IRF6629TRPBF Datasheet

https://www.DiGi-Electronics.com

DiGi Electronics Part Number	IRF6629TRPBF-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	IRF6629TRPBF
Description	MOSFET N-CH 25V 29A DIRECTFET
Detailed Description	N-Channel 25 V 29A (Ta), 180A (Tc) 2.8W (Ta), 100W (Tc) Surface Mount DIRECTFET™ MX

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IRF6629TRPBF	Infineon Technologies
Series:	Product Status:
HEXFET®	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
25 V	29A (Ta), 180A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
4.5V, 10V	2.1mOhm @ 29A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
2.35V @ 100µA	51 nC @ 4.5 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	4260 pF @ 13 V
FET Feature:	Power Dissipation (Max):
-	2.8W (Ta), 100W (Tc)
Operating Temperature:	Mounting Type:
-40°C ~ 150°C (TJ)	Surface Mount
Supplier Device Package:	Package / Case:
DIRECTFET™ MX	DirectFET™ Isometric MX

Environmental & Export classification

Moisture Sensitivity Level (MSL):	REACH Status:
1 (Unlimited)	REACH Unaffected
ECCN:	HTSUS:
EAR99	8541.29.0095

PD - 97235

International
IOR Rectifier

IRF6629PbF
IRF6629TRPbF

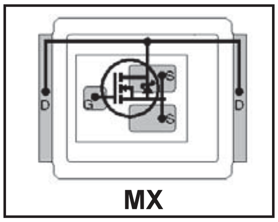
DirectFET™ Power MOSFET ②

- RoHs Compliant ①
- Lead-Free (Qualified up to 260°C Reflow)
- Application Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- High Cdv/dt Immunity
- Low Profile (<0.7mm)
- Dual Sided Cooling Compatible ①
- Compatible with existing Surface Mount Techniques ①

Typical values (unless otherwise specified)

V_{DSS}	V_{GS}	$R_{DS(on)}$	$R_{DS(on)}$
25V max	±20V max	1.6mΩ@ 10V	2.1mΩ@ 4.5V

$Q_{g\ tot}$	Q_{gd}	Q_{gs2}	Q_{rr}	Q_{oss}	$V_{gs(th)}$
34nC	11nC	4.2nC	27nC	23nC	1.8V



MX

DirectFET™ ISOMETRIC

Applicable DirectFET Outline and Substrate Outline (see p.7,8 for details)①

SQ	SX	ST		MQ	**MX**	MT	MP			

Description

The IRF6629PbF combines the latest HEXFET® Power MOSFET Silicon technology with the advanced DirectFET™ packaging to achieve the lowest on-state resistance in a package that has the footprint of a SO-8 and only 0.6 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 IRF6629PbF balances both low resistance and low charge along with ultra low package inductance to reduce both conduction and switching losses. The reduced total losses make this product ideal for high efficiency DC-DC converters that power the latest generation of processors operating at higher frequencies. The IRF6629PbF has been optimized for parameters that are critical in synchronous buck including Rds(on), gate charge and Cdv/dt-induced turn on immunity. The IRF6629PbF offers particularly low Rds(on) and high Cdv/dt immunity for synchronous FET applications.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	25	V
V_{GS}	Gate-to-Source Voltage	±20	
I_D @ $T_A = 25°C$	Continuous Drain Current, V_{GS} @ 10V ③	29	A
I_D @ $T_A = 70°C$	Continuous Drain Current, V_{GS} @ 10V ③	23	
I_D @ $T_C = 25°C$	Continuous Drain Current, V_{GS} @ 10V ④	180	
I_{DM}	Pulsed Drain Current ⑤	230	
E_{AS}	Single Pulse Avalanche Energy ⑥	1170	mJ
I_{AR}	Avalanche Current ⑤	23	A

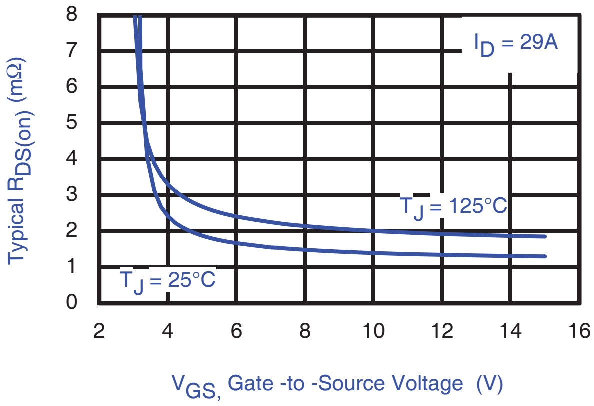


Fig 1. Typical On-Resistance vs. Gate Voltage

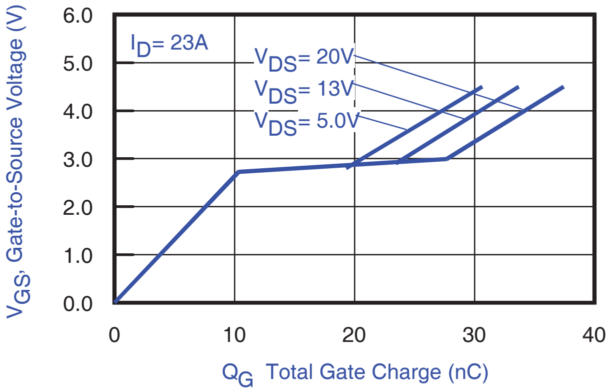


Fig 2. Typical Total Gate Charge vs Gate-to-Source Voltage

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.

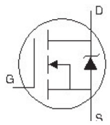
⑤ Repetitive rating; pulse width limited by max. junction temperature.

⑥ Starting $T_J = 25°C$, L = 4.4mH, $R_G = 25Ω$, $I_{AS} = 23A$.

