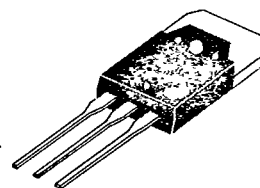


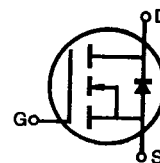
IRFP250/251/252/253**N-CHANNEL
POWER MOSFETS****FEATURES**

- Low $R_{DS(on)}$
- Improved inductive ruggedness
- Fast switching times
- Rugged polysilicon gate cell structure
- Low input capacitance
- Extended safe operating area
- Improved high temperature reliability
- TO-3P package

TO-3P

**PRODUCT SUMMARY**

Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRFP250	200V	0.085Ω	30A
IRFP251	150V	0.085Ω	30A
IRFP252	200V	0.12Ω	25A
IRFP253	150V	0.12Ω	25A

**MAXIMUM RATINGS**

Characteristic	Symbol	IRFP250	IRFP251	IRFP252	IRFP253	Unit
Drain-Source Voltage (1)	V_{DS}	200	150	200	150	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$) (1)	V_{DGR}	200	150	200	150	Vdc
Gate-Source Voltage	V_{GS}	± 20				Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	30	30	25	25	Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	19	19	16	16	Adc
Drain Current—Pulsed (3)	I_{DM}	120	120	100	100	Adc
Gate Current—Pulsed	I_{GM}	± 1.5				Adc
Total Power Dissipation @ $T_C=25^\circ C$	P_D	150				Watts
Derate above $25^\circ C$		1.2				W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to 150				$^\circ C$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300				$^\circ C$

Notes: (1) $T_J=25^\circ C$ to $150^\circ C$ (2) Pulse test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

(3) Repetitive rating: Pulse width limited by max. junction temperature

IRFP250/251/252/253**N-CHANNEL
POWER MOSFETS****ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Type	Min	Typ	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	IRFP250	200	—	—	V	$V_{GS}=0V$
		IRFP252	—	—	—	V	$I_D=250\mu A$
		IRFP251	150	—	—	V	
		IRFP253	—	—	—	V	
Gate Threshold Voltage	$V_{GS(th)}$	ALL	2.0	—	4.0	V	$V_{DS}=V_{GS}$, $I_D=250\mu A$
Gate-Source Leakage Forward	I_{GSS}	ALL	—	—	100	nA	$V_{GS}=20V$
Gate-Source Leakage Reverse	I_{GSS}	ALL	—	—	-100	nA	$V_{GS}=-20V$
Zero Gate Voltage Drain Current	I_{DSS}	ALL	—	—	250	μA	$V_{DS}=\text{Max. Rating}$, $V_{GS}=0V$
			—	—	1000	μA	$V_{DS}=\text{Max. Rating} \times 0.8$, $V_{GS}=0V$, $T_C=125^\circ\text{C}$
On-State Drain-Source Current (2)	$I_{D(on)}$	IRFP250	30	—	—	A	$V_{DS} > I_{D(on)} \times R_{DS(on) \text{ max.}}$, $V_{GS}=10V$
		IRFP251	—	—	—	A	
		IRFP252	25	—	—	A	
		IRFP253	—	—	—	A	
Static Drain-Source On-State Resistance (2)	$R_{DS(on)}$	IRFP250	—	0.07	0.085	Ω	$V_{GS}=10V$, $I_D=16A$
		IRFP251	—	—	—	Ω	
		IRFP252	—	0.09	0.120	Ω	
		IRFP253	—	—	—	Ω	
Forward Transconductance (2)	g_{fs}	ALL	8.0	12.5	—	S	$V_{DS} > I_{D(on)} \times R_{DS(on) \text{ max.}}$, $I_D=16A$
Input Capacitance	C_{iss}	ALL	—	2640	3000	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0\text{MHz}$
Output Capacitance	C_{oss}	ALL	—	800	1200	pF	
Reverse Transfer Capacitance	C_{rss}	ALL	—	300	500	pF	
Turn-On Delay Time	$t_{d(on)}$	ALL	—	—	35	ns	$V_{DD}=0.5BV_{DSS}$, $I_D=2.5A$, $Z_\theta=15^\circ\text{C}$ (MOSFET switching times are essentially independent of operating temperature)
Rise Time	t_r	ALL	—	—	100	ns	
Turn-Off Delay Time	$t_{d(off)}$	ALL	—	—	125	ns	
Fall Time	t_f	ALL	—	—	100	ns	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	ALL	—	68	120	nC	$V_{GS}=10V$, $I_D=38A$, $V_{DS}=0.8 \text{ Max. Rating}$ (Gate charge is essentially independent of operating temperature.)
Gate-Source Charge	Q_{gs}	ALL	—	18	—	nC	
Gate-Drain ("Miller") Charge	Q_{gd}	ALL	—	50	—	nC	

