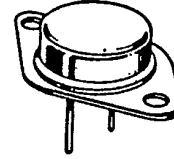


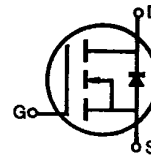
IRF140/141/142/143**N-CHANNEL
POWER MOSFETS****FEATURES**

- 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-3 package (High current)

TO-3

**PRODUCT SUMMARY**

| Part Number | V _{DS} | R _{DS(on)} | I _D |
|-------------|-----------------|---------------------|----------------|
| IRF140 | 100V | 0.085Ω | 27A |
| IRF141 | 60V | 0.085Ω | 27A |
| IRF142 | 100V | 0.11Ω | 24A |
| IRF143 | 60V | 0.11Ω | 24A |

**MAXIMUM RATINGS**

| Characteristic | Symbol | IRF140 | IRF141 | IRF142 | IRF143 | Unit |
|--|-----------------------------------|------------|--------|--------|--------|---------------|
| Drain-Source Voltage (1) | V _{DSS} | 100 | 60 | 100 | 60 | Vdc |
| Drain-Gate Voltage (R _{GS} =1.0MΩ) (1) | V _{DGR} | 100 | 60 | 100 | 60 | Vdc |
| Gate-Source Voltage | V _{GS} | ±20 | | | | Vdc |
| Continuous Drain Current T _C =25°C | I _D | 27 | 27 | 24 | 24 | Adc |
| Continuous Drain Current T _C =100°C | I _D | 17 | 17 | 15 | 15 | Adc |
| Drain Current—Pulsed (3) | I _{DM} | 108 | 108 | 96 | 96 | Adc |
| Gate Current—Pulsed | I _{GM} | ±1.5 | | | | Adc |
| Total Power Dissipation @ T _C =25°C Derate above 25°C | P _D | 125 1.0 | | | | Watts W/°C |
| Operating and Storage Junction Temperature Range | T _J , T _{stg} | -55 to 150 | | | | °C |
| Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds | T _L | 300 | | | | °C |

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

**SAMSUNG SEMICONDUCTOR**

IRF140/141/142/143

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

| Characteristic | Symbol | Type | Min | Typ | Max | Units | Test Conditions |
|---|---------------------|------------------|-----|------|-------|-------|--|
| Drain-Source Breakdown Voltage | BV _{DSS} | IRF140 IRF142 | 100 | — | — | V | V _{GS} =0V |
| | | IRF141 IRF143 | 60 | — | — | V | I _D =250μA |
| Gate Threshold Voltage | V _{GS(th)} | ALL | 2.0 | — | 4.0 | V | V _{DS} =V _{GS} , I _D =250μA |
| 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} =Max. Rating, V _{GS} =0V |
| | | | — | — | 1000 | μA | V _{DS} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C |
| On-State Drain-Source Current (2) | I _{D(on)} | IRF140 IRF141 | 27 | — | — | A | V _{DS} >I _{D(on)} ×R _{DS(on)} max., V _{GS} =10V |
| | | IRF142 IRF143 | 24 | — | — | A | |
| Static Drain-Source On-State Resistance (2) | R _{DS(on)} | IRF140 IRF141 | — | 0.06 | 0.085 | Ω | V _{GS} =10V, I _D =15A |
| | | IRF142 IRF143 | — | 0.09 | 0.11 | Ω | |
| Forward Transconductance (2) | g _{fs} | ALL | 6.0 | 10.5 | — | Ω | V _{DS} >I _{D(on)} ×R _{DS(on)} max., I _D =15A |
| Input Capacitance | C _{iss} | ALL | — | 1320 | 1600 | pF | V _{GS} =0V, V _{DS} =25V, f=1.0MHz |
| Output Capacitance | C _{oss} | ALL | — | 600 | 800 | pF | |
| Reverse Transfer Capacitance | C _{rss} | ALL | — | 250 | 300 | pF | |
| Turn-On Delay Time | t _{d(on)} | ALL | — | — | 30 | ns | V _{DD} =0.5BV _{DSS} , I _D =15A, Z _O =4.7 Ω (MOSFET switching times are essentially independent of operating temperature.) |
| Rise Time | t _r | ALL | — | — | 60 | ns | |
| Turn-Off Delay Time | t _{d(off)} | ALL | — | — | 80 | ns | |
| Fall Time | t _f | ALL | — | — | 30 | ns | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | Q _g | ALL | — | 39 | 60 | nC | V _{GS} =10V, I _D =34A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature.) |
| Gate-Source Charge | Q _{gs} | ALL | — | 12 | — | nC | |
| Gate-Drain ("Miller") Charge | Q _{gd} | ALL | — | 27 | — | nC | |

