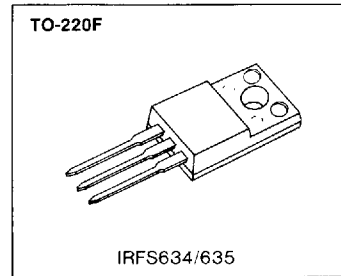


IRFS634/635

N-CHANNEL POWER MOSFETS

FEATURES

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



PRODUCT SUMMARY

Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRFS634	250V	0.45 Ω	5.5A
IRFS635	250V	0.68 Ω	4.4A

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ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	IRFS634	IRFS635	Unit
Drain-Source Voltage (1)	V_{DS}	250	250	Vdc
Drain-Gate Voltage ($R_{GS}=1.0\text{Mohm}$)(1)	V_{DGR}	250	250	Vdc
Gate-Source Voltage	V_{GS}		± 20	Vdc
Continuous Drain Current $T_C=25^\circ\text{C}$	I_D	5.5	4.4	Adc
Continuous Drain Current $T_C=100^\circ\text{C}$	I_D	3.5	2.8	Adc
Drain Current—Pulsed (3)	I_{DM}	32	26	Adc
Gate Current—Pulsed	I_{GM}		± 1.5	Adc
Single Pulsed Avalanche Energy (4)	E_{AS}		90	m_J
Avalanche Current	I_{AS}		5.5	A
Total Power Dissipation at $T_C=25^\circ\text{C}$ Derate above 25°C	P_D		35 0.28	Watts $W/^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}		-55 to 150	$^\circ\text{C}$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L		300	$^\circ\text{C}$

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 with limited by max. junction temperature

(4) $L=5.5\text{mH}$, $V_{dd}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

IRFS634/635

N-CHANNEL
POWER MOSFETSELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage IRFS634 IRFS635	250 250	— —	— —	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} =V _{GS} , I _D =250μA
I _{GSS}	Gate-Source Leakage Forward	—	—	100	nA	V _{GS} =20V
I _{GSS}	Gate-Source Leakage Reverse	—	—	-100	nA	V _{GS} =-20V
I _{DSS}	Zero Gate Voltage Drain Current	—	—	250	μA	V _{DS} =Max. Rating, V _{GS} =0V
		—	—	1000	μA	V _{DS} =Max. Rating, T _C =125°C
I _{D(on)}	On-State Drain-Source Current (2) IRFS634 IRFS635	8.1 6.5	— —	— —	A	V _{DS} ≥5.5V V _{GS} =10V
R _{DS(on)}	Static Drain-Source On-State Resistance (2) IRFS634 IRFS635	— —	0.40 0.45	0.45 0.68	Ω	V _{GS} =10V, I _D =4.1A
g _{fs}	Forward Transconductance (2)	2.9	—	—	∩	V _{DS} ≥50V, I _D =4.1A
C _{iss}	Input Capacitance	—	764	—	pF	V _{GS} =0V
C _{oss}	Output Capacitance	—	100	—	pF	V _{DS} =25V
C _{rss}	Reverse Transfer Capacitance	—	32	—	pF	f=1.0MHz
t _{d(on)}	Turn-On Delay Time	—	9.1	14	ns	V _{DD} =0.5 BV _{DSS} , I _D =8.1A Z _O =12Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	—	—	35	ns	
t _{d(off)}	Turn-Off Delay Time	—	31	47	ns	
t _f	Fall Time	—	19	29	ns	V _{GS} =10V, I _D =8.1A, V _{DS} =0.8. Max. Rating (Gate charge is essentially independent of operating temperature.)
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	—	24	35	nC	
Q _{gs}	Gate-Source Charge	—	5.1	7.7	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	—	12	8.1	nC	

THERMAL RESISTANCE

R _{thJC}	Junction-to-Case	MAX	3.57	K/W	
R _{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat smooth, and greased
R _{thJA}	Junction-to-Ambient	MAX	80	K/W	Free Air Operation

Notes: (1) T_J=25°C to 150°C

(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%

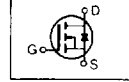
(3) Repetitive rating: Pulse width limited by max. junction temperature

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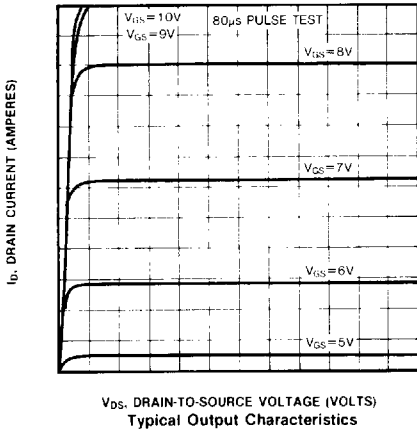
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SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

