International
IOR Rectifier

IRF6811SPbF
IRF6811STRPbF

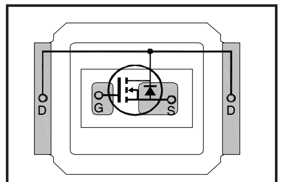
DirectFET®*plus* Power MOSFET ②

Typical values (unless otherwise specified)

V_{DSS}	V_{GS}	$R_{DS(on)}$	$R_{DS(on)}$
25V max	±16V max	2.8mΩ @ 10V	4.1mΩ @ 4.5V

$Q_{g\ tot}$	Q_{gd}	Q_{gs2}	Q_{rr}	Q_{oss}	$V_{gs(th)}$
11nC	4.2nC	1.4nC	23nC	11nC	1.6V

- RoHS Compliant and Halogen Free ①
- Low Profile (<0.7 mm)
- Dual Sided Cooling Compatible ①
- Ultra Low Package Inductance
- Optimized for High Frequency Switching ①
- Ideal for CPU Core DC-DC Converters
- Optimized for Control FET Application①
- Compatible with existing Surface Mount Techniques ①
- 100% Rg tested
- Footprint compatible to DirectFET



SQ

ISOMETRIC

Applicable DirectFET Outline and Substrate Outline (see p.7,8 for details)

SQ	SX	ST		MQ	MX	MT	MP			

Description

The IRF6811STRPbF combines the latest HEXFET® Power MOSFET Silicon technology with the advanced DirectFET® packaging to achieve improved performance in a package that has the footprint of a MICRO-8 and only 0.7 mm profile. The DirectFET® package is compatible with existing layout geometries used in power applications, PCB assembly equipment and vapor phase, infra-red or convection soldering techniques, when application note AN-1035 is followed regarding the manufacturing methods and processes. The DirectFET® package allows dual sided cooling to maximize thermal transfer in power systems, improving previous best thermal resistance by 80%.

The IRF6811STRPbF has low gate resistance and low charge along with ultra low package inductance providing significant reduction in switching losses. The reduced losses make this product ideal for high efficiency DC-DC converters that power the latest generation of processors operating at higher frequencies. The IRF6811STRPbF has been optimized for the control FET socket of synchronous buck operating from 12 volt bus converters.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	25	V
V_{GS}	Gate-to-Source Voltage	±16	
I_D @ $T_A = 25°C$	Continuous Drain Current, V_{GS} @ 10V ③	19	A
I_D @ $T_A = 70°C$	Continuous Drain Current, V_{GS} @ 10V ③	15	
I_D @ $T_C = 25°C$	Continuous Drain Current, V_{GS} @ 10V ④	74	
I_{DM}	Pulsed Drain Current ⑤	150	
E_{AS}	Single Pulse Avalanche Energy ⑥	32	mJ
I_{AR}	Avalanche Current ⑤	15	A

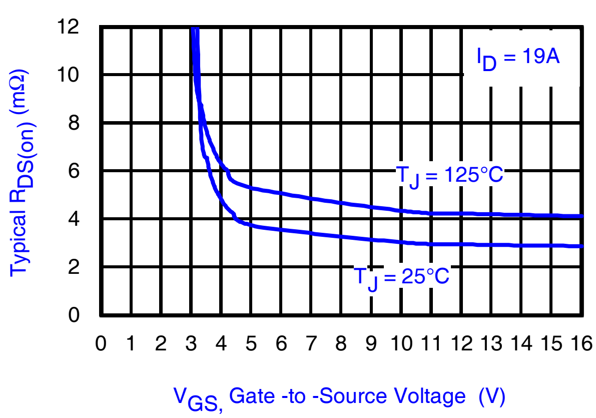


Fig 1. Typical On-Resistance vs. Gate Voltage

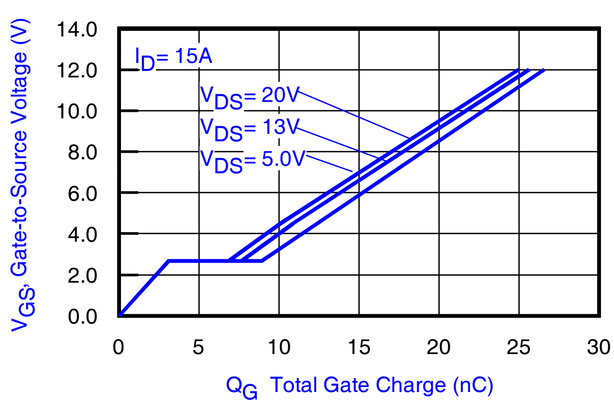


Fig 2. Typical Total Gate Charge vs Gate-to-Source Voltage

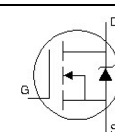
Notes:

① Click on this section to link to the appropriate technical paper.
② Click on this section to link to the DirectFET Website.
③ Surface mounted on 1 in. square Cu board, steady state.
④ T_C measured with thermocouple mounted to top (Drain) of part.
⑤ Repetitive rating; pulse width limited by max. junction temperature.
⑥ Starting $T_J = 25°C$, L = 0.28mH, $R_G = 50\Omega$, $I_{AS} = 15A$.

Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	25	——	——	V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	22	——	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	2.8	3.7	mΩ	V_{GS} = 10V, I_D = 19A ⑦
		——	4.1	5.4		V_{GS} = 4.5V, I_D = 15A ⑦
$V_{GS(th)}$	Gate Threshold Voltage	1.1	1.6	2.1	V	$V_{DS} = V_{GS}$, I_D = 35μA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	——	-6.2	——	mV/°C	$V_{DS} = V_{GS}$, I_D = 25μA
I_{DSS}	Drain-to-Source Leakage Current	——	——	1.0	μA	V_{DS} = 20V, V_{GS} = 0V
		——	——	150		V_{DS} = 20V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	100	nA	V_{GS} = 16V
	Gate-to-Source Reverse Leakage	——	——	-100		V_{GS} = -16V
gfs	Forward Transconductance	180	——	——	S	V_{DS} = 13V, I_D = 15A
Q_g	Total Gate Charge	——	11	17	nC	
Q_{gs1}	Pre-Vth Gate-to-Source Charge	——	2.2	——		V_{DS} = 13V
Q_{gs2}	Post-Vth Gate-to-Source Charge	——	1.4	——		V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge	——	4.2	——		I_D = 15A
Q_{godr}	Gate Charge Overdrive	——	3.2	——		See Fig. 2 & 15
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$)	——	5.6	——		
Q_{oss}	Output Charge	——	11	——	nC	V_{DS} = 16V, V_{GS} = 0V
R_G	Gate Resistance	——	0.4	——	Ω	
$t_{d(on)}$	Turn-On Delay Time	——	8.7	——	ns	V_{DD} = 13V, V_{GS} = 4.5V ⑦
t_r	Rise Time	——	19	——		I_D = 15A
$t_{d(off)}$	Turn-Off Delay Time	——	11	——		R_G = 1.5Ω
t_f	Fall Time	——	5.5	——		See Fig. 17
C_{iss}	Input Capacitance	——	1590	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	460	——		V_{DS} = 13V
C_{rss}	Reverse Transfer Capacitance	——	110	——		f = 1.0MHz

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	40	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ⑤	——	——	150		
V_{SD}	Diode Forward Voltage	——	——	1.0	V	T_J = 25°C, I_S = 15A, V_{GS} = 0V ⑦
t_{rr}	Reverse Recovery Time	——	18	27	ns	T_J = 25°C, I_F = 15A
Q_{rr}	Reverse Recovery Charge	——	23	35	nC	di/dt = 300A/μs ⑦

Notes:

⑤ Repetitive rating; pulse width limited by max. junction temperature.
⑦ Pulse width ≤ 400μs; duty cycle ≤ 2%.

Absolute Maximum Ratings

	Parameter	Max.	Units
P_D @T_A = 25°C	Power Dissipation ③	2.1	W
P_D @T_A = 70°C	Power Dissipation ③	1.3	
P_D @T_C = 25°C	Power Dissipation ④	32	
T_P	Peak Soldering Temperature	270	°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-40 to + 150	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ③⑩	——	60	°C/W
$R_{\theta JA}$	Junction-to-Ambient ⑧⑩	12.5	——	
$R_{\theta JA}$	Junction-to-Ambient ⑨⑩	20	——	
$R_{\theta JC}$	Junction-to-Case ④⑩	——	3.9	
$R_{\theta J\text{-}PCB}$	Junction-to-PCB Mounted	1.0	——	
	Linear Derating Factor ③	0.017		W/°C

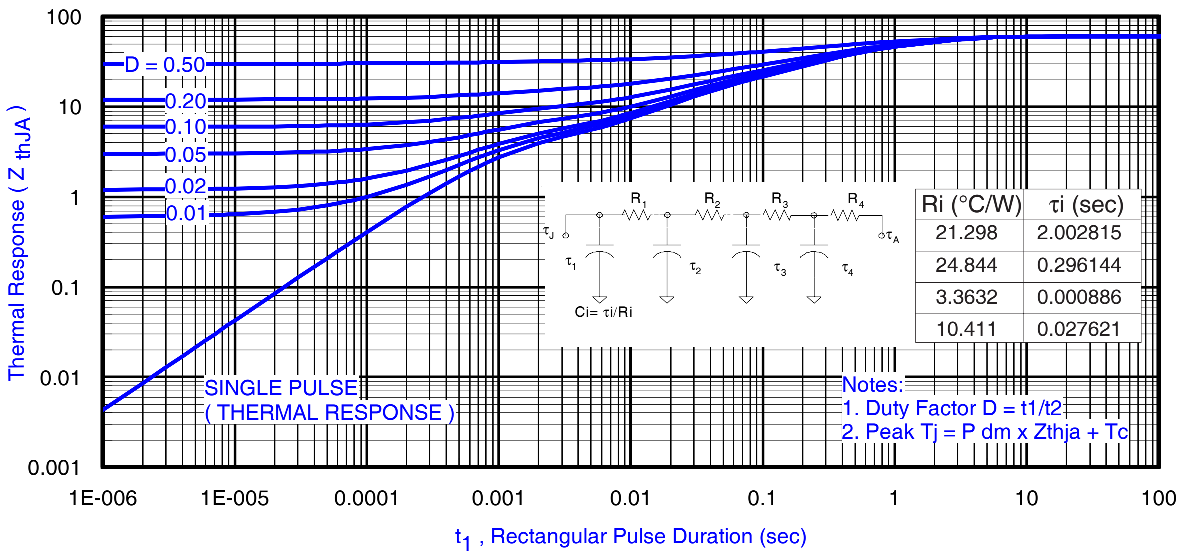


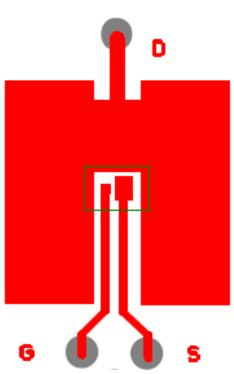
Fig 3. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient ①