THERMAL RESISTANCE

| | | | | | | | |
|---------------------|-------------------|-----|---|-----|-----|-----|--|
| Junction-to-Case | R _{thJC} | ALL | — | — | 1.0 | K/W | |
| Case-to-Sink | R _{thCS} | ALL | — | 0.1 | — | K/W | Mounting surface flat, smooth, and greased |
| Junction-to-Ambient | R _{thJA} | ALL | — | — | 30 | 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

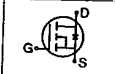


SAMSUNG SEMICONDUCTOR

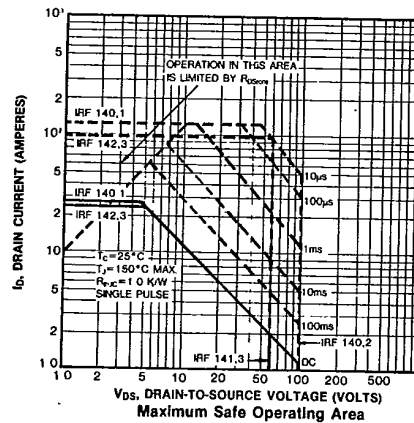
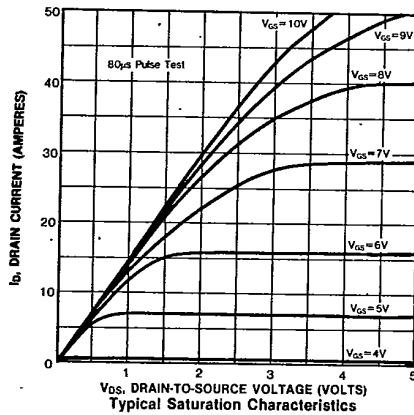
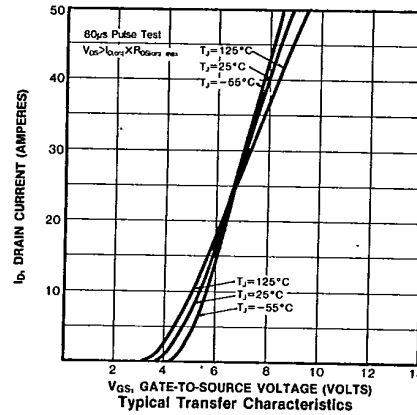
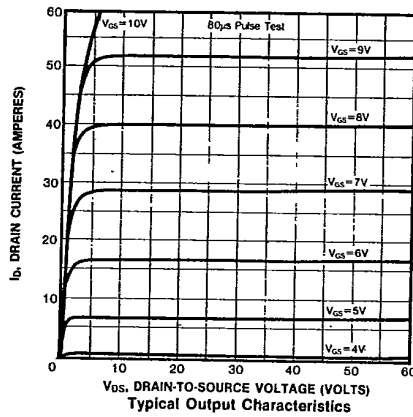
IRF140/141/142/143

