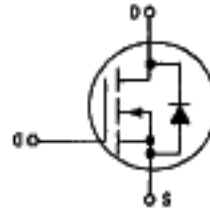


Power Field Effect Transistors
N-Channel Enhancement-Mode
Silicon Gate TMOS

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
 $r_{DS(on)} = 0.035 \text{ OHM}$



CASE 221A-04
TO-220AB

MAXIMUM RATINGS

Rating	Symbol	Device		Unit
		IRFZ40	IRFZ42	
Drain-Source Voltage	V_{DS}	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 @ $T_C = 25^\circ\text{C}$	I_D	51	46	Adc
— Continuous @ $T_C = 100^\circ\text{C}$		32	29	
— Pulsed @ $T_C = 25^\circ\text{C}$	I_{DM}	160	145	
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	125 1		Watts W/C
Operating and Storage Temperature Range	T_J, T_{stg}	-65 to 150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

See the MTP50H02E Designer's Data Sheet for a complete set of design curves for these devices.

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25 \text{ mA}$)	$V_{(BR)DSS}$	50	—	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = \text{Rated } V_{DSS}, V_{GS} = 0$) ($V_{DS} = 0.8 \text{ Rated } V_{DSS}, V_{GS} = 0, T_J = 125^\circ\text{C}$)	I_{DSS}	—	0.2 1	mAdc
Gate-Body Leakage Current, Forward ($V_{GSF} = 20 \text{ Vdc}, V_{DS} = 0$)	I_{GSSF}	—	100	nAac
Gate-Body Leakage Current, Reverse ($V_{GSR} = 20 \text{ Vdc}, V_{DS} = 0$)	I_{GSR}	—	100	nAac

ON CHARACTERISTICS*

Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 0.25 \text{ mA}$)	$V_{GS(th)}$	2	4	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10 \text{ Vdc}, I_D = 29 \text{ Adc}$)	$r_{DS(on)}$	—	0.028 0.035	Ω mm
On-State Drain Current ($V_{GS} = 10 \text{ V}$) ($V_{DS} > 1.4 \text{ Vdc}$) ($V_{DS} > 1.6 \text{ Vdc}$)	$I_{D(on)}$	51 45	—	Aac
Forward Transconductance ($V_{DS} > 1.4 \text{ V}, I_D = 29 \text{ A}$) ($V_{DS} > 1.6 \text{ V}, I_D = 29 \text{ A}$)	g_{FS}	17 17	—	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	$V_{DS} = 25 \text{ V}, V_{GS} = 0,$ $f = 1 \text{ MHz}$	C_{iss}	—	3000	μF
Output Capacitance		C_{oss}	—	1200	
Reverse Transfer Capacitance		C_{rss}	—	400	

SWITCHING CHARACTERISTICS*

Turn-On Delay Time	$(V_{DD} = 25 \text{ V}, I_D = 29 \text{ Apk},$ $R_{gen} = \text{Ohms})$	$t_{d(on)}$	—	25	ns
Rise Time		t_r	—	60	
Turn-Off Delay Time		$t_{d(off)}$	—	70	
Fall Time		t_f	—	25	
Total Gate Charge	$(V_{DS} = 0.8 \text{ Rated } V_{DSS},$ $V_{GS} = 10 \text{ Vdc}, I_D = \text{Rated } I_D)$	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	$(I_S = \text{Rated } I_D,$ $V_{GS} = 0)$	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 $< 300 \mu\text{s}$, Duty Cycle $< 2\%$.
(1) Add 0.3 V for IRFZ40.

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

STY/3
PRT CASE
1 DRN
2 SOURCE
3 GATE

NOTES
1. DIMENSIONS ARE MILLIMETERS AND INCHES.
2. DIMENSIONS SHOWN ARE FOR ALL UNLESS OTHERWISE SPECIFIED.
3. DIMENSIONS SHOWN ARE FOR ALL UNLESS OTHERWISE SPECIFIED.

TEMPERATURE	MIN	TYP	MAX
$V_{GS(th)}$	2	4	—
$r_{DS(on)}$	—	0.028	0.035
$I_{D(on)}$	51	—	—
g_{FS}	17	—	—
V_{SD}	1.3	2.2	—
t_{on}	Limited by stray inductance		
t_{rr}	350	—	—