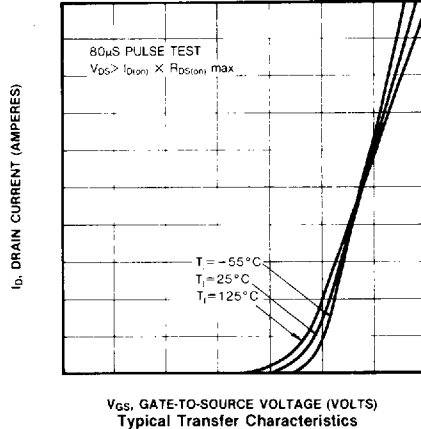
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	IRFS634 IRFS635	— —	8.1 6.5	A	Modified MOSFET integral reverse P-N junction rectifier
I_{SM}	Pulse Source Current (3)	IRFS634 IRFS635	— —	32 26	A	
V_{SD}	Diode Forward Voltage (2)	IRFS634 IRFS635	— —	2.0 2.0	V	$T_C=25^\circ\text{C}$, $I_S=8.1\text{A}$, $V_{GS}=0\text{V}$ $T_C=25^\circ\text{C}$, $I_S=8.1\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	—	190	390	ns	$T_J=25^\circ\text{C}$, $I_F=8.1\text{A}$, $dI_F/dt=100\text{A}/\mu\text{S}$



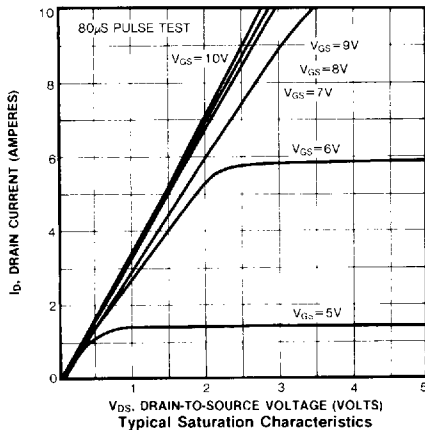
- Notes: (1) $T_J=25^\circ\text{C}$ to 150°C
 (2) Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating: Pulse with limited by max. junction temperature



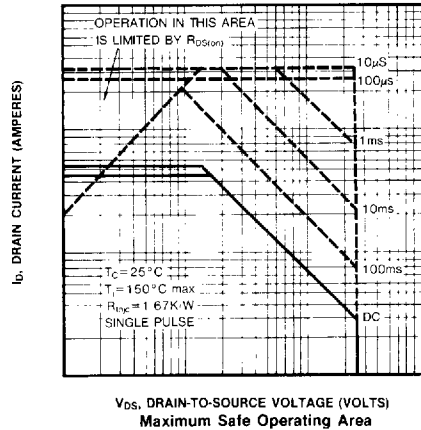
V_{DS} , DRAIN-TO-SOURCE VOLTAGE (VOLTS)
Typical Output Characteristics



V_{GS} , GATE-TO-SOURCE VOLTAGE (VOLTS)
Typical Transfer Characteristics



V_{DS} , DRAIN-TO-SOURCE VOLTAGE (VOLTS)
Typical Saturation Characteristics

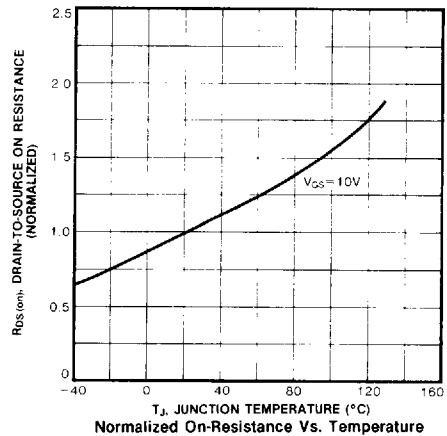
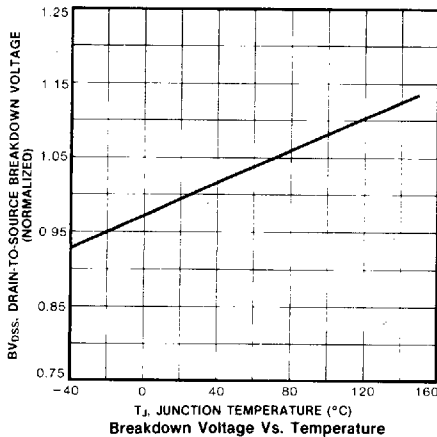
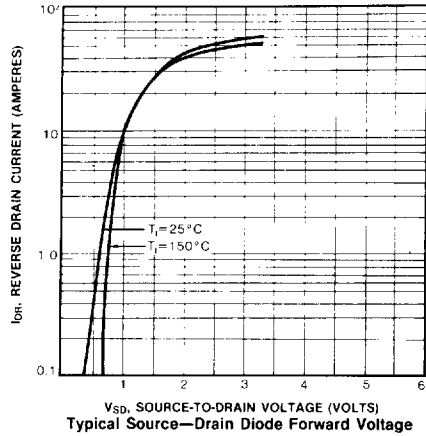
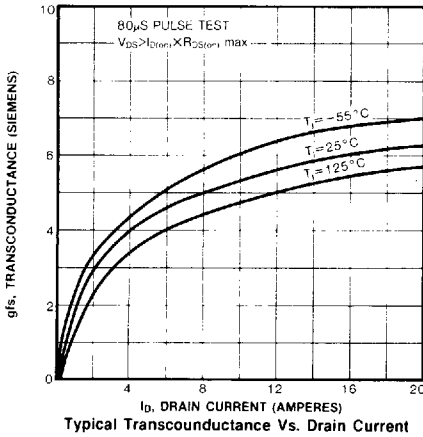
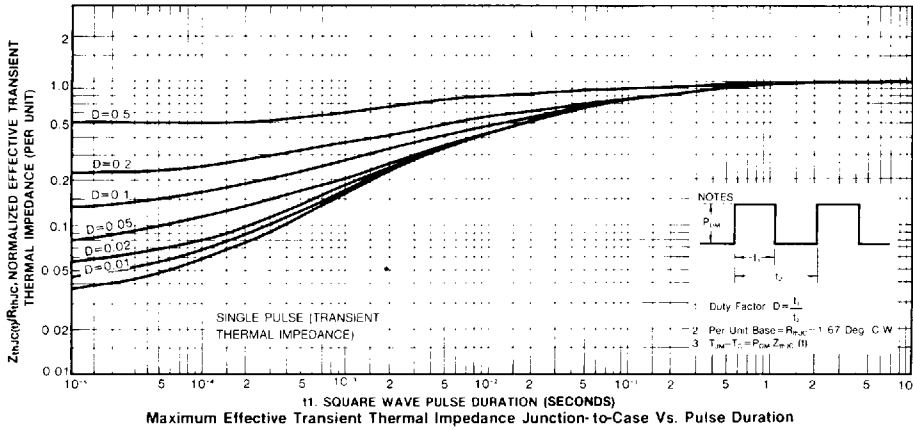