THERMAL RESISTANCE

Junction-to-Case	R_{thJC}	ALL	—	—	0.83	K/W	
Case-to-Sink	R_{thCS}	ALL	—	0.1	—	K/W	Mounting surface flat, smooth, and greased
Junction-to-Ambient	R_{thJA}	ALL	—	—	80	K/W	Free Air Operation

Notes: (1) $T_J=25^\circ\text{C}$ to 150°C (2) Pulse test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

(3) Repetitive rating: Pulse width limited by max. junction temperature

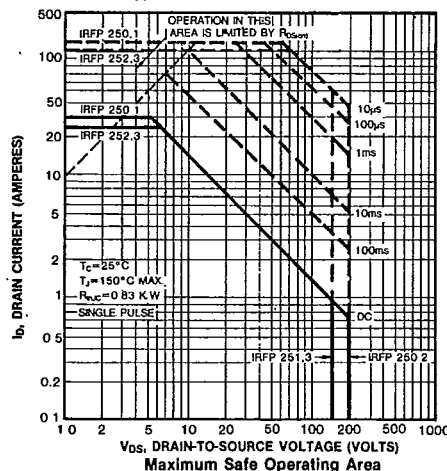
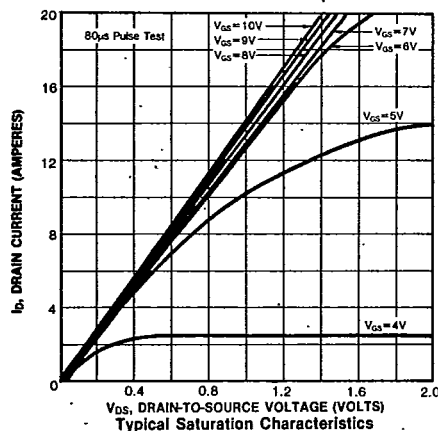
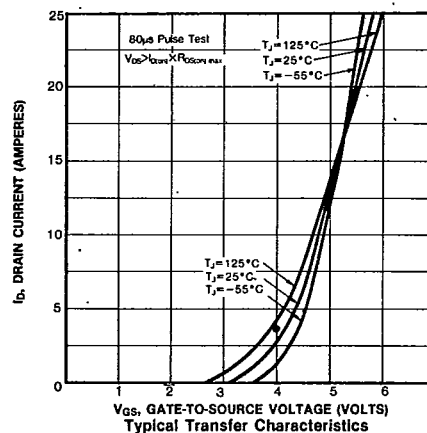
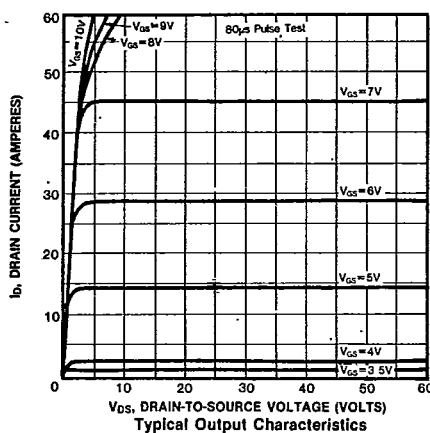


