

**HEXFET® POWER MOSFET
SURFACE MOUNT (SMD-1)**

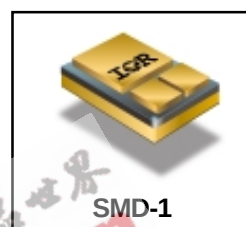
**IRF5N3710
100V, N-CHANNEL**

Product Summary

Part Number	BVDSS	RDS(on)	Id
IRF5N3710	100V	0.028Ω	45A

Fifth Generation HEXFET® power MOSFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon unit area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

These devices are well-suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high-energy pulse circuits.



Features:

- Low RDS(on)
- Avalanche Energy Ratings
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed
- Surface Mount
- Light Weight

Absolute Maximum Ratings

	Parameter		Units
Id @ VGS = 10V, TC = 25°C	Continuous Drain Current	45	A
Id @ VGS = 10V, TC = 100°C	Continuous Drain Current	30	
IDM	Pulsed Drain Current ①	180	
PD @ TC = 25°C	Max. Power Dissipation	125	W
	Linear Derating Factor	1.0	W/°C
VGS	Gate-to-Source Voltage	±20	V
EAS	Single Pulse Avalanche Energy ②	250	mJ
IAR	Avalanche Current ①	28	A
EAR	Repetitive Avalanche Energy ①	12.5	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.7	V/ns
TJ	Operating Junction	-55 to 150	°C
TSTG	Storage Temperature Range		
	Package Mounting Surface Temperature	300 (for 5 s)	
	Weight	2.6 (Typical)	g

For footnotes refer to the last page

www.irf.com

Electrical Characteristics @ T_j = 25°C (Unless Otherwise Specified)

	Parameter	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	100	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _j	Temperature Coefficient of Breakdown Voltage	—	0.104	—	V/°C	Reference to 25°C, I _D = 1.0mA
R _{DS(on)}	Static Drain-to-Source On-State Resistance	—	—	0.028	Ω	V _{GS} = 10V, I _D = 28A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	20	—	—	S (Ω)	V _{DS} = 15V, I _{DS} = 28A ④
I _{DSS}	Zero Gate Voltage Drain Current	—	—	25	μA	V _{DS} = 100V, V _{GS} = 0V
		—	—	250		V _{DS} = 80V, V _{GS} = 0V, T _j = 125°C
I _{GSS}	Gate-to-Source Leakage Forward	—	—	100	nA	V _{GS} = -20V
I _{GSS}	Gate-to-Source Leakage Reverse	—	—	-100		V _{GS} = -20V
Q _g	Total Gate Charge	—	—	200	nC	V _{GS} = 10V, I _D = 28A
Q _{gs}	Gate-to-Source Charge	—	—	28		V _{DS} = 80V
Q _{gd}	Gate-to-Drain ('Miller') Charge	—	—	94		
t _{d(on)}	Turn-On Delay Time	—	—	25	ns	V _{DD} = 50V, I _D = 28A, V _{GS} = 10V, R _G = 2.5Ω
t _r	Rise Time	—	—	86		
t _{d(off)}	Turn-Off Delay Time	—	—	75		
t _f	Fall Time	—	—	54		
L _S + L _D	Total Inductance	—	4.0	—	nH	Measured from the center of drain pad to center of source pad
C _{iss}	Input Capacitance	—	2920	—	pF	V _{GS} = 0V, V _{DS} = 25V f = 1.0MHz
C _{oss}	Output Capacitance	—	700	—		
C _{rss}	Reverse Transfer Capacitance	—	340	—		