V_{DS} , DRAIN-TO-SOURCE VOLTAGE (VOLTS)
Maximum Safe Operating Area



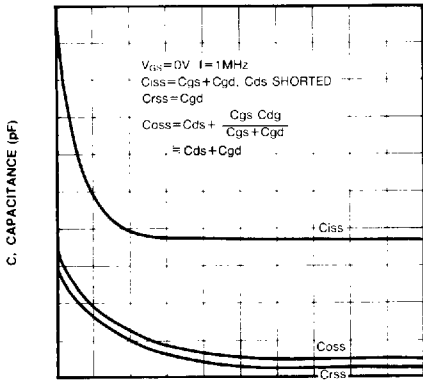
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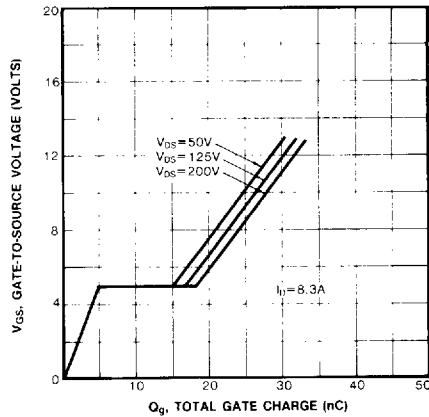


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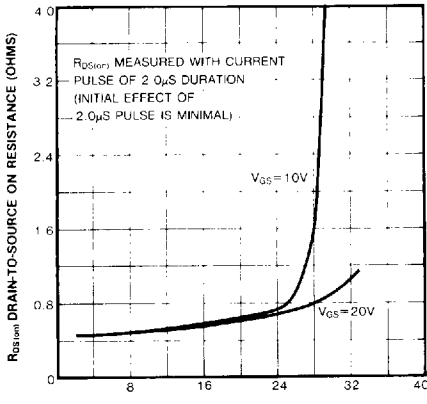
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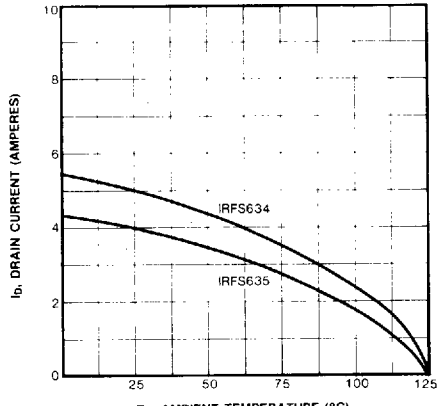
Typical Capacitance Vs. Drain to Source Voltage



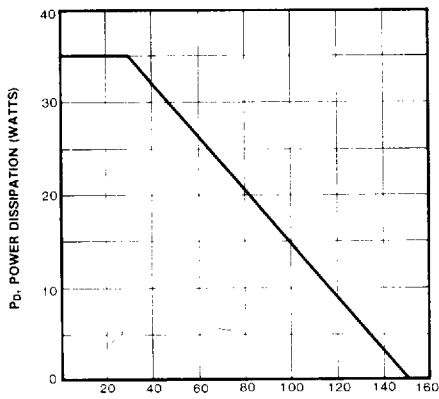
Typical Gate Charge Vs. Gate-To-Source Voltage



Typical On-Resistance Vs. Drain Current



Maximum Drain Current Vs. Case Temperature



Power Vs. Temperature Derating Curve

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