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	—	17	—	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	1.6	2.1	mΩ	V_{GS} = 10V, I_D = 29A ⑦
		—	2.1	2.7		V_{GS} = 4.5V, I_D = 23A ⑦
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.8	2.35	V	V_{DS} = V_{GS}, I_D = 100μA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-6.2	—	mV/°C	
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} = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -20V
gfs	Forward Transconductance	150	—	—	S	V_{DS} = 15V, I_D = 23A
Q_g	Total Gate Charge	—	34	51	nC	
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	7.8	—		V_{DS} = 13V
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	4.2	—		V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge	—	11	—		I_D = 23A
Q_{godr}	Gate Charge Overdrive	—	11	—		See Fig. 15
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	15	—		
Q_{oss}	Output Charge	—	23	—	nC	V_{DS} = 16V, V_{GS} = 0V
R_G	Gate Resistance	—	1.3	3.2	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	20	—	ns	V_{DD} = 13V, V_{GS} = 4.5V ⑦
t_r	Rise Time	—	67	—		I_D = 23A
$t_{d(off)}$	Turn-Off Delay Time	—	20	—		Clamped Inductive Load
t_f	Fall Time	—	7.4	—		See Fig. 17
C_{iss}	Input Capacitance	—	4260	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	1130	—		V_{DS} = 13V
C_{rss}	Reverse Transfer Capacitance	—	550	—		ƒ = 1.0MHz

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ⑤	—	—	230		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 23A, V_{GS} = 0V ⑦
t_{rr}	Reverse Recovery Time	—	22	33	ns	T_J = 25°C, I_F = 23A
Q_{rr}	Reverse Recovery Charge	—	27	41	nC	di/dt = 220A/μs ⑦ See Fig. 18

Notes:

⑤ Repetitive rating; pulse width limited by max. junction temperature.

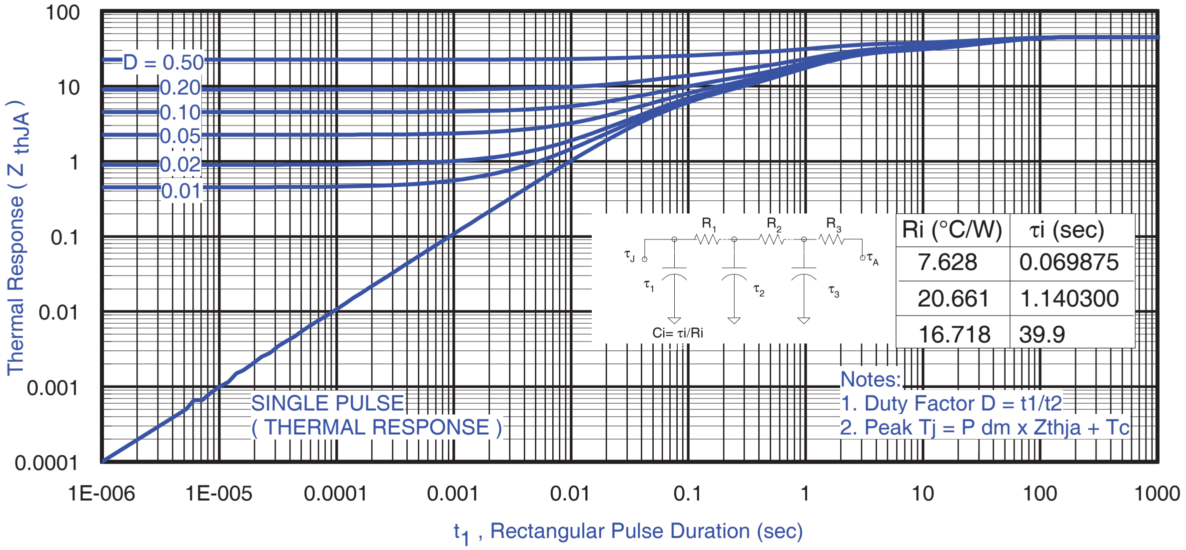
⑦ Pulse width ≤ 400μs; duty cycle ≤ 2%.

Absolute Maximum Ratings

	Parameter	Max.	Units
P_D @T_A = 25°C	Power Dissipation ③	2.8	W
P_D @T_A = 70°C	Power Dissipation ③	1.8	
P_D @T_C = 25°C	Power Dissipation ④	100	
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 ③⓿	——	45	°C/W
$R_{\theta JA}$	Junction-to-Ambient ⑨⓿	12.5	——	
$R_{\theta JA}$	Junction-to-Ambient ⑩⓿	20	——	
$R_{\theta JC}$	Junction-to-Case ④⓿	——	1.2	
$R_{\theta J\text{-}PCB}$	Junction-to-PCB Mounted	1.0	——	
	Linear Derating Factor ③	0.022		W/°C



Ri (°C/W)	τi (sec)
7.628	0.069875
20.661	1.140300
16.718	39.9

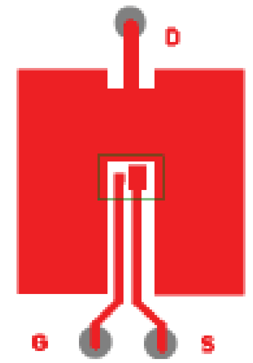
Fig 3. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Notes:

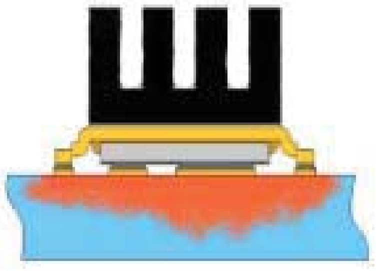
⑨ Used double sided cooling , mounting pad.

⑩ Mounted on minimum footprint full size board with metalