GENERAL SEMICONDUCTOR®

GFP70N03

N-Channel Enhancement-Mode MOSFET

VDS 30V   **RDS(ON)** 8mΩ   **ID** 70A

TRENCH GENFET®

TO-220AB
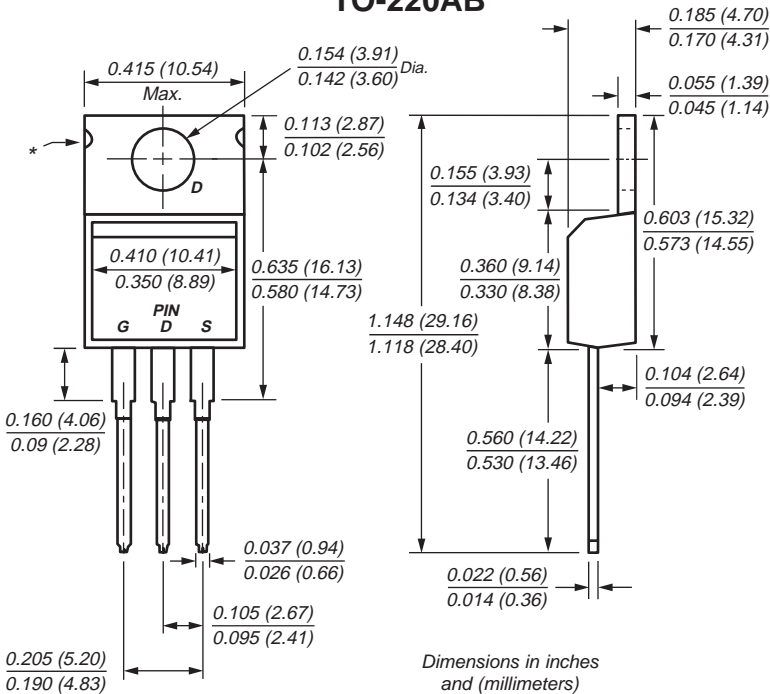
0.415 (10.54)
Max.

0.154 (3.91) / 0.142 (3.60) Dia.

0.113 (2.87) / 0.102 (2.56)

0.185 (4.70) / 0.170 (4.31)

0.055 (1.39) / 0.045 (1.14)

0.155 (3.93) / 0.134 (3.40)

0.603 (15.32) / 0.573 (14.55)

0.410 (10.41) / 0.350 (8.89)

0.635 (16.13) / 0.580 (14.73)

0.360 (9.14) / 0.330 (8.38)

PIN
G D S

1.148 (29.16) / 1.118 (28.40)

0.104 (2.64) / 0.094 (2.39)

0.160 (4.06) / 0.09 (2.28)

0.560 (14.22) / 0.530 (13.46)

0.037 (0.94) / 0.026 (0.66)

0.022 (0.56) / 0.014 (0.36)

0.105 (2.67) / 0.095 (2.41)

0.205 (5.20) / 0.190 (4.83)

Dimensions in inches and (millimeters)

* *May be notched or flat*

D

G

S
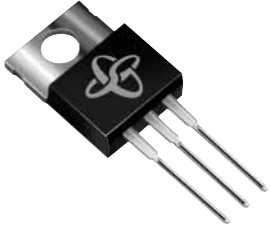
Features

- Advanced Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Specially Designed for Low Voltage DC/DC Converters
- Fast Switching for High Efficiency

Mechanical Data

Case: JEDEC TO-220AB molded plastic body

Terminals: Leads solderable per MIL-STD-750, Method 2026

High temperature soldering guaranteed: 250°C/10 seconds, 0.17" (4.3mm) from case

Mounting Torque: 10 in-lbs maximum

Weight: 2.0g

Maximum Ratings and Thermal Characteristics (Tc = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current[1]		I_D	70	A
Pulsed Drain Current		I_{DM}	200	
Maximum Power Dissipation	$T_C = 25°C$ $T_C = 100°C$	P_D	62.5 25	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 150	°C
Lead Temperature (1/8" from case for 5 sec.)		T_L	275	°C
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	2.0	°C/W
Junction-to-Ambient Thermal Resistance		$R_{\theta JA}$	62.5	°C/W

Notes: (1) Maximum DC current limited by the package
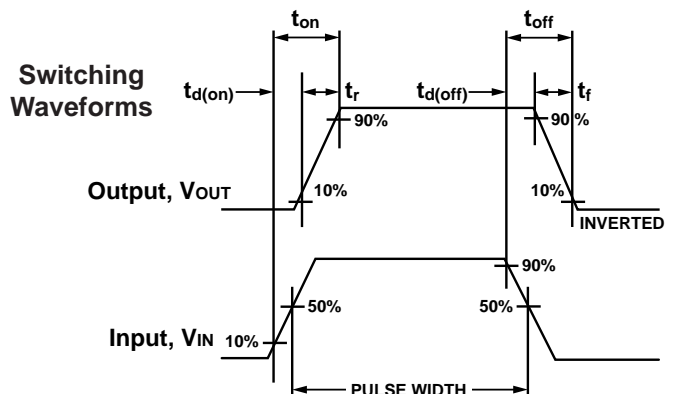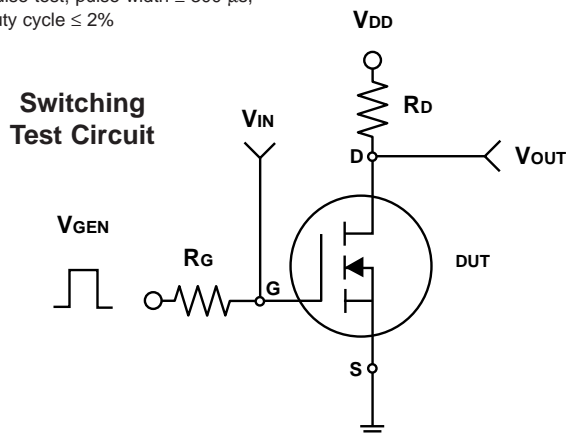
N-Channel Enhancement-Mode MOSFET

Electrical Characteristics (T_J = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250µA	30	—	—	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.0	—	3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	—	—	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	—	—	1	µA
On-State Drain Current[2]	$I_{D(on)}$	V_{DS} ≥ 5V, V_{GS} = 10V	70	—	—	A
Drain-Source On-State Resistance[2]	$R_{DS(on)}$	V_{GS} = 10V, I_D = 35A	—	6	8	mΩ
		V_{GS} = 4.5V, I_D = 30A	—	9	11	
Forward Transconductance[2]	g_{fs}	V_{DS} = 15V, I_D = 35A	—	61	—	S
Dynamic						
Total Gate Charge	Q_g	V_{DS} =15V, V_{GS}=5V, I_D=35A	—	34	48	nC
		V_{DS} = 15V, V_{GS} = 10V I_D = 35A	—	63	95	
Gate-Source Charge	Q_{gs}		—	11	—	
Gate-Drain Charge	Q_{gd}		—	11	—	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15V, R_L = 15Ω I_D ≅ 1A, V_{GEN} = 10V R_G = 6Ω	—	9	14	ns
Rise Time	t_r		—	9	14	
Turn-Off Delay Time	$t_{d(off)}$		—	100	167	
Fall Time	t_f		—	31	62	
Input Capacitance	C_{iss}	V_{GS} = 0V V_{DS} = 15V f = 1.0MHz	—	3400	—	pF
Output Capacitance	C_{oss}		—	618	—	
Reverse Transfer Capacitance	C_{rss}		—	300	—	
Source-Drain Diode						
Max Diode Forward Current	I_S	—	—	—	35	A
Diode Forward Voltage[2]	V_{SD}	I_S = 35A, V_{GS} = 0V	—	0.9	1.3	V

Notes:
(1) Maximum DC current limited by the package
(2) Pulse test; pulse width ≤ 300 µs,
     duty cycle ≤ 2%

