



POWER-MOS FET

FIELD EFFECT POWER TRANSISTOR

IRF642,643

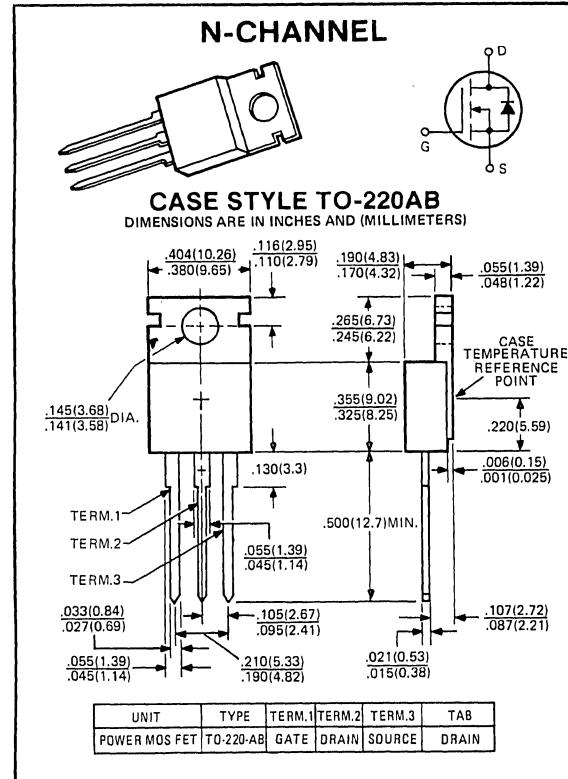
16 AMPERES
200, 150 VOLTS
 $R_{DS(ON)} = 0.22 \Omega$

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.

Features

- Polysilicon gate — Improved stability and reliability
- No secondary breakdown — Excellent ruggedness
- Ultra-fast switching — Independent of temperature
- Voltage controlled — High transconductance
- Low input capacitance — Reduced drive requirement
- Excellent thermal stability — Ease of paralleling



maximum ratings ($T_C = 25^\circ C$) (unless otherwise specified)

RATING	SYMBOL	IRF642	IRF643	UNITS
Drain-Source Voltage	V_{DSS}	200	150	Volts
Drain-Gate Voltage, $R_{GS} = 1\text{M}\Omega$	V_{DGR}	200	150	Volts
Continuous Drain Current @ $T_C = 25^\circ C$ @ $T_C = 100^\circ C$	I_D	16 10	16 10	A A
Pulsed Drain Current ⁽¹⁾	I_{DM}	64	64	A
Gate-Source Voltage	V_{GS}	± 20	± 20	Volts
Total Power Dissipation @ $T_C = 25^\circ C$ Derate Above $25^\circ C$	P_D	125 1.0	125 1.0	Watts $W/\text{ }^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ C$

thermal characteristics

Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.00	1.00	$^\circ C/W$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	80	80	$^\circ C/W$
Maximum Lead Temperature for Soldering Purposes: $1/8"$ from Case for 5 Seconds	T_L	260	260	$^\circ C$

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

electrical characteristics ($T_C = 25^\circ C$) (unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
off characteristics					
Drain-Source Breakdown Voltage ($V_{GS} = 0V$, $I_D = 250 \mu A$)	IRF642 IRF643	BVDSS 150	200	—	Volts
Zero Gate Voltage Drain Current ($V_{DS} = \text{Max Rating}$, $V_{GS} = 0V$, $T_C = 25^\circ C$) ($V_{DS} = \text{Max Rating} \times 0.8$, $V_{GS} = 0V$, $T_C = 125^\circ C$)	I_{DSS}	— —	— —	250 1000	μA
Gate-Source Leakage Current ($V_{GS} = \pm 20V$)	I_{GSS}	—	—	± 500	nA

on characteristics*

Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250 \mu A$)	$T_C = 25^\circ C$	$V_{GS(TH)}$	2.0	—	4.0	Volts
On-State Drain Current ($V_{GS} = 10V$, $V_{DS} = 10V$)		$I_{D(ON)}$	16	—	—	A
Static Drain-Source On-State Resistance ($V_{GS} = 10V$, $I_D = 10A$)		$R_{DS(ON)}$	—	0.18	0.22	Ohms
Forward Transconductance ($V_{DS} = 10V$, $I_D = 10A$)		g_{fs}	4.8	6.0	—	mhos

dynamic characteristics

Input Capacitance	$V_{GS} = 10V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$	C_{iss}	—	1400	1600	pF
Output Capacitance		C_{oss}	—	310	750	pF
Reverse Transfer Capacitance		C_{rss}	—	65	300	pF

switching characteristics*

Turn-on Delay Time	$V_{DS} = 90V$ $I_D = 0A$, $V_{GS} = 15V$ $R_{GEN} = 50\Omega$, $R_{GS} = 12.5\Omega$ (R_{GS} (EQUIV.) = 10Ω)	$t_{d(on)}$	—	20	—	ns
Rise Time		t_r	—	40	—	ns
Turn-off Delay Time		$t_{d(off)}$	—	60	—	ns
Fall Time		t_f	—	30	—	ns

source-drain diode ratings and characteristics*

Continuous Source Current	I_S	—	—	16	A
Pulsed Source Current	I_{SM}	—	—	64	A
Diode Forward Voltage ($T_C = 25^\circ C$, $V_{GS} = 10V$, $I_S = 16A$)	V_{SD}	—	1.0	1.9	Volts
Reverse Recovery Time ($I_S = 18A$, $dI_S/dt = 100A/\mu s$, $T_C = 125^\circ C$)	t_{rr} Q_{RR}	—	330 3.5	—	ns μC

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