Source-Drain Diode Ratings and Characteristics

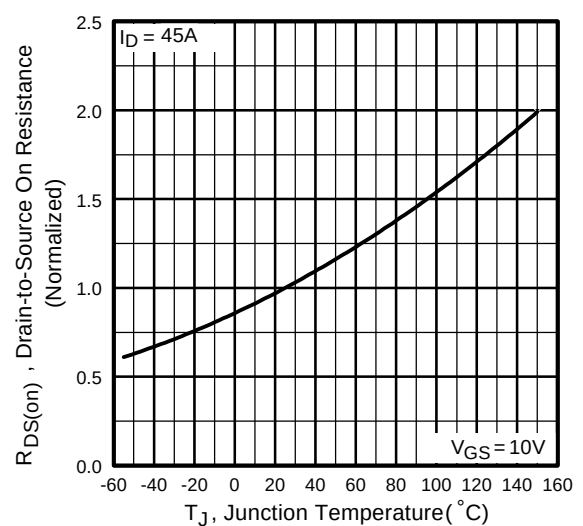
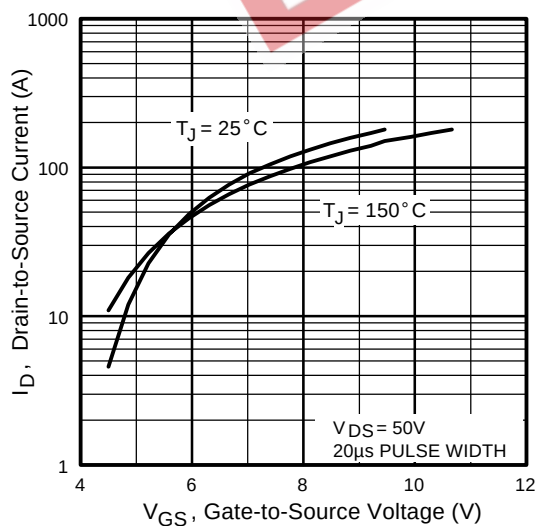
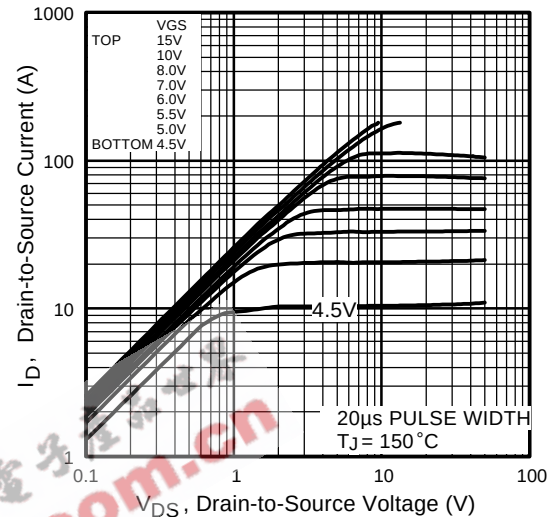
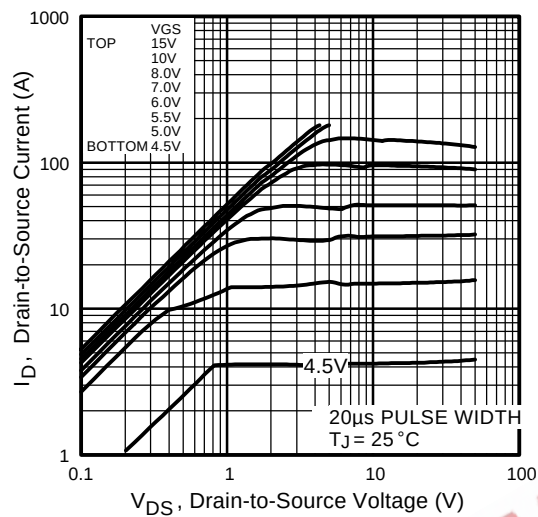
	Parameter	Min	Typ	Max	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	45	A	T _J = 25°C, I _S = 28A, V _{GS} = 0V ④
I _{SM}	Pulse Source Current (Body Diode) ①	—	—	180		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J = 25°C, I _F = 28A, di/dt ≤ 100A/μs V _{DD} ≤ 50V ④
t _{rr}	Reverse Recovery Time	—	—	280	ns	
Q _{RR}	Reverse Recovery Charge	—	—	2.0	μC	
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by L _S + L _D .				

Thermal Resistance

	Parameter	Min	Typ	Max	Units	Test Conditions
R _{thJC}	Junction-to-Case	—	—	1.0	°C/W	

Note: Corresponding Spice and Saber models are available on the G&S Website.