Switching Test Circuit

Switching Waveforms

N-Channel Enhancement-Mode MOSFET

Ratings and
Characteristic Curves (T$_A$ = 25°C unless otherwise noted)
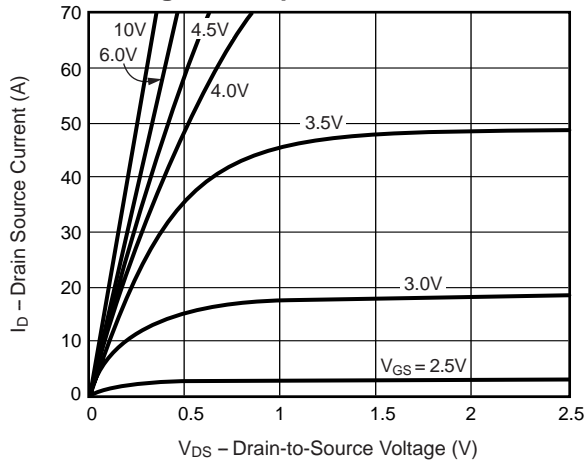
Fig. 1 – Output Characteristics
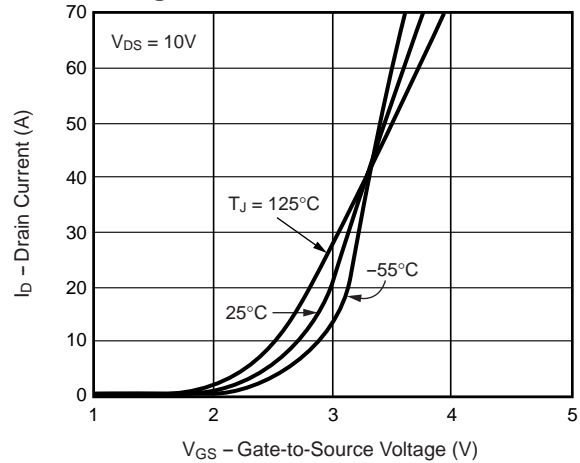

Fig. 2 – Transfer Characteristics

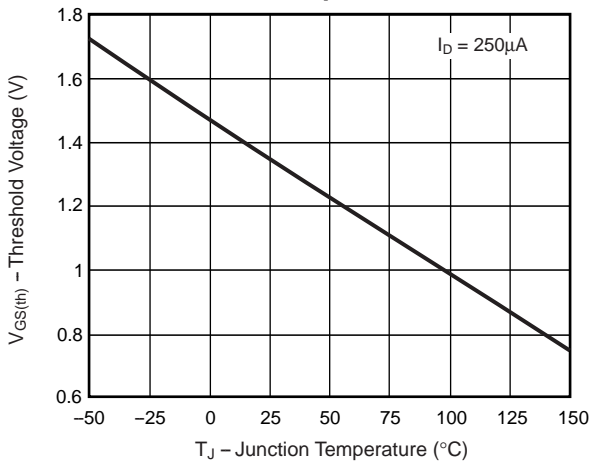**Fig. 3 – Threshold Voltage vs. Temperature**

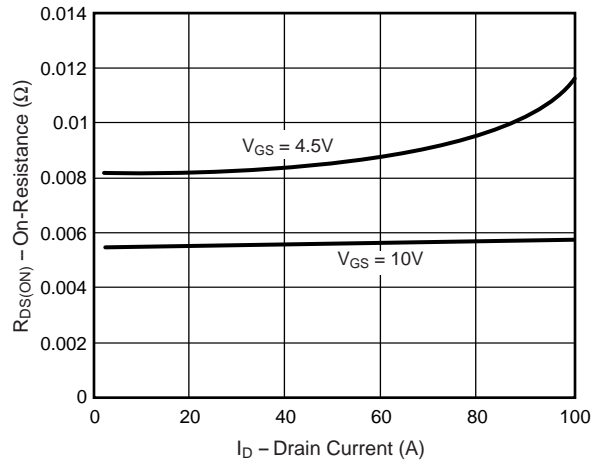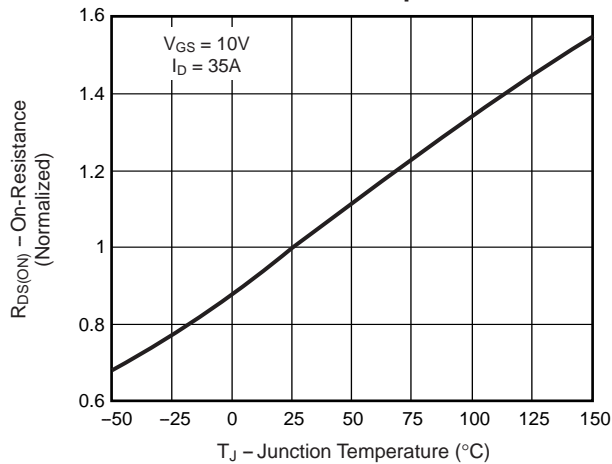**Fig. 4 – On-Resistance vs. Drain Current**

