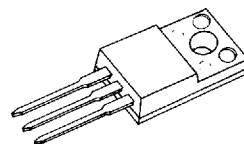


IRFS840/841/842/843**N-CHANNEL
POWER MOSFETS****FEATURES**

- 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	$0.85\ \Omega$	4.5A
IRFS841	450V	$0.85\ \Omega$	4.5A
IRFS842	500V	$1.1\ \Omega$	4.0A
IRFS843	450V	$1.1\ \Omega$	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 $T_C=25^\circ\text{C}$	I_D	4.5	4.5	4.0	4.0	Adc
Continuous Drain Current $T_C=100^\circ\text{C}$	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 $T_C=25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32				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) $L=14\text{mH}$, $V_{dd}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

IRFS840/841/842/843**N-CHANNEL
POWER MOSFETS****ELECTRICAL CHARACTERISTICS** ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage IRFS840/842 IRFS841/843	500 450	— —	— —	V	$V_{GS}=0V$, $I_D=250\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}$, $I_D=250\mu A$
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 1000	μA	$V_{DS}=\text{Max. Rating}$, $V_{GS}=0V$ $V_{DS}=0.8\text{Max. Rating}$, $T_C=125^\circ\text{C}$
$I_{D(on)}$	On-State Drain-Source Current (2) IRFS840/841 IRFS842/843	8 7	— —	— —	A	$V_{DS}\geq 8.8V$, $V_{GS}=10V$
$R_{DS(on)}$	Static Drain-Source On-State Resistance (2) IRFS840/841 IRFS842/843	— —	0.76 0.85	0.85 1.10	Ω	$V_{GS}=10V$, $I_D=4A$
g_{fs}	Forward Transconductance (2)	4.0	6.5	—	μ	$V_{DS}\geq 50V$, $I_D=4A$
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	$f=1.0\text{MHz}$
$t_{d(on)}$	Turn-On Delay Time	—	14	21	ns	$V_{DD}=0.5 BV_{DSS}$, $I_D=8A$, $Z_O=19\text{ohm}$ (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	$V_{GS}=10V$, $I_D=8A$, $V_{DS}=0.8\text{Max. Rating}$ (Gate charge is essentially independent of operating temperature.)
Q_{gs}	Gate-Source Charge	—	6.2	9.3	nC	
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) $T_J=25^\circ\text{C}$ to 150°C (2) Pulse test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

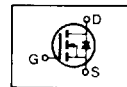
(3) Repetitive rating: Pulse width limited by max. junction temperature

IRFS840/841/842/843

N-CHANNEL
POWER MOSFETS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

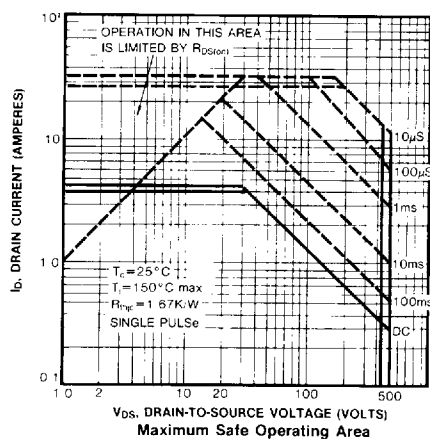
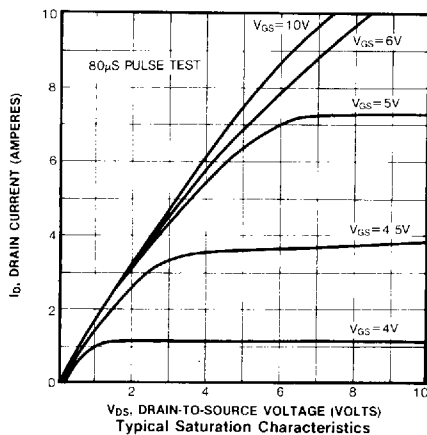
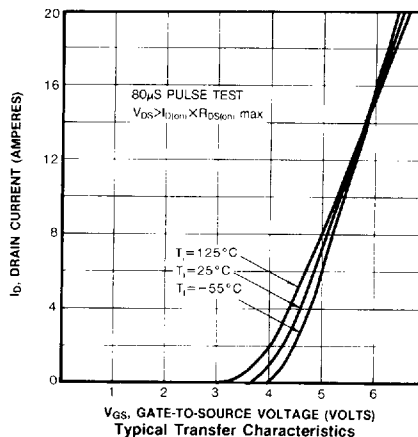
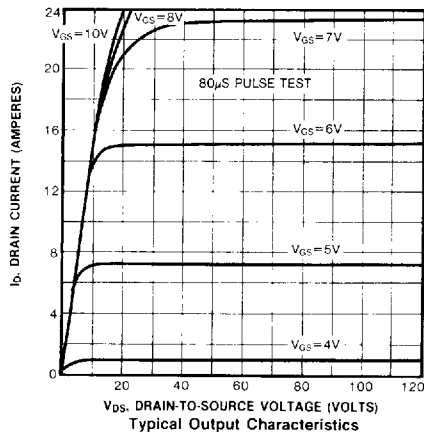
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode) IRFS840/841 IRFS842/843	—	—	8 7	A	Modified MOSFET integral reverse P-N junction rectifier
I_{SM}	Pulse Source Current (3) IRFS840/841 IRFS842/843	—	—	32 28	A	
V_{SD}	Diode Forward Voltage (2) IRFS840/841 IRFS842/843	—	—	2.0 1.9	V	$T_C = 25^\circ\text{C}$, $I_S = 8\text{A}$, $V_{GS} = 0\text{V}$ $T_C = 25^\circ\text{C}$, $I_S = 7\text{A}$, $V_{GS} = 0\text{V}$
t_{rr}	Reverse Recovery Time	—	460	970	ns	$T_J = 25^\circ\text{C}$, $I_F = 10\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$



