



POWER-MOS FET

FIELD EFFECT POWER TRANSISTOR

VN40AFA
Series**1.2 AMPERES**
40-80 VOLTS
 $R_{DS(ON)} = 3.5-5.0 \Omega$

This series of N-Channel Enhancement-mode Power MOSFETs utilizes GE's advanced Power DMOS technology to achieve low on-resistance with excellent device ruggedness and reliability.

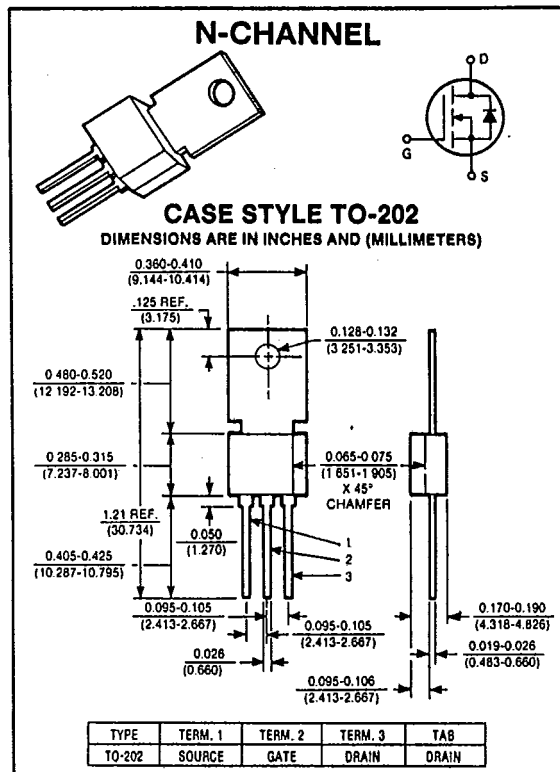
This design has been optimized to give superior performance in most switching applications including: switching power supplies, inverters, converters and solenoid/relay drivers. Also, the extended safe operating area with good linear transfer characteristics makes it well suited for many linear applications such as audio amplifiers and servo motors.

Applications

- Switching power supplies
- DC to DC inverters
- CMOS and TTL to high current interface
- Line drivers
- Logic buffers
- Pulse amplifiers

Features

- High speed, high current switching
- Current sharing capability when paralleled
- Directly interface to CMOS, DTL, TTL logic
- Simple DC biasing
- Extended safe operating area
- Inherently temperature stable



maximum ratings ($T_A = 25^\circ\text{C}$) (unless otherwise specified)

RATING	SYMBOL	VN40AFA	VN67AFA	VN89AFA	UNITS
Drain-Source Voltage	V_{DS}	40	60	80	Volts
Drain-Gate Voltage, $R_{GS} = 1\text{M}\Omega$	V_{DGR}	40	60	80	Volts
Continuous Drain Current @ $T_A = 25^\circ\text{C}$	I_D	1.2	1.2	1.2	A
Peak Drain Current ⁽¹⁾	I_{DM}	3.0	3.0	3.0	A
Gate-Source Voltage	V_{GS}	± 30	± 30	± 30	Volts
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	12 96	12 96	12 96	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-40 to 150	-40 to 150	-40 to 150	$^\circ\text{C}$

thermal characteristics

Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	10.4	10.4	10.4	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: 1/16" from Case for 10 Seconds	T_L	300	300	300	$^\circ\text{C}$

(1) Repetitive Rating: Pulse width limited by max. junction temperature.

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
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off characteristics

Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 10 \mu A$)	VN40AFA VN67AFA VN89AFA	BV_{DSS}	40 60 80	— — —	— — —	Volts
Zero Gate Voltage Drain Current ($V_{DS} = \text{Max Rating}, V_{GS} = 0V$) ($V_{DS} = \text{Max Rating} \times 0.8, V_{GS} = 0V, T_A = 125^\circ C$)		I_{DSS}	— —	— —	10 100	μA
Gate-Source Leakage Current ($V_{GS} = 15V, V_{DS} = 0V$) ($V_{GS} = 15V, V_{DS} = 0V - T_A = 125^\circ C$)		I_{GSS}	— —	— —	100 500	nA nA

on characteristics*

Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1 \text{ mA}$)	VN40AFA VN67AFA VN89AFA	$V_{GS(TH)}$	0.6 0.8 0.8	1.2 1.2 1.2	— — —	Volts
Drain-Source Saturation Voltage ($V_{GS} = 5V, I_D = 0.3A$)	VN40AFA VN67AFA VN89AFA	$V_{DS(ON)}$	— — —	— — —	2.0 1.7 1.9	V
Drain-Source Saturation Voltage ($V_{GS} = 10V, I_D = 1.0A$)	VN40AFA VN67AFA VN89AFA	$V_{DS(ON)}$	— — —	— — —	5.0 3.5 4.5	V
On-State Drain Current ($V_{DS} = 25V, V_{GS} = 10V$)		$I_{D(ON)}$	1	—	—	A
Forward Transconductance ($V_{DS} = 24V, I_D = 0.5A, f = 1 \text{ KHz}$)		g_{fs}	—	.25	—	mhos

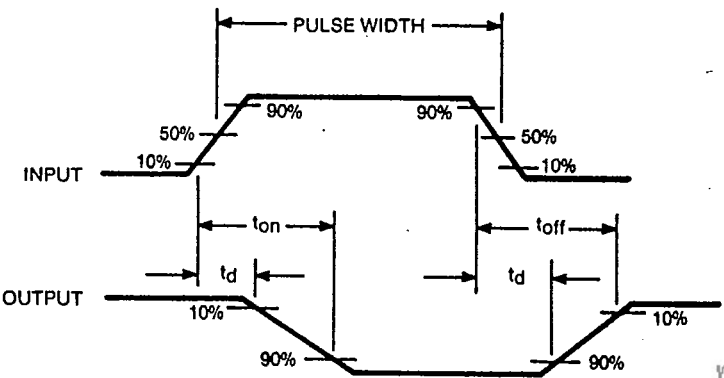
dynamic characteristics

Input Capacitance	$V_{GS} = 0V$	C_{iss}	—	—	50	pF
Output Capacitance	$V_{DS} = 25V$	C_{oss}	—	—	50	pF
Reverse Transfer Capacitance	$f = 1 \text{ MHz}$	C_{rss}	—	—	10	pF

switching characteristics*

Turn-on Delay Time	See switching times waveform below	$t_{d(on)}$	—	2	5	ns
Rise Time		T_r	—	2	5	ns
Turn-off Delay Time		$t_{d(off)}$	—	2	5	ns
Fall Time		t_f	—	2	5	ns

*Pulse Test: Pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$



SWITCHING TIME TEST WAVEFORMS