

## FDB13AN06A0 / FDP13AN06A0

### N-Channel PowerTrench® MOSFET 60V, 62A, 13.5mΩ

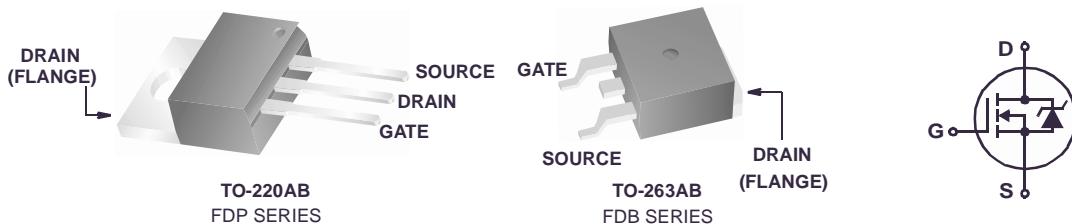
#### Features

- $r_{DS(ON)} = 11.5\text{m}\Omega$  (Typ.),  $V_{GS} = 10\text{V}$ ,  $I_D = 62\text{A}$
- $Q_g(\text{tot}) = 22\text{nC}$  (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 82555

#### 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



#### 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	$\pm 20$	V
$I_D$	Drain Current Continuous ( $T_C = 25^\circ\text{C}$ , $V_{GS} = 10\text{V}$ )	62	A
	Continuous ( $T_C = 100^\circ\text{C}$ , $V_{GS} = 10\text{V}$ )	44	A
	Continuous ( $T_A = 25^\circ\text{C}$ , $V_{GS} = 10\text{V}$ , $R_{\theta JA} = 43^\circ\text{C/W}$ )	10.9	A
	Pulsed	Figure 4	A
$E_{AS}$	Single Pulse Avalanche Energy (Note 1)	56	mJ
$P_D$	Power dissipation	115	W
	Derate above $25^\circ\text{C}$	0.77	$\text{W}/^\circ\text{C}$
$T_J$ , $T_{STG}$	Operating and Storage Temperature	-55 to 175	$^\circ\text{C}$

#### Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case TO-220,TO-263	1.3	$^\circ\text{C/W}$
$R_{\theta JA}$	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 <sup>2</sup> copper pad area	43	$^\circ\text{C/W}$

## Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDB13AN06A0	FDB13AN06A0	TO-263AB	330mm	24mm	800 units
FDP13AN06A0	FDP13AN06A0	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	$\mu\text{A}$
		$V_{GS} = 0\text{V}$	$T_C = 150^\circ\text{C}$	-	-	
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	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	$I_D = 62\text{A}, V_{GS} = 10\text{V}$	-	0.0115	0.0135	$\Omega$
		$I_D = 31\text{A}, V_{GS} = 6\text{V}$	-	0.022	0.034	
		$I_D = 62\text{A}, V_{GS} = 10\text{V}, T_J = 175^\circ\text{C}$	-	0.026	0.030	

### Dynamic Characteristics

$C_{ISS}$	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	-	1350	-	pF
$C_{OSS}$	Output Capacitance		-	260	-	pF
$C_{RSS}$	Reverse Transfer Capacitance		-	90	-	pF
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{GS} = 0\text{V to } 10\text{V}$	-	22	29	nC
$Q_{g(TH)}$	Threshold Gate Charge		-	2.6	3.4	nC
$Q_{gs}$	Gate to Source Gate Charge		-	8.5	-	nC
$Q_{gs2}$	Gate Charge Threshold to Plateau		-	5.9	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge		-	6.4	-	nC

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

$t_{ON}$	Turn-On Time	$V_{DD} = 30\text{V}, I_D = 62\text{A}$	-	-	158	ns
$t_{d(ON)}$	Turn-On Delay Time		-	9	-	ns
$t_r$	Rise Time		-	96	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	24	-	ns
$t_f$	Fall Time		-	26	-	ns
$t_{OFF}$	Turn-Off Time		-	-	74	ns

### Drain-Source Diode Characteristics

$V_{SD}$	Source to Drain Diode Voltage	$I_{SD} = 62\text{A}$	-	-	1.25	V
		$I_{SD} = 31\text{A}$	-	-	1.0	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 62\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	25	ns
$Q_{RR}$	Reverse Recovered Charge	$I_{SD} = 62\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	17	nC

Notes:

1: Starting  $T_J = 25^\circ\text{C}$ ,  $L = 45\mu\text{H}$ ,  $I_{AS} = 50\text{A}$ .

2: Pulse width = 100s.