Notes:

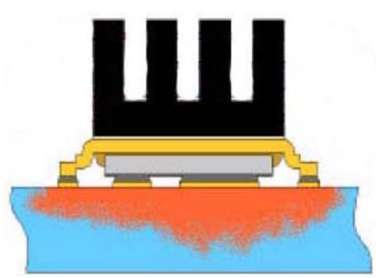
⑧ Used double sided cooling, mounting pad with large heatsink.

⑨ Mounted on minimum footprint full size board with metalized back and with small clip heatsink.

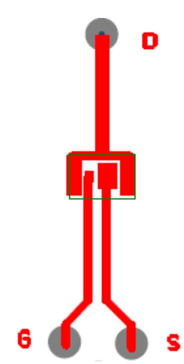
⑩ R_θ is measured at T_J of approximately 90°C.



③ Surface mounted on 1 in. square Cu (still air).



⑨ Mounted to a PCB with small clip heatsink (still air)



⑨ Mounted on minimum footprint full size board with metalized back and with small clip heatsink (still air)

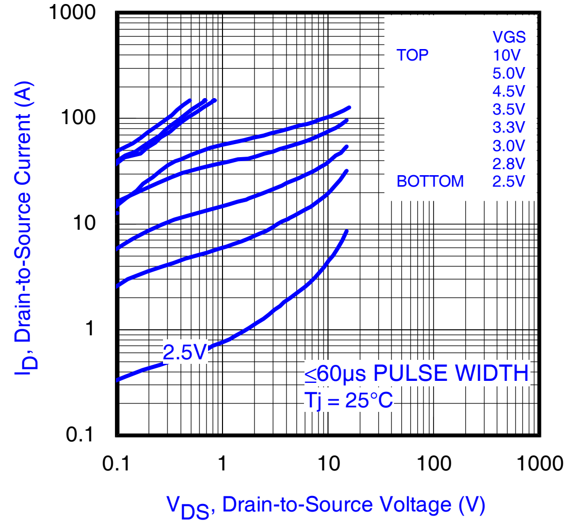


Fig 4. Typical Output Characteristics

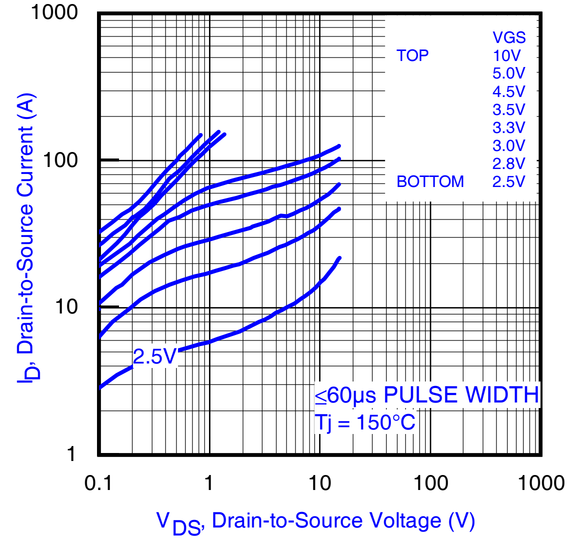


Fig 5. Typical Output Characteristics

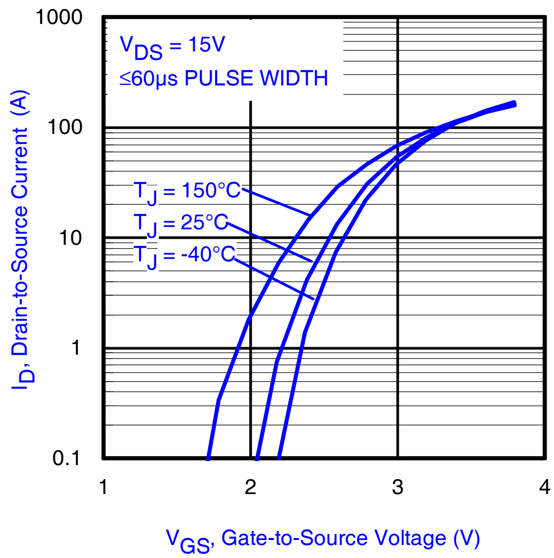


Fig 6. Typical Transfer Characteristics

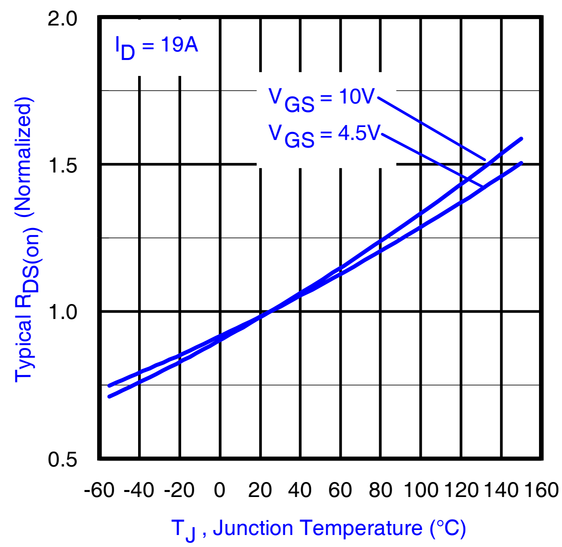


Fig 7. Normalized On-Resistance vs. Temperature

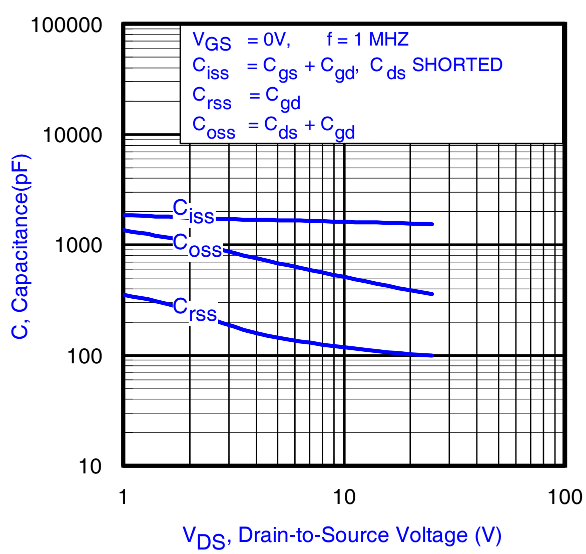


Fig 8. Typical Capacitance vs.Drain-to-Source Voltage

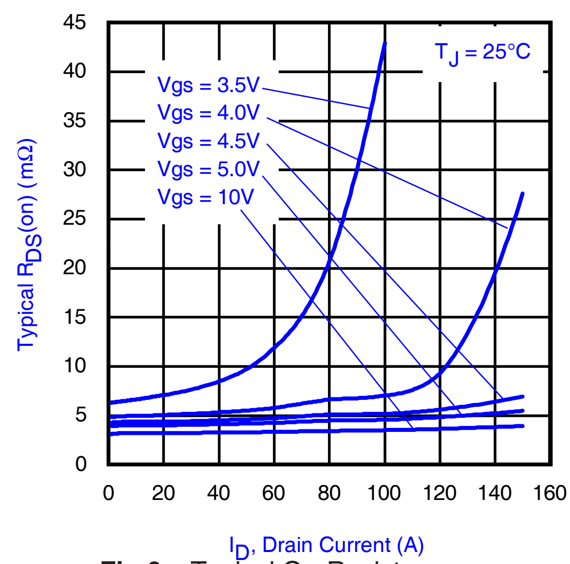