Fig. 5 – On-Resistance vs. Junction Temperature

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Ratings and
Characteristic Curves (T_A = 25°C unless otherwise noted)
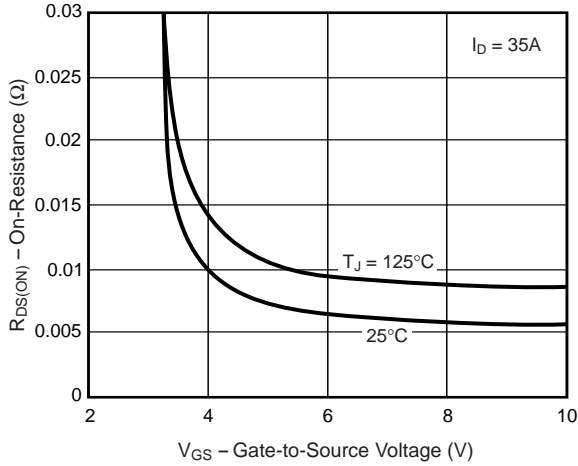
Fig. 6 – On-Resistance vs. Gate-to-Source Voltage

I_D = 35A

T_J = 125°C

25°C

X-axis: V_{GS} – Gate-to-Source Voltage (V)
Y-axis: $R_{DS(ON)}$ – On-Resistance (Ω)

Fig. 7 – Gate Charge

V_{DS} = 15V
I_D = 35A

X-axis: Q_g – Gate Charge (nC)
Y-axis: V_{GS} – Gate-to-Source Voltage (V)

Fig. 8 – Capacitance

f = 1MH_Z
V_{GS} = 0V

C_{iss}

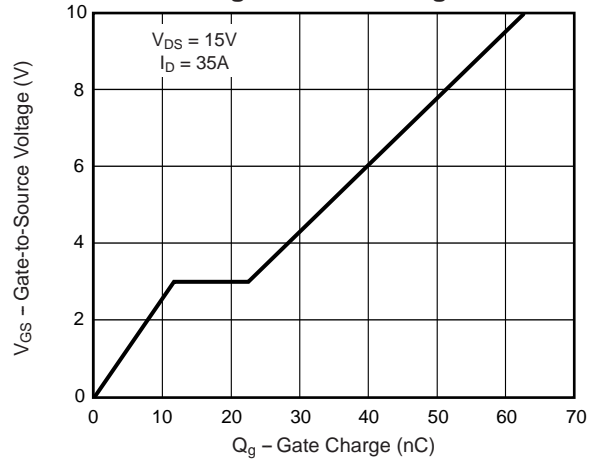C_{oss}

C_{rss}

X-axis: V_{DS} – Drain-to-Source Voltage (V)
Y-axis: C – Capacitance (pF)
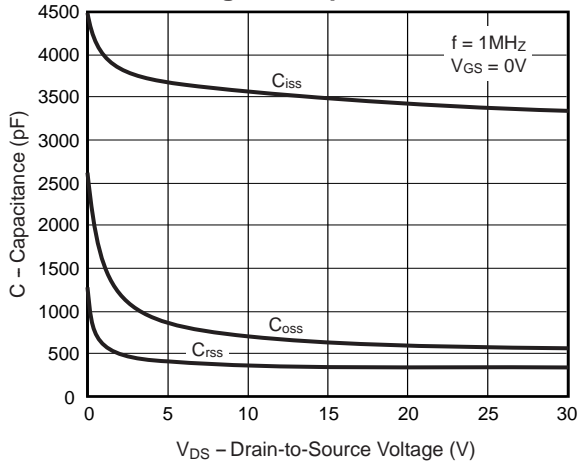
Fig. 9 – Source-Drain Diode Forward Voltage
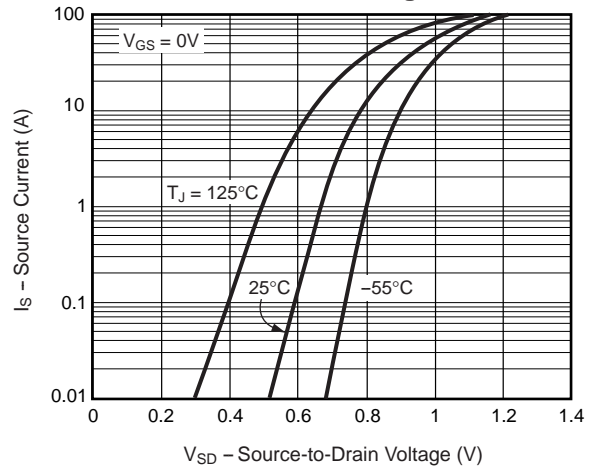
V_{GS} = 0V