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

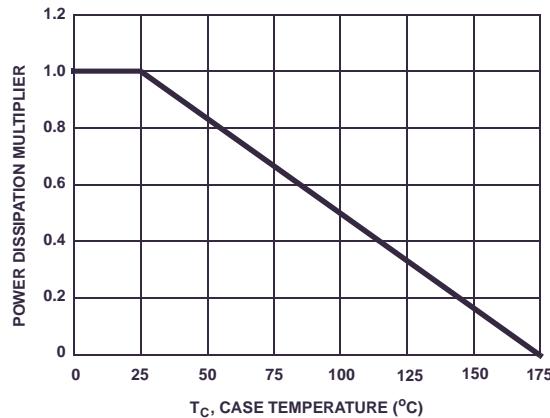


Figure 1. Normalized Power Dissipation vs Ambient Temperature

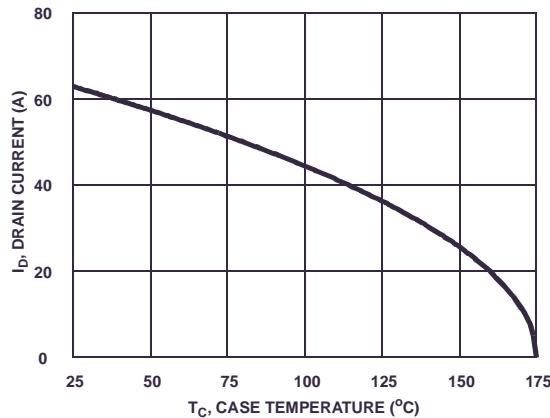


Figure 2. Maximum Continuous Drain Current vs Case Temperature

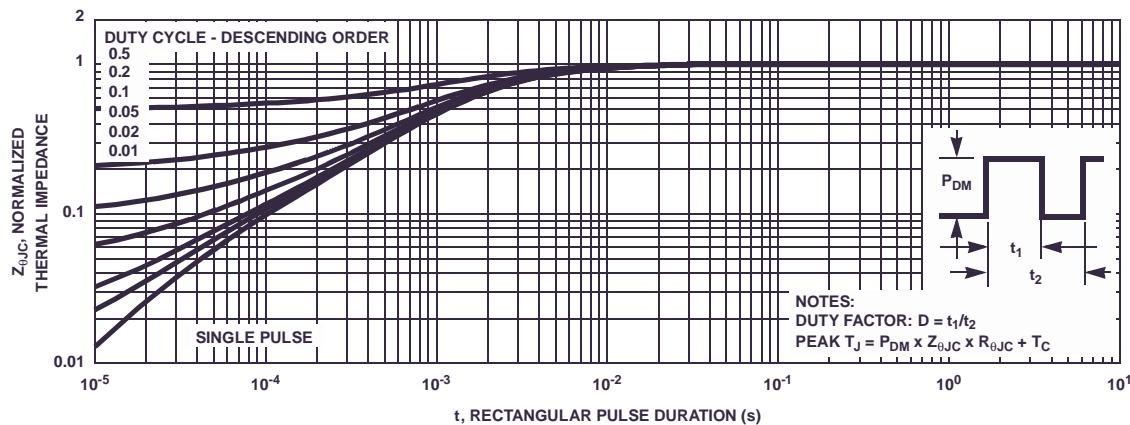


Figure 3. Normalized Maximum Transient Thermal Impedance

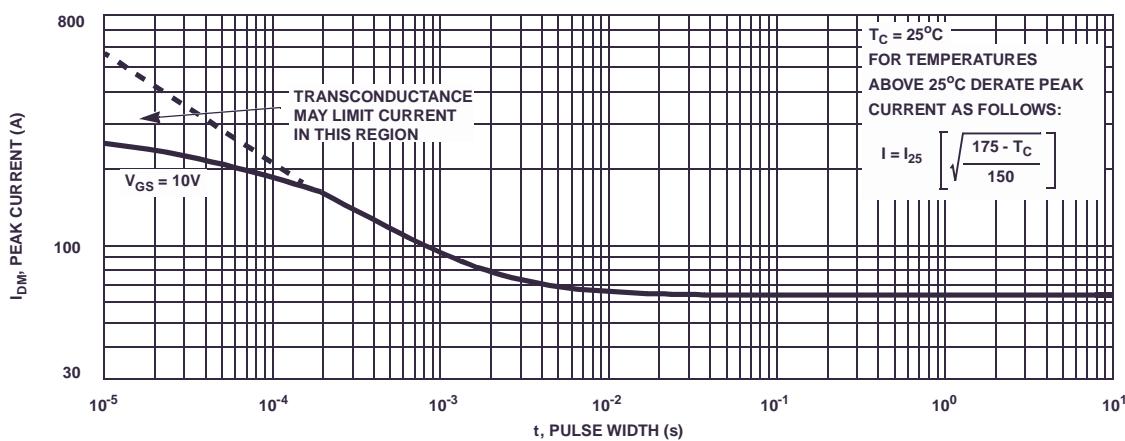


Figure 4. Peak Current Capability