Fig 9. Typical On-Resistance vs. Drain Current and Gate Voltage

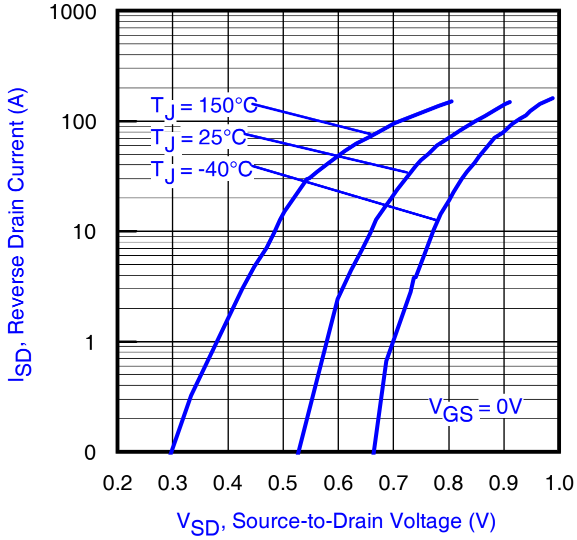


Fig 10. Typical Source-Drain Diode Forward Voltage

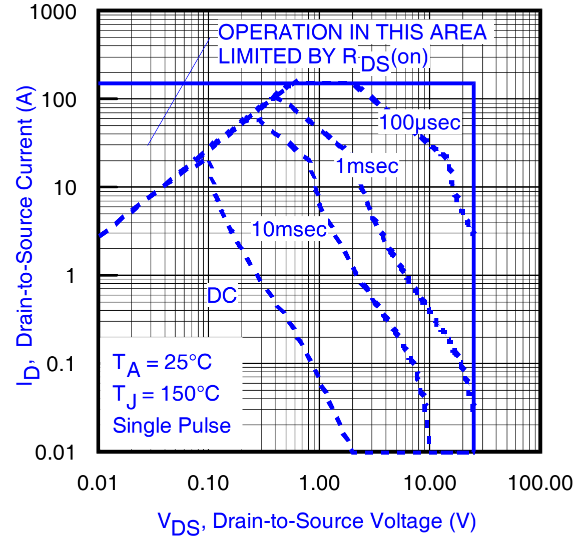


Fig11. Maximum Safe Operating Area

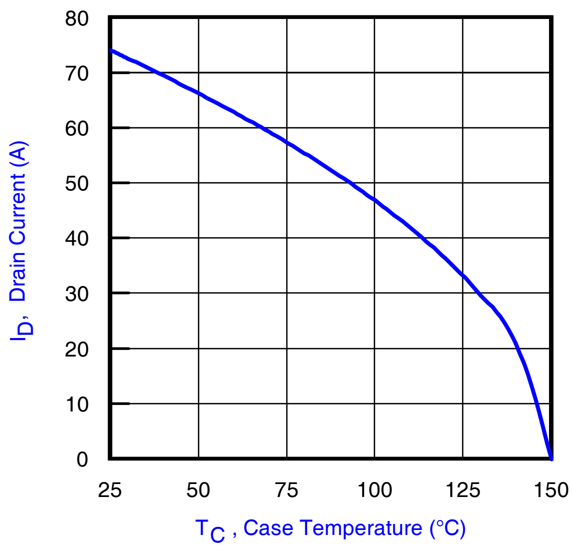


Fig 12. Maximum Drain Current vs. Case Temperature

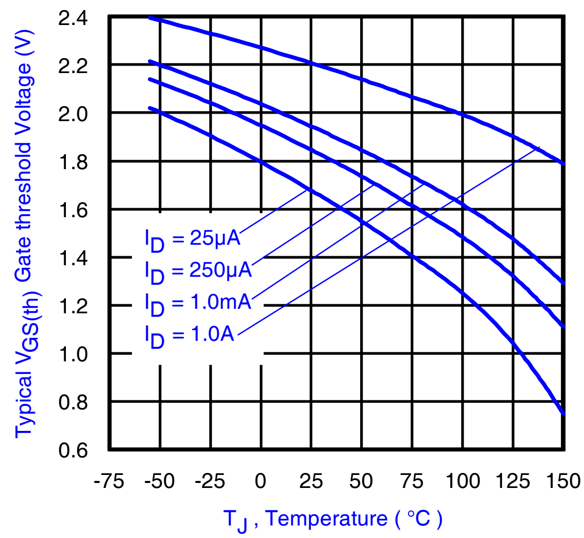


Fig 13. Typical Threshold Voltage vs. Junction Temperature

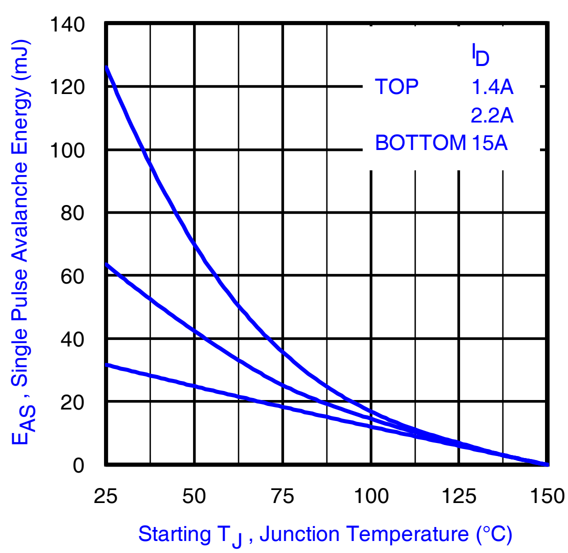


Fig 14. Maximum Avalanche Energy vs. Drain Current

