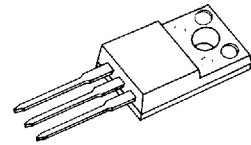


IRFS840/841/842/843**N-CHANNEL
POWER MOSFETS****FEATURES**

- 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

TO-220F



IRFS840/841/842/843

PRODUCT SUMMARY

Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRFS840	500V	0.85 Ω	4.5A
IRFS841	450V	0.85 Ω	4.5A
IRFS842	500V	1.1 Ω	4.0A
IRFS843	450V	1.1 Ω	4.0A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	IRFS840	IRFS841	IRFS842	IRFS843	Unit
Drain-Source Voltage (1)	V_{DSS}	500	450	500	450	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V_{DGR}	500	450	500	450	Vdc
Gate-Source Voltage	V_{GS}	± 20				Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	4.5	4.5	4.0	4.0	Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	2.8	2.8	2.5	2.5	Adc
Drain Current—Pulsed (3)	I_{DM}	32	32	28	28	Adc
Gate Current—Pulsed	I_{GM}	± 1.5				Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	161				mJ
Avalanche Current	I_{AS}	4.5				A
Total Power Dissipation at $T_C=25^\circ C$ Derate above $25^\circ C$	P_D	40 0.32				Watts 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 with limited by max. junction temperature

(4) $L=14mH$, $V_{dd}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

IRFS840/841/842/843

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 IRFS840/842 IRFS841/843	500	—	—	V	V _{GS} =0V, I _D =250μA
		450	—	—		
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 V _{DS} =0.8Max. Rating, T _C =125°C
		—	—	1000		
I _{D(on)}	On-State Drain-Source Current (2) IRFS840/841 IRFS842/843	8	—	—	A	V _{DS} ≥8.8V, V _{GS} =10V
		7	—	—		
R _{DS(on)}	Static Drain-Source On-State Resistance (2) IRFS840/841 IRFS842/843	—	0.76	0.85	Ω	V _{GS} =10V, I _D =4A
		—	0.85	1.10		
g _{fs}	Forward Transconductance (2)	4.0	6.5	—	Ω	V _{DS} ≥50V, I _D =4A
C _{iss}	Input Capacitance	—	1510	—	pF	V _{GS} =0V
C _{oss}	Output Capacitance	—	154	—	pF	V _{DS} =25V
C _{rss}	Reverse Transfer Capacitance	—	66	—	pF	f=1.0MHz
t _{d(on)}	Turn-On Delay Time	—	14	21	ns	V _{DD} =0.5 BV _{DSS} , I _D =8A, Z _O =19ohm (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	—	23	35	ns	
t _{d(off)}	Turn-Off Delay Time	—	49	74	ns	
t _f	Fall Time	—	20	30	ns	
Q _g	Total Gate Charge (Gate-Source Pulse Gate-Drain)	—	42	63	nC	
Q _{gs}	Gate-Source Charge	—	6.2	9.3	nC	V _{GS} =10V, I _D =8A, V _{DS} =0.8Max. Rating (Gate charge is essentially independent of operating temperature.)
Q _{gd}	Gate-Drain ("Miller") Charge	—	22	32	nC	

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THERMAL RESISTANCE

R _{thJC}	Junction-to-Case	MAX	3.12	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%

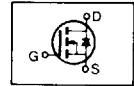
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IRFS840/841/842/843

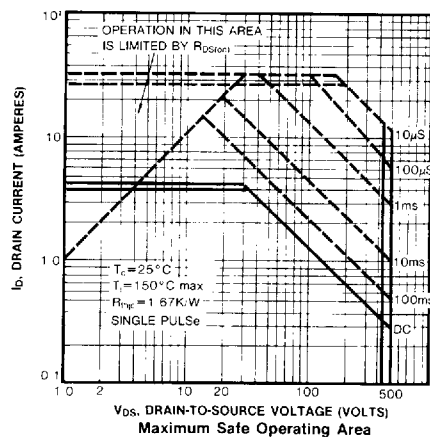
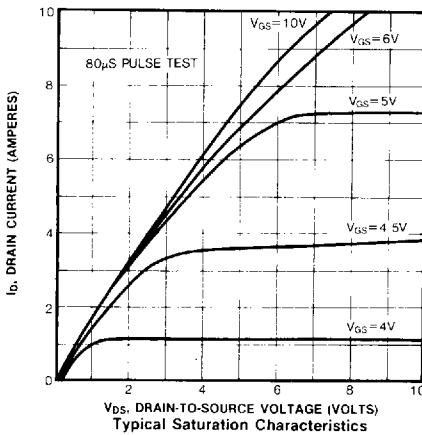
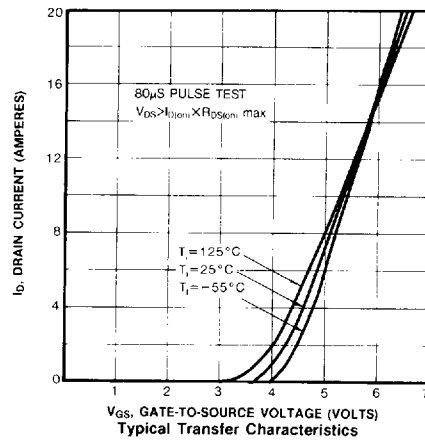
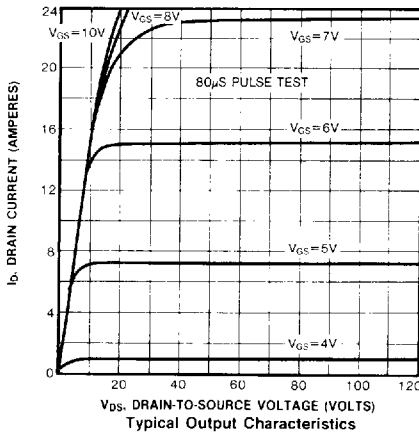
**N-CHANNEL
POWER MOSFETS**