For footnotes refer to the last page



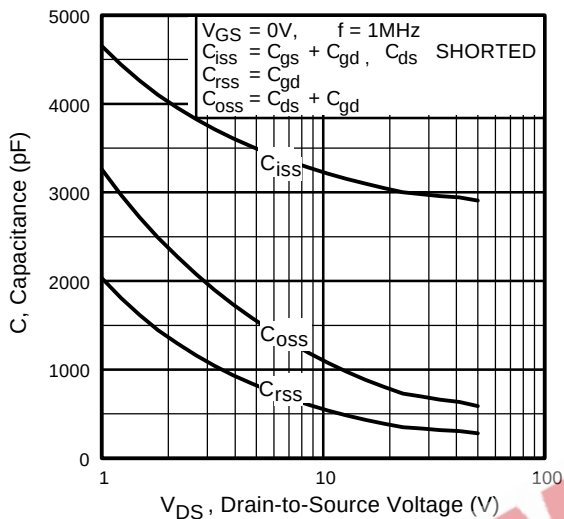


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

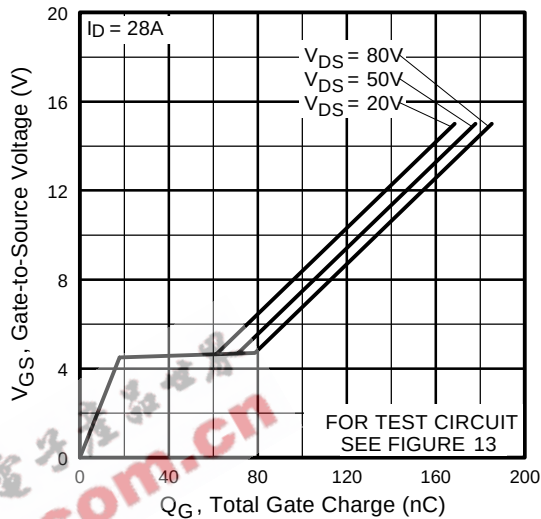


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

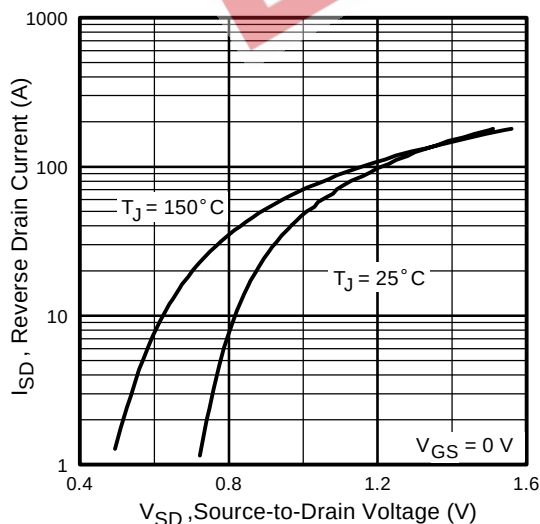


Fig 7. Typical Source-Drain Diode Forward Voltage

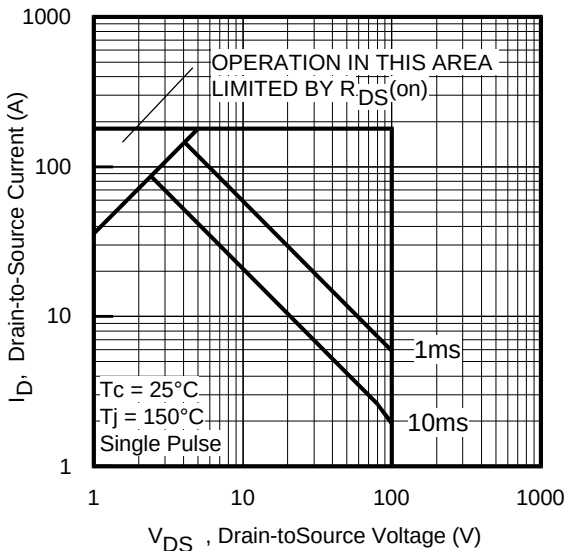


Fig 8. Maximum Safe Operating Area

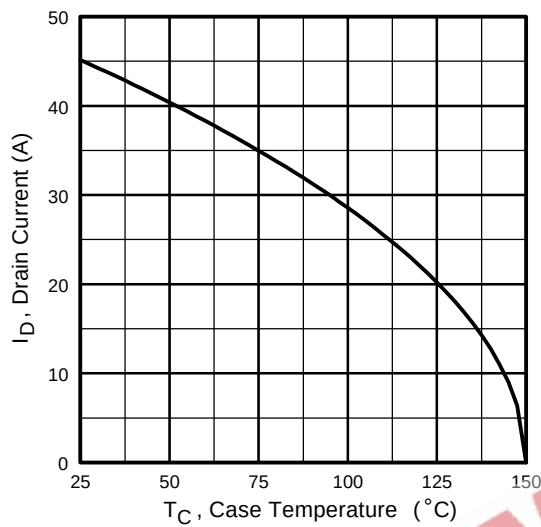


Fig 9. Maximum Drain Current Vs. Case Temperature

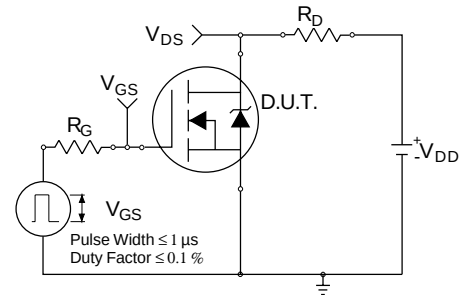


Fig 10a. Switching Time Test Circuit

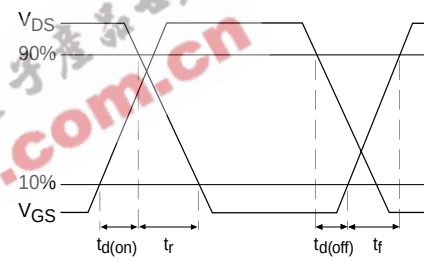


Fig 10b. Switching Time Waveforms

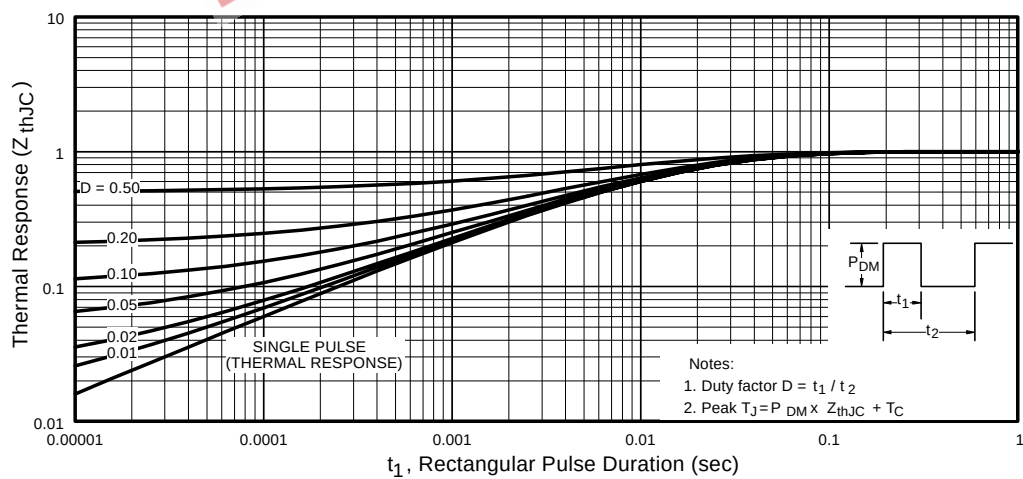


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

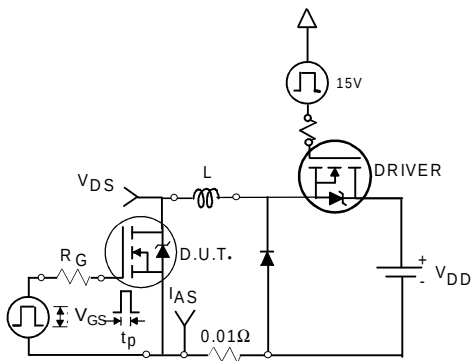


Fig 12a. Unclamped Inductive Test Circuit

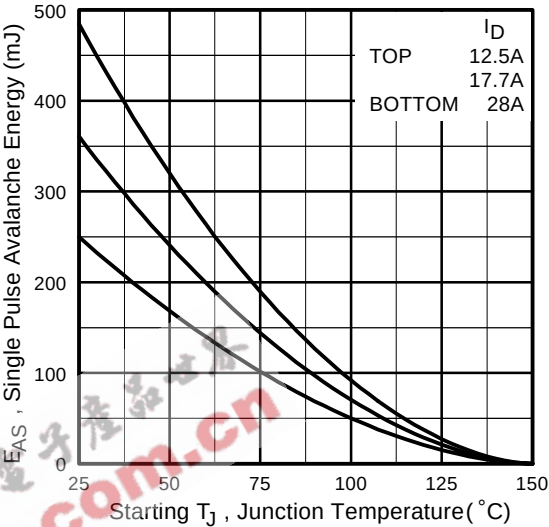


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

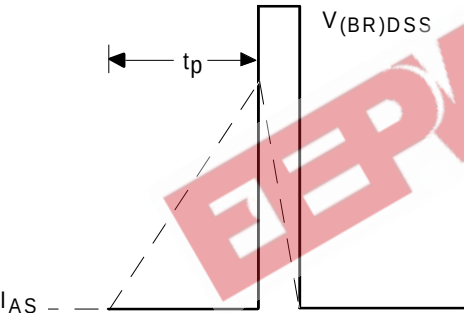


Fig 12b. Unclamped Inductive Waveforms

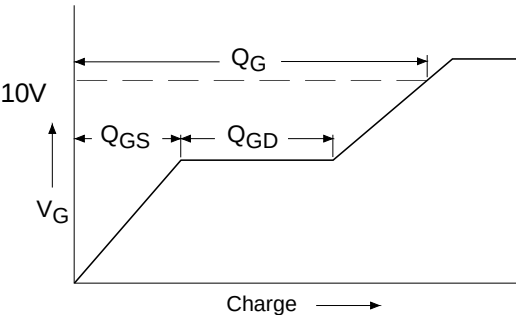