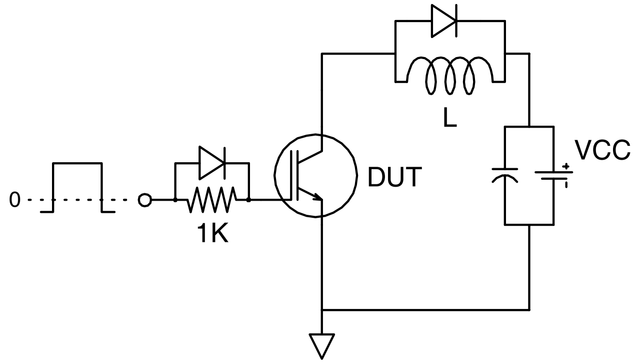


Fig 15a. Gate Charge Test Circuit

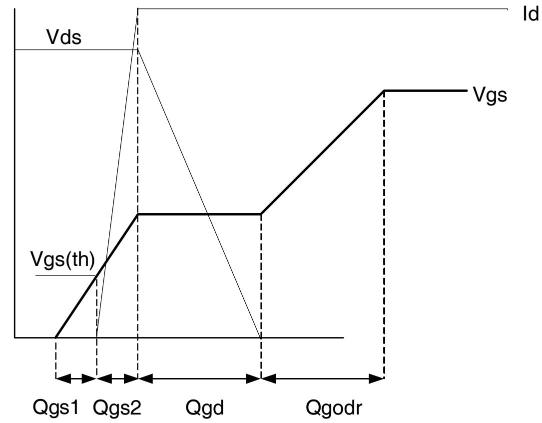


Fig 15b. Gate Charge Waveform

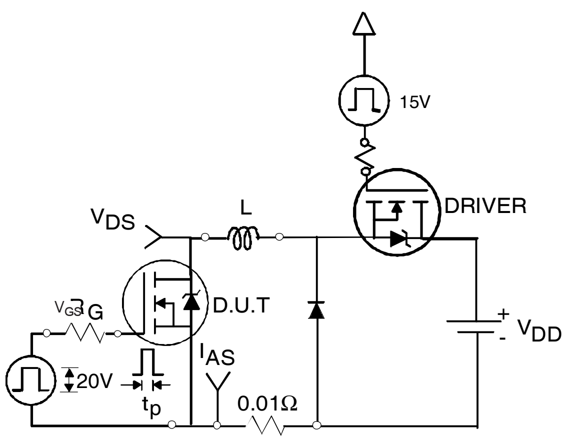


Fig 16a. Unclamped Inductive Test Circuit

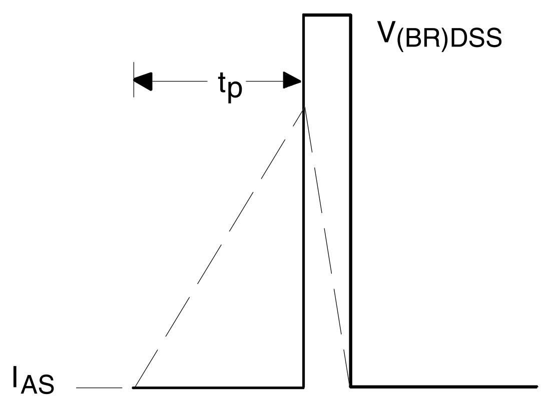


Fig 16b. Unclamped Inductive Waveforms

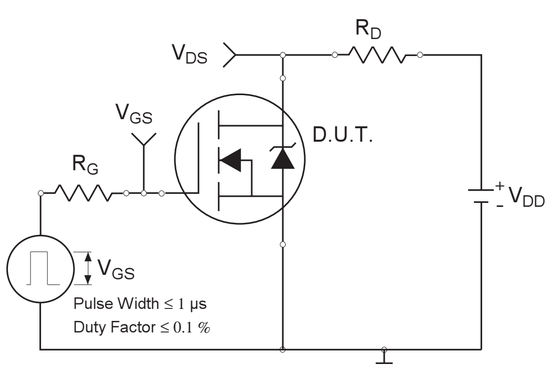


Fig 17a. Switching Time Test Circuit

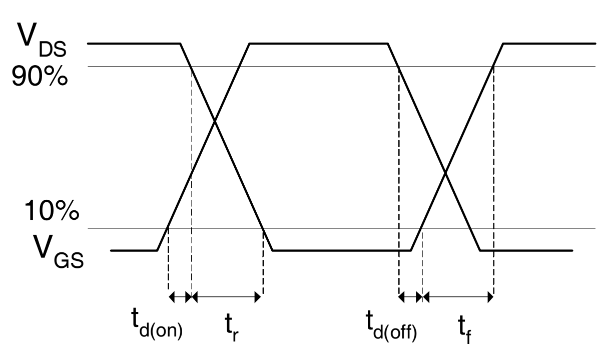
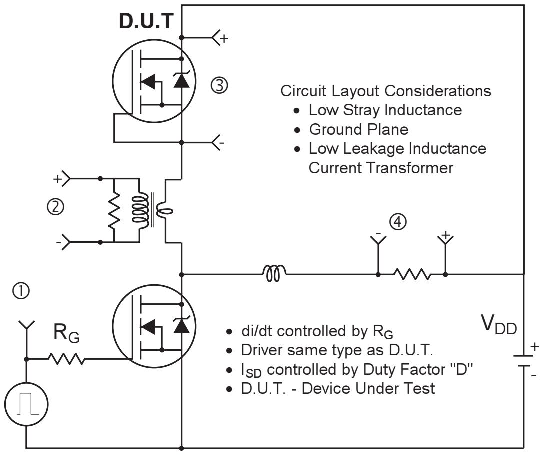