N-CHANNEL POWER MOSFETS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

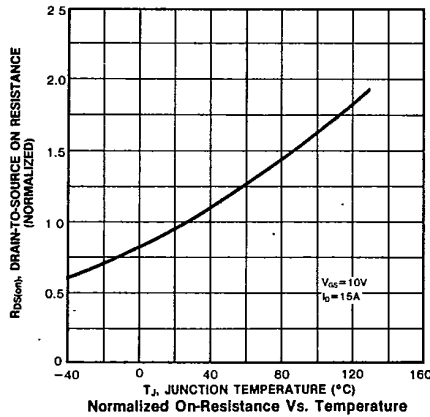
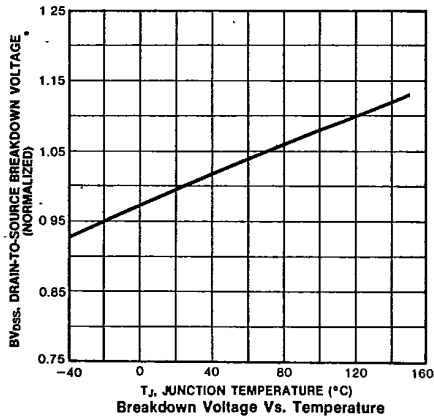
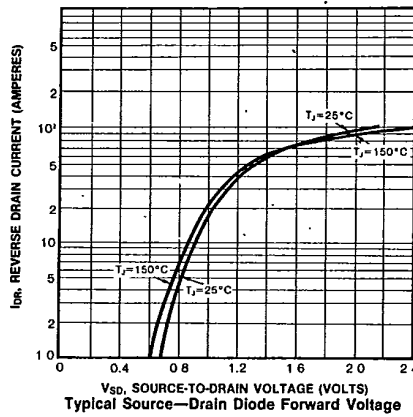
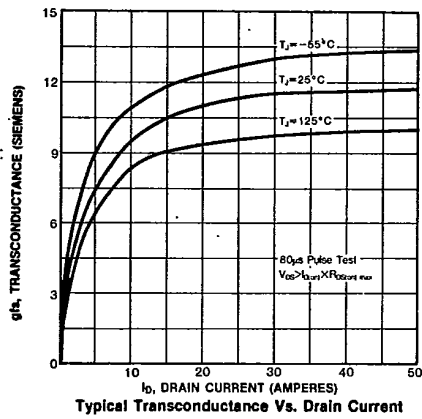
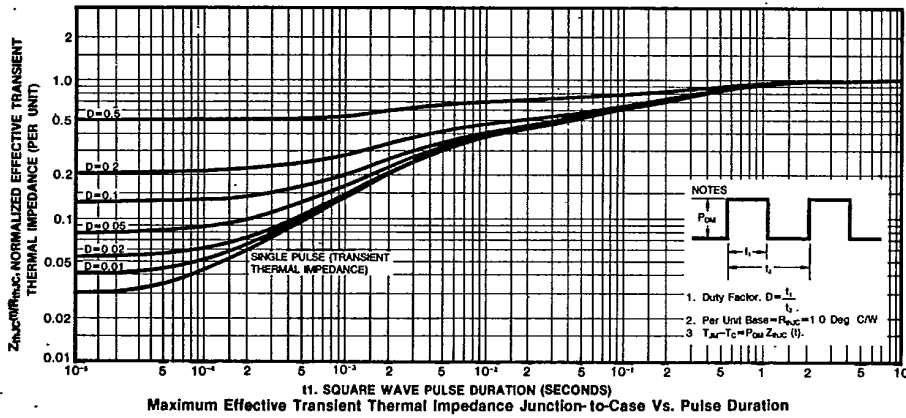
| Characteristic | Symbol | Type | Min | Typ | Max | Units | Test Conditions |
|--|-----------------|--------|-----|-----|-----|-------|--|
| Continuous Source Current (Body Diode) | I _S | IRF140 | — | — | 27 | A | Modified MOSFET symbol showing the integral reverse P-N junction rectifier  |
| | | IRF141 | — | — | 27 | A | |
| Pulse Source Current (Body Diode) (3) | I _{SM} | IRF142 | — | — | 24 | A | |
| | | IRF143 | — | — | 24 | A | |
| | | IRF140 | — | — | 108 | A | |
| Diode Forward Voltage (2) | V _{SD} | IRF141 | — | — | 108 | A | T _C =25°C, I _S =27A, V _{GS} =0V |
| | | IRF142 | — | — | 96 | A | T _C =25°C, I _S =24A, V _{GS} =0V |
| | | IRF143 | — | — | 96 | A | T _C =25°C, I _S =24A, V _{GS} =0V |
| Reverse Recovery Time | t _{rr} | ALL | — | 500 | — | ns | T _J =150°C, I _F =27A, di/dt=100A/μs |

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



IRF140/141/142/143

N-CHANNEL POWER MOSFETS



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IRF140/141/142/143

**N-CHANNEL
POWER MOSFETS**