Fig 13a. Basic Gate Charge Waveform

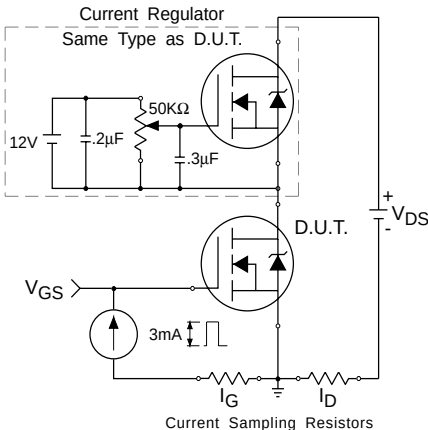


Fig 13b. Gate Charge Test Circuit

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
- ② $V_{DD} = 25\text{ V}$, Starting $T_J = 25^\circ\text{C}$, $L = 0.64\text{ mH}$
Peak $I_{AS} = 28\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 25\Omega$

- ③ $I_{SD} \leq 28A$, $di/dt \leq 390 A/\mu s$,
 $V_{DD} \leq 100V$, $T_J \leq 150^\circ C$
- ④ Pulse width $\leq 300 \mu s$; Duty Cycle $\leq 2\%$

Technical drawing of a mechanical part showing three views: front, side, and top. The drawing includes dimensions in millimeters (mm) and inches (in), surface finish symbols, and feature control frames.

Front View Dimensions:

- Overall width: 11.55 [.455]
- Overall height: 16.00 [.630]
- Inner width: 11.31 [.445]
- Inner height: 15.75 [.620]

Side View Dimensions:

- Overall width: 3.58 [.141] MAX.
- Overall height: 8.61 [.339]
- Inner height: 1.99 [.0785]

Top View Dimensions:

- Overall width: 9.65 [.380]
- Overall height: 9.40 [.370]
- Inner width: 10.66 [.420]
- Inner height: 10.42 [.410]