T_J = 125°C

25°C

−55°C

X-axis: V_{SD} – Source-to-Drain Voltage (V)
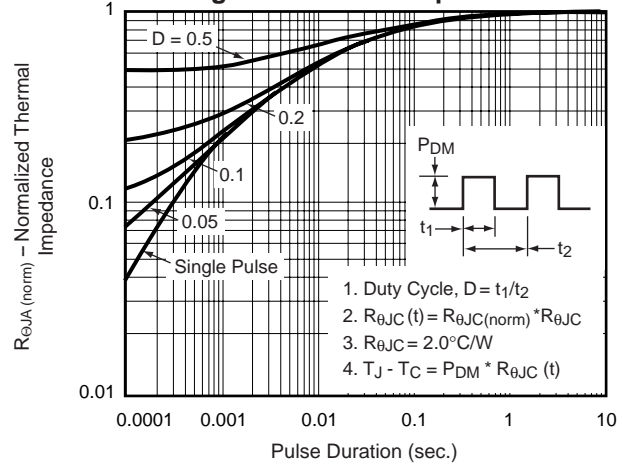Y-axis: I_S – Source Current (A)

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Ratings and Characteristic Curves (T_A = 25°C unless otherwise noted)

Fig. 10 – Breakdown Voltage vs. Junction Temperature

$I_D = 250\mu A$

x-axis: T_J – Junction Temperature (°C)
y-axis: BV_{DSS} – Breakdown Voltage (V)

Fig. 11 – Thermal Impedance

D = 0.5
0.2
0.1
0.05
Single Pulse

P_{DM}
t_1
t_2

1. Duty Cycle, D = t_1/t_2
2. $R_{\theta JC}(t) = R_{\theta JC(norm)} * R_{\theta JC}$
3. $R_{\theta JC} = 2.0°C/W$
4. $T_J - T_C = P_{DM} * R_{\theta JC}(t)$
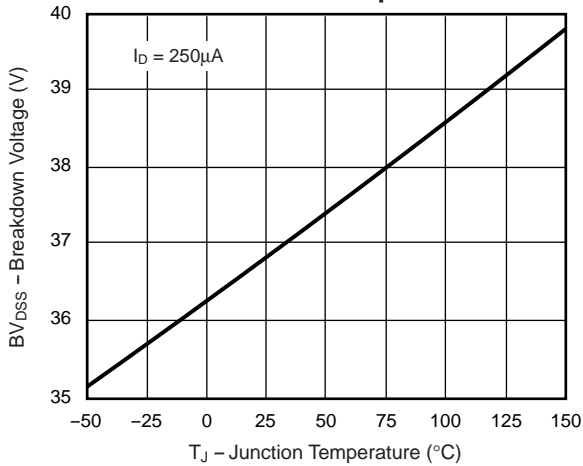
x-axis: Pulse Duration (sec.)
y-axis: $R_{\theta JA (norm)}$ – Normalized Thermal Impedance

Fig. 12 – Power vs. Pulse Duration

Single Pulse
$R_{\theta JC} = 2.0°C/W$
$T_C = 25°C$

x-axis: Pulse Duration (sec.)
y-axis: Power (W)
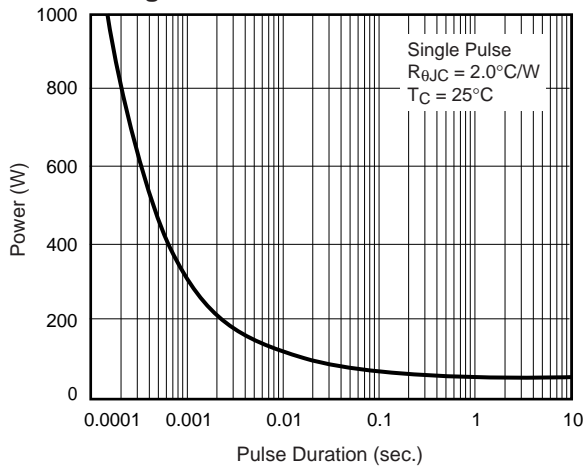
Fig. 13 – Maximum Safe Operating Area

$R_{DS(ON)}$ Limit
100μs
1ms
10ms
100ms
DC

$V_{GS} = 10V$
Single Pulse
$R_{\theta JC} = 2.0 °C/W$
$T_C = 25°C$

x-axis: V_{DS} – Drain-Source Voltage (V)
y-axis: I_D – Drain Current (A)