Fig 17b. Switching Time Waveforms



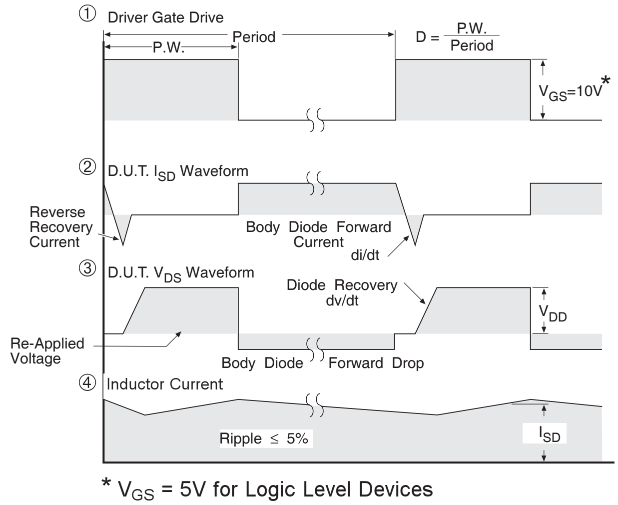
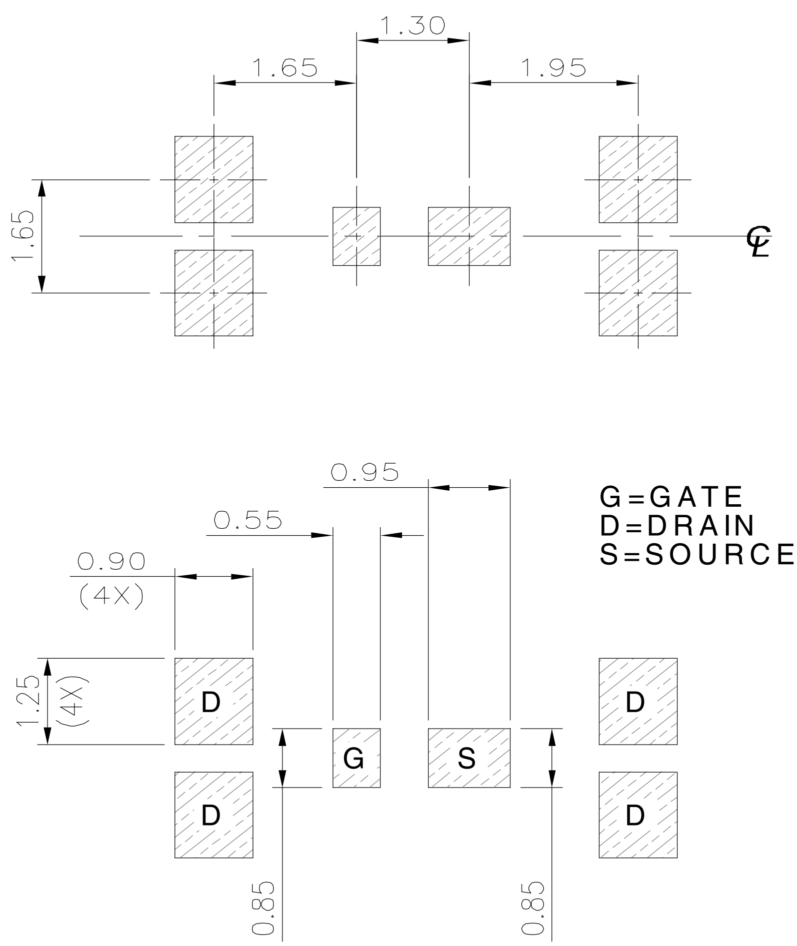


Fig 18. Diode Reverse Recovery Test Circuit for N-Channel HEXFET® Power MOSFETs

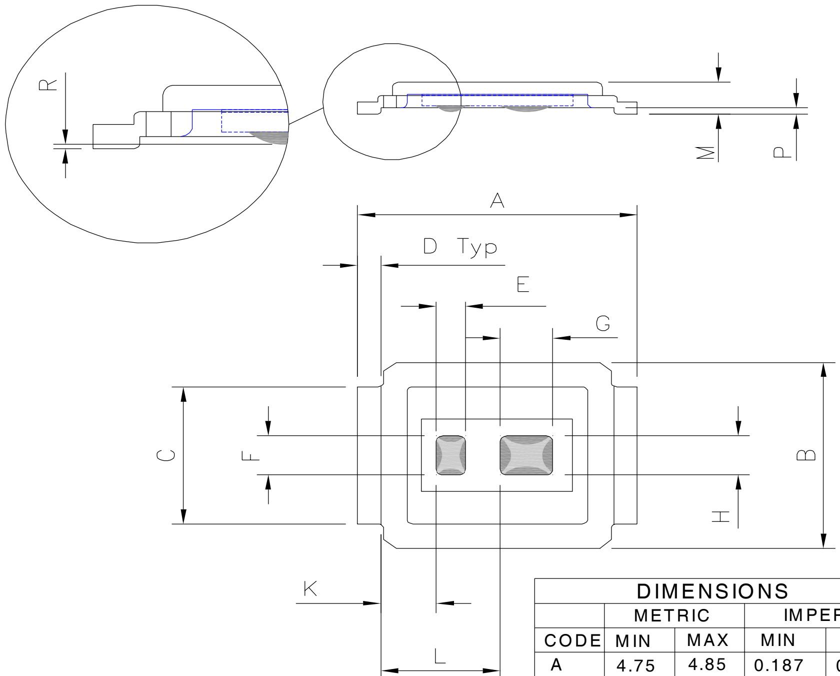
DirectFET®*plus* Board Footprint, SQ Outline (Small Size Can, Q-Designation).

Please see DirectFET application note AN-1035 for all details regarding the assembly of DirectFET. This includes all recommendations for stencil and substrate designs.