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)					Modified MOSFET integral reverse P-N junction rectifier
	IRFS840/841	—	—	8	A	
I_{SM}	Pulse Source Current (3)					
	IRFS840/841	—	—	32	A	
V_{SD}	Diode Forward Voltage (2)					$T_C=25^\circ\text{C}$, $I_S=8\text{A}$, $V_{GS}=0\text{V}$ $T_C=25^\circ\text{C}$, $I_S=7\text{A}$, $V_{GS}=0\text{V}$
	IRFS842/843	—	—	1.9	V	
t_{rr}	Reverse Recovery Time	—	460	970	ns	$T_J=25^\circ\text{C}$, $I_F=10\text{A}$, $dI_F/dt=100\text{A}/\mu\text{s}$

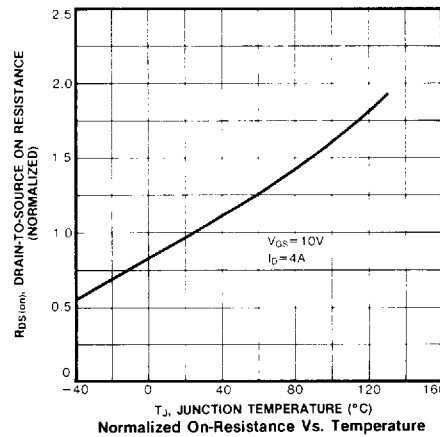
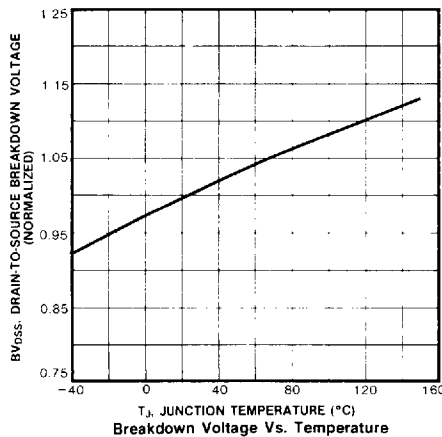
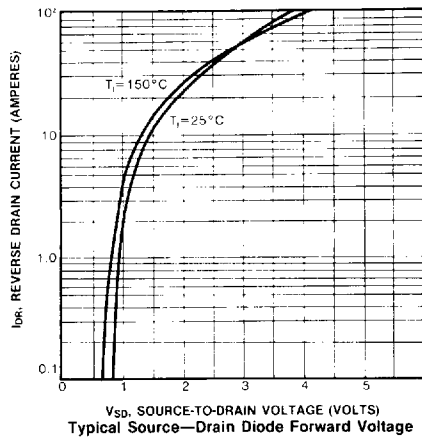
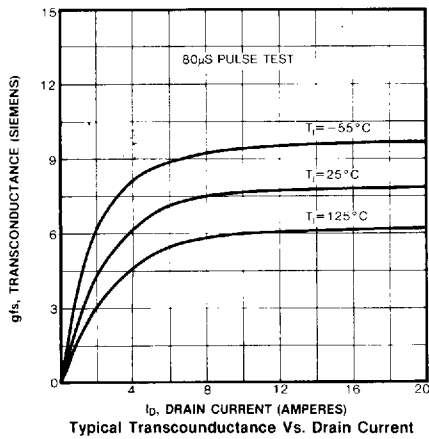
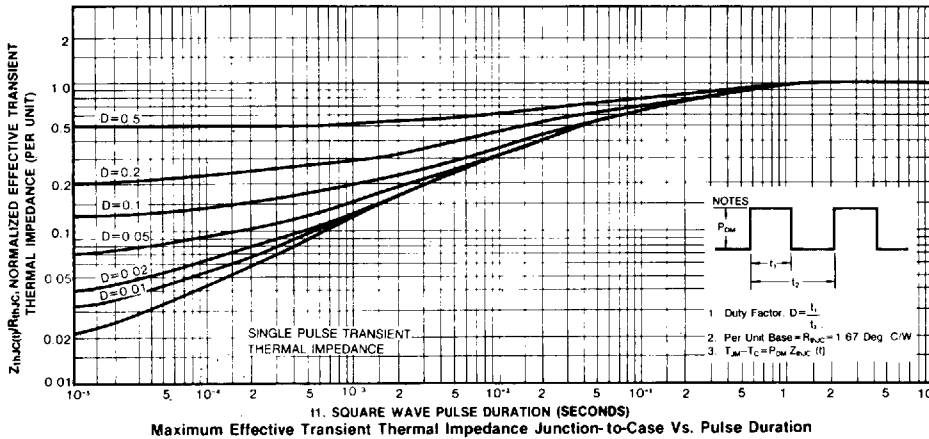


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 (3) Repetitive rating: Pulse with limited by max. junction temperature



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