IRFP250/251/252/253

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

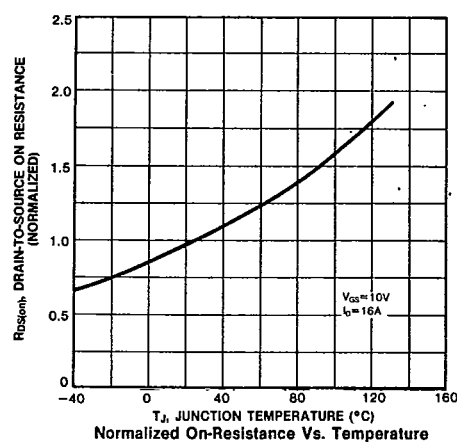
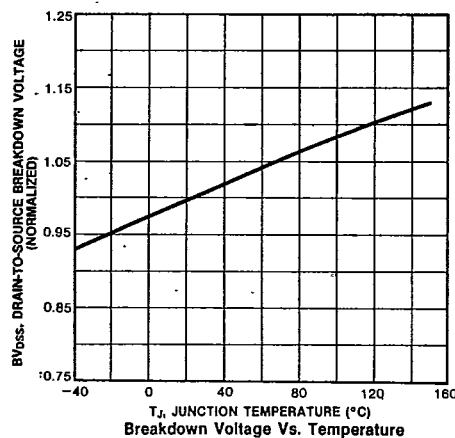
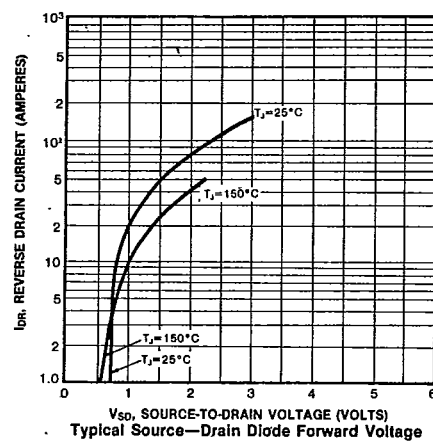
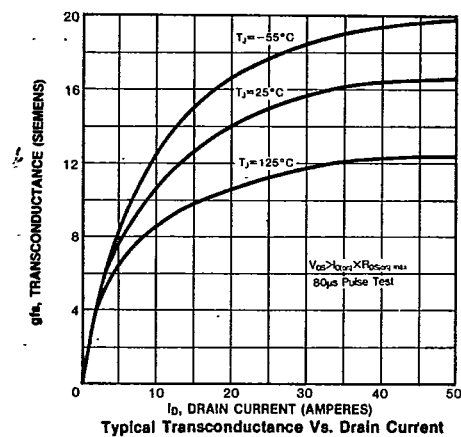
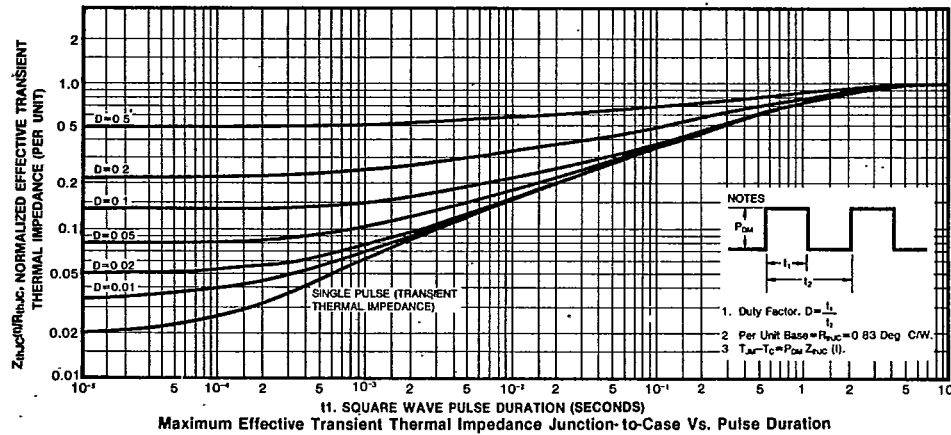
Characteristic	Symbol	Type	Min	Typ	Max	Units	Test Conditions
Continuous Source Current (Body Diode)	I_S	IRFP250	—	—	30	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier
		IRFP251	—	—	25	A	
		IRFP252	—	—	25	A	
		IRFP253	—	—	25	A	
Pulse Source Current (Body Diode) (3)	I_{SM}	IRFP250	—	—	120	A	
		IRFP251	—	—	100	A	
		IRFP252	—	—	100	A	
		IRFP253	—	—	100	A	
Diode Forward Voltage (2)	V_{SD}	IRFP250	—	—	2.0	V	$T_C = 25^\circ\text{C}$, $I_S = 30\text{A}$, $V_{GS} = 0\text{V}$
		IRFP251	—	—	1.8	V	$T_C = 25^\circ\text{C}$, $I_S = 25\text{A}$, $V_{GS} = 0\text{V}$
		IRFP252	—	—	1.8	V	$T_C = 25^\circ\text{C}$, $I_S = 25\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time	t_{rr}	ALL	—	750	—	ns	$T_J = 150^\circ\text{C}$, $I_F = 30\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$

