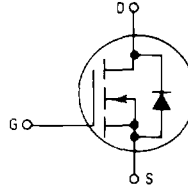


Power Field Effect Transistors
N-Channel Enhancement-Mode
Silicon Gate TMOS

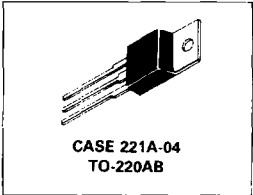
These TMOS Power FETs are designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- Silicon Gate for Fast Switching Speeds
- Low $r_{DS(on)}$ to Minimize On-Losses
- Rugged — SOA is Power Dissipation Limited
- Source-to-Drain Diode Characterized for Use With Inductive Loads



IRFZ40
IRFZ42

TMOS POWER FETs
46 and 51 AMPERES
 $r_{DS(on)} = 0.028 \text{ OHM}$
50 VOLTS
 $r_{DS(on)} = 0.035 \text{ OHM}$



3

MAXIMUM RATINGS

Rating	Symbol	Device		Unit
		IRFZ40	IRFZ42	
Drain-Source Voltage	V_{DSS}	50		Vdc
Drain-Gate Voltage ($R_{GS} = 1 \text{ M}\Omega$)	V_{DGR}	50		Vdc
Gate-Source Voltage	V_{GS}	± 20		Vdc
Drain Current — Continuous μ $T_C = 25^\circ\text{C}$	I_D	51	46	Adc
— Continuous μ $T_C = 100^\circ\text{C}$		32	29	
— Pulsed μ $T_C = 25^\circ\text{C}$	I_{DM}	160	145	
Total Power Dissipation μ $T_C = 25^\circ\text{C}$ Derate above 25 C	P_D	125	1	Watts W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	- 65 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	1 62.5		°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from Case for 5 Seconds	T_L	300		°C

See the MTP50N05E Designer's Data Sheet for a complete set of design curves for these devices.

IRFZ40,42

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage (V _{GS} = 0, I _D = 0.25 mA)	V(BR)DSS	50	—	Vdc
Zero Gate Voltage Drain Current (V _{DS} = Rated V _{DSS} , V _{GS} = 0) (V _{DS} = 0.8 Rated V _{DSS} , V _{GS} = 0, T _J = 125°C)	I _{DSS}	—	0.2 1	mAdc
Gate-Body Leakage Current, Forward (V _{GSF} = 20 Vdc, V _{DS} = 0)	I _{GSSF}	—	100	nAdc
Gate-Body Leakage Current, Reverse (V _{GSR} = 20 Vdc, V _{DS} = 0)	I _{GSSR}	—	100	nAdc

ON CHARACTERISTICS*

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 0.25 mA)	V _{GS(th)}	2	4	Vdc
Static Drain-Source On-Resistance (V _{GS} = 10 Vdc, I _D = 29 Adc)	r _{DS(on)}	—	0.028 0.035	Ohm
On-State Drain Current (V _{GS} = 10 V) (V _{DS} ≥ 1.4 Vdc) (V _{DS} ≥ 1.6 Vdc)	I _{D(on)}	51 45	—	Adc
Forward Transconductance (V _{DS} ≥ 1.4 V, I _D = 29 A) (V _{DS} ≥ 1.6 V, I _D = 29 A)	g _{FS}	17 17	—	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 V, V _{GS} = 0, f = 1 MHz)	C _{iss}	—	3000	pF
Output Capacitance		C _{oss}	—	1200	
Reverse Transfer Capacitance		C _{rss}	—	400	

SWITCHING CHARACTERISTICS*

Turn-On Delay Time	(V _{DD} ≈ 25 V, I _D = 29 Apk, R _{gen} = Ohms)	t _{d(on)}	—	25	ns
Rise Time		t _r	—	60	
Turn-Off Delay Time		t _{d(off)}	—	70	
Fall Time		t _f	—	25	
Total Gate Charge	(V _{DS} = 0.8 Rated V _{DSS} , V _{GS} = 10 Vdc, I _D = Rated I _D)	Q _g	40 (Typ)	60	nC
Gate-Source Charge		Q _{gs}	22 (Typ)	—	
Gate-Drain Charge		Q _{gd}	18 (Typ)	—	

SOURCE-DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage	(I _S = Rated I _D , V _{GS} = 0)	V _{SD}	1.3 (Typ)	2.2 ⁽¹⁾	Vdc
Forward Turn-On Time		t _{on}	Limited by stray inductance		
Reverse Recovery Time		t _{rr}	350 (Typ)	—	ns

*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
(1) Add 0.3 V for IRFZ40.

**CASE 221A-04
TO-220AB**

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIM Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

MILLIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX
A	14.48	15.75	0.570	0.620
B	3.66	10.29	0.390	0.405
C	4.07	4.82	0.160	0.190
D	0.94	0.98	0.035	0.035
F	3.81	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.60	3.83	0.100	0.150
J	0.38	0.55	0.014	0.022
K	12.70	14.27	0.500	0.562
L	1.15	1.38	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.29	0.080	0.110
S	1.15	1.38	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.60	1.27	0.020	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080