = 64\text{A}$.

2: Pulse width = 100s.

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

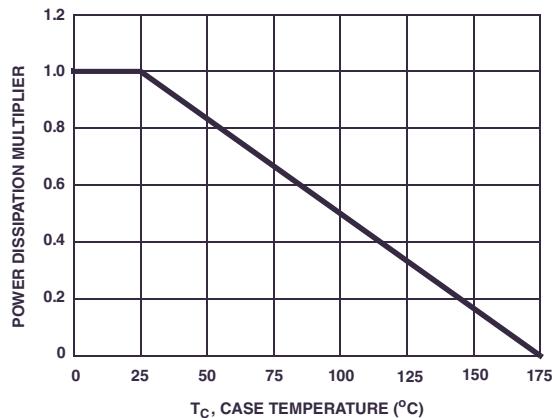


Figure 1. Normalized Power Dissipation vs Ambient Temperature

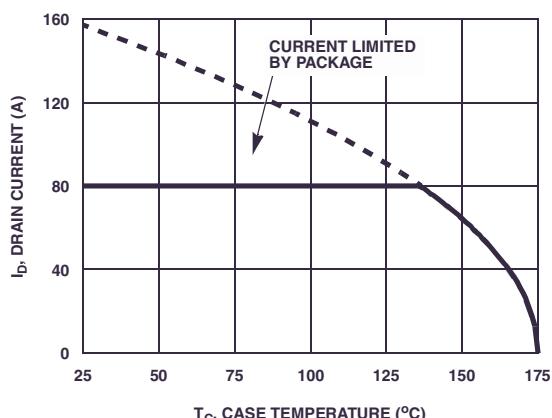


Figure 2. Maximum Continuous Drain Current vs Case Temperature

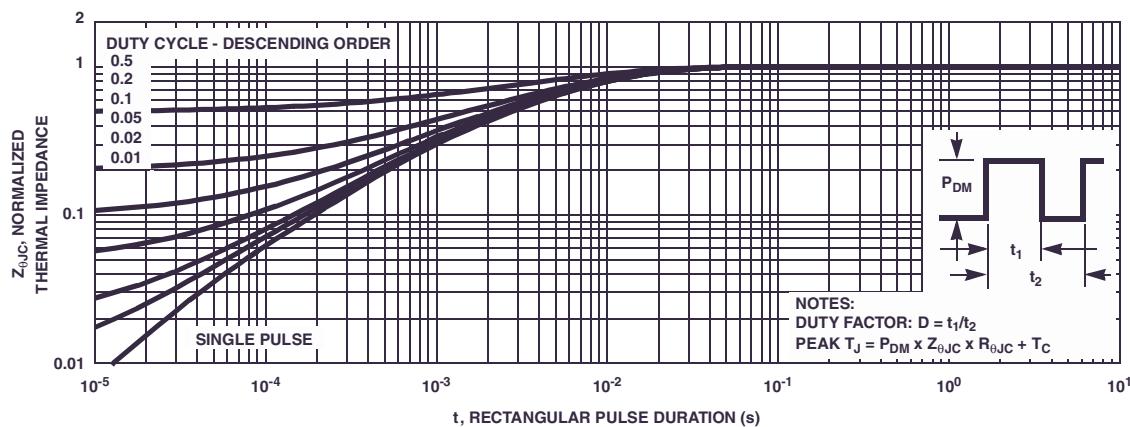


Figure 3. Normalized Maximum Transient Thermal Impedance

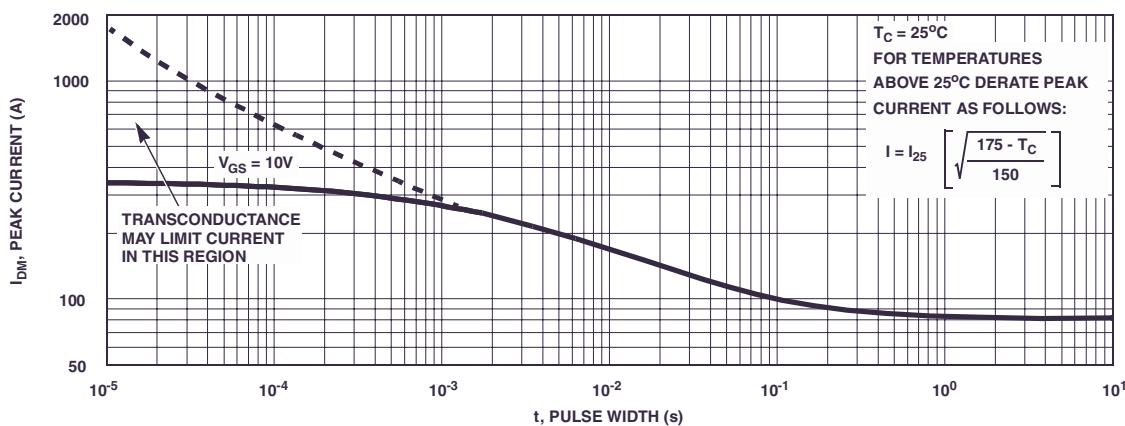


Figure 4. Peak Current Capability