- Distance from center to feature 1: 8.09 [.318]
- Distance from center to feature 2: 4.11 [.162]
- Distance from center to feature 3: 3.87 [.152]
- Distance from center to feature 4: 0.76 [.030] MIN.
- Distance from center to feature 5: 0.89 [.035] MIN.
- Distance from center to feature 6: 2.67 [.105]
- Distance from center to feature 7: 5.33 [.210]

Surface Finish and Feature Control Frames:

- Surface finish symbol: 0.102 [.004]
- Feature 1: 3 SURFACES
- Feature 2: 3X 0.508 [.020] 0.254 [.010]
- Feature 3: 2X 3.68 [.145] 3.43 [.135]
- Feature 4: 0.76 [.030] MIN.
- Feature 5: 0.89 [.035] MIN.
- Feature 6: 2.67 [.105]
- Feature 7: 5.33 [.210]

Feature Control Frames:

- Feature 1: 0.254 [.010] M C A
- Feature 2: 0.254 [.010] M C B
- Feature 3: 0.254 [.010] M C B
- Feature 4: 0.254 [.010] M C A
- Feature 5: 0.254 [.010] M C B
- Feature 6: 0.254 [.010] M C A
- Feature 7: 0.254 [.010] M C B

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. DIMENSION INCLUDES METALLIZATION FLASH.
5. DIMENSION DOES NOT INCLUDE METALLIZATION FLASH.

1 = DRAIN
2 = GATE
3 = SOURCE