Notes: (1) $T_J = 25^\circ\text{C}$ to 150°C (2) Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating: Pulse width limited by max. junction temperature



IRFP250/251/252/253

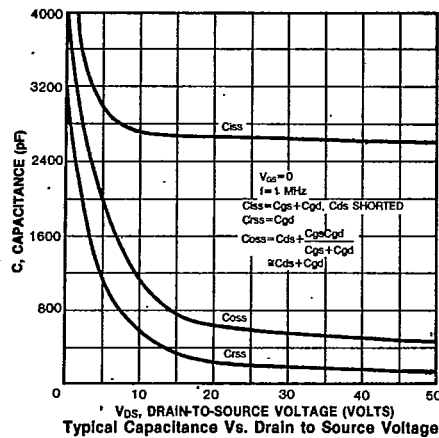
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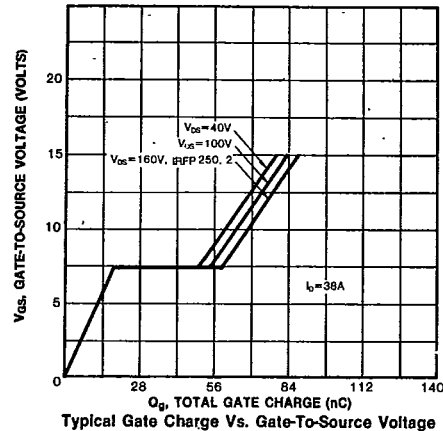
IRFP250/251/252/253

N-CHANNEL
POWER MOSFETS

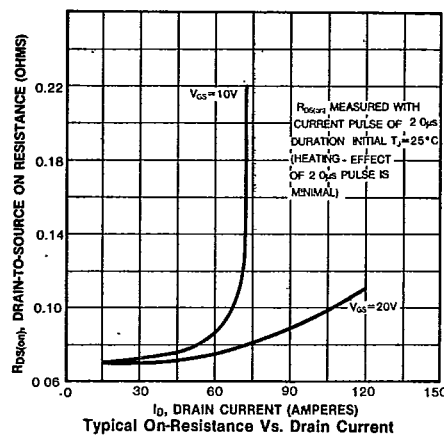
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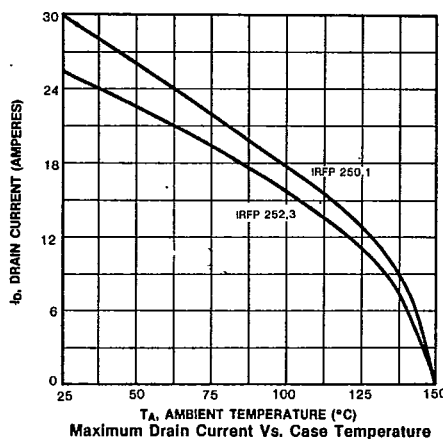
Typical Capacitance Vs. Drain to Source Voltage



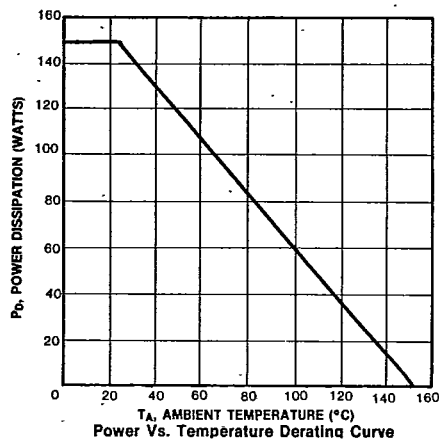
Typical Gate Charge Vs. Gate-To-Source Voltage