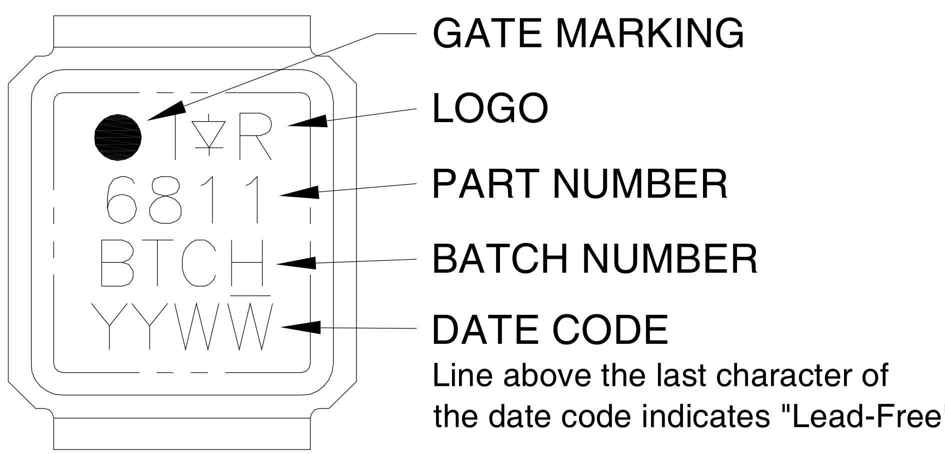
DirectFET®*plus* Outline Dimension, SQ Outline (Small Size Can, Q-Designation).

Please see DirectFET application note AN-1035 for all details regarding the assembly of DirectFET. This includes all recommendations for stencil and substrate designs.



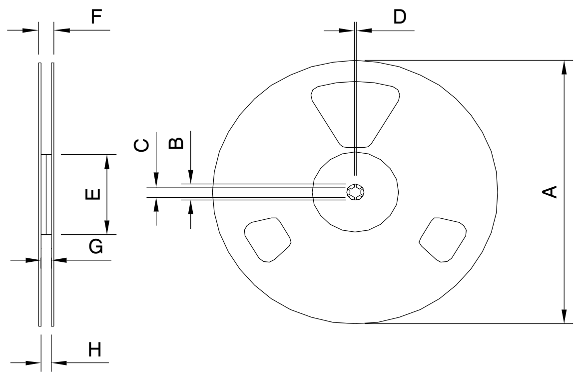
DIMENSIONS				
	METRIC		IMPERIAL	
CODE	MIN	MAX	MIN	MAX
A	4.75	4.85	0.187	0.191
B	3.70	3.95	0.146	0.156
C	2.75	2.85	0.108	0.112
D	0.35	0.45	0.014	0.018
E	0.48	0.52	0.019	0.020
F	0.78	0.82	0.031	0.032
G	0.88	0.92	0.035	0.036
H	0.78	0.82	0.031	0.032
J	N/A	N/A	N/A	N/A
K	0.93	0.97	0.037	0.038
L	2.00	2.10	0.079	0.083
M	0.535	0.595	0.021	0.023
R	0.020	0.080	0.0008	0.0031
P	0.08	0.17	0.003	0.007

DirectFET®*plus* Part Marking



Note: For the most current drawing please refer to IR website at http://www.irf.com/package

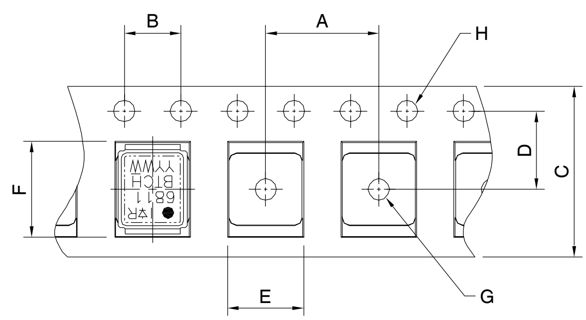
DirectFET®*plus* Tape & Reel Dimension (Showing component orientation).



NOTE: Controlling dimensions in mm
Std reel quantity is 4800 parts. (ordered as IRF6811STRPBF). For 1000 parts on 7" reel, order IRF6811STR1PBF

REEL DIMENSIONS								
	STANDARD OPTION **(QTY 4800)**				TR1 OPTION **(QTY 1000)**			
	METRIC		IMPERIAL		METRIC		IMPERIAL	
CODE	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
A	330.0	N.C	12.992	N.C	177.77	N.C	6.9	N.C
B	20.2	N.C	0.795	N.C	19.06	N.C	0.75	N.C
C	12.8	13.2	0.504	0.520	13.5	12.8	0.53	0.50
D	1.5	N.C	0.059	N.C	1.5	N.C	0.059	N.C
E	100.0	N.C	3.937	N.C	58.72	N.C	2.31	N.C
F	N.C	18.4	N.C	0.724	N.C	13.50	N.C	0.53
G	12.4	14.4	0.488	0.567	11.9	12.01	0.47	N.C
H	11.9	15.4	0.469	0.606	11.9	12.01	0.47	N.C

LOADED TAPE FEED DIRECTION



NOTE: CONTROLLING DIMENSIONS IN MM

DIMENSIONS				
	METRIC		IMPERIAL	
CODE	MIN	MAX	MIN	MAX
A	7.90	8.10	0.311	0.319
B	3.90	4.10	0.154	0.161
C	11.90	12.30	0.469	0.484
D	5.45	5.55	0.215	0.219
E	4.00	4.20	0.158	0.165
F	5.00	5.20	0.197	0.205
G	1.50	N.C	0.059	N.C
H	1.50	1.60	0.059	0.063

Note: For the most current drawing please refer to IR website at http://www.irf.com/package

International
IOR Rectifier
IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.