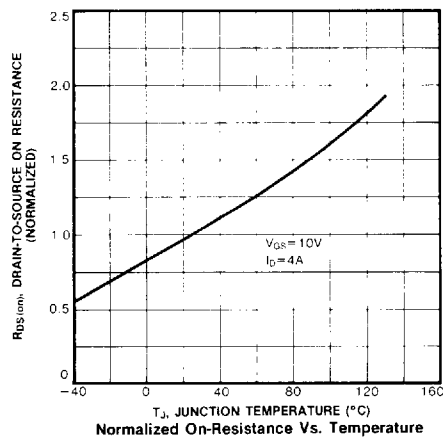
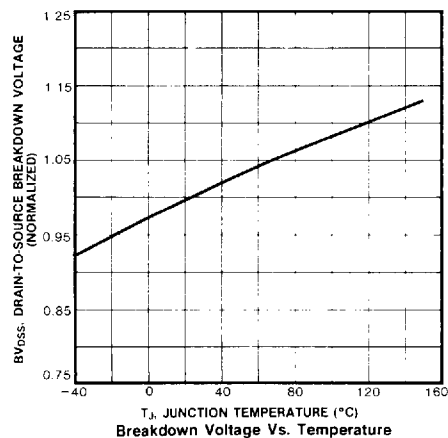
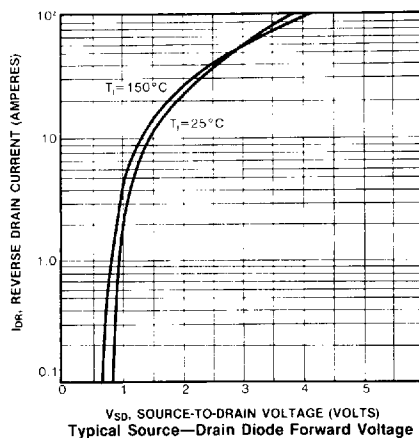
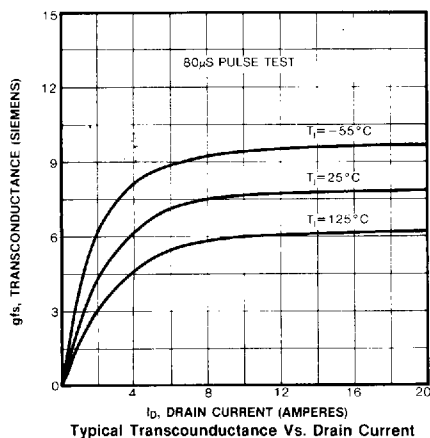
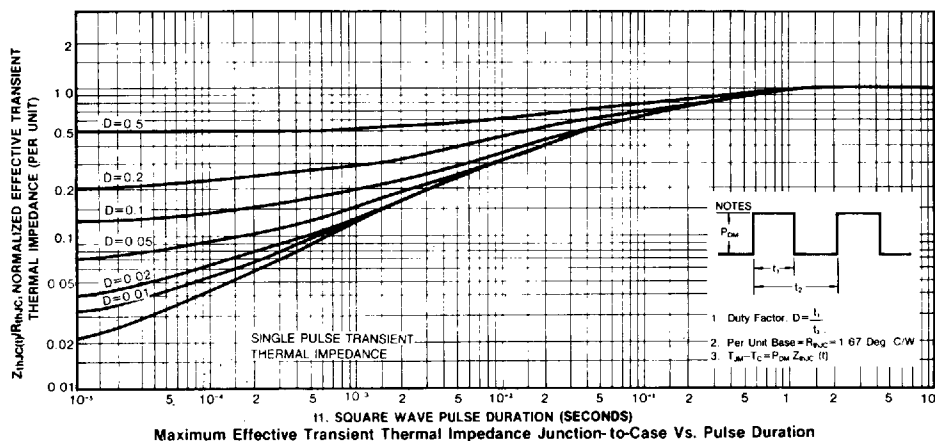
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