Typical On-Resistance Vs. Drain Current



Maximum Drain Current Vs. Case Temperature

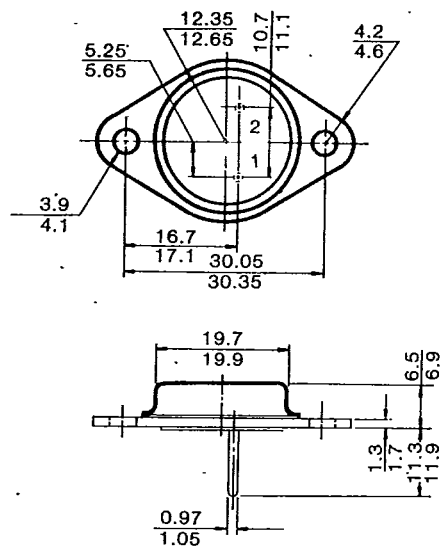


Power Vs. Temperature Derating Curve

PACKAGE DIMENSIONS

TO-3(Standard Type)

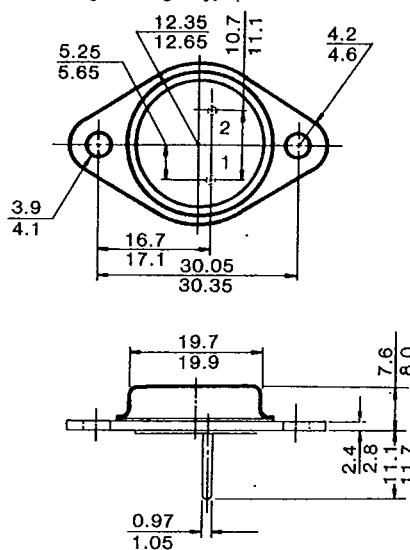
Unit: mm



1. Gate 2. Source Case: Drain

TO-3(High-Voltage Type)

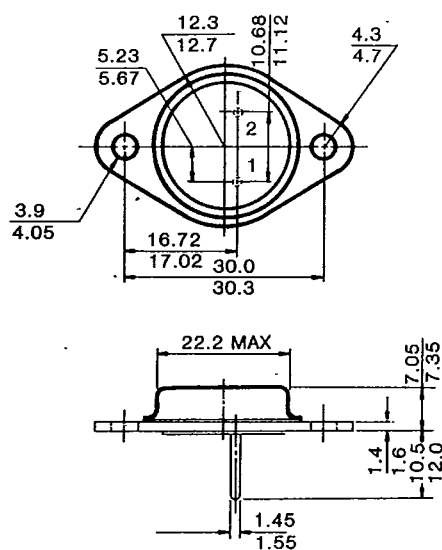
Unit: mm



1. Gate 2. Source Case: Drain

TO-3(High Current Type)

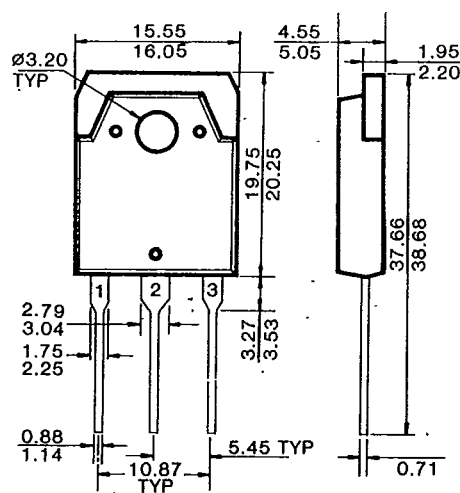
Unit: mm



1. Gate 2. Source Case: Drain

TO-3P

Unit: mm



1. Gate 2. Drain 3. Source

6°



SAMSUNG SEMICONDUCTOR

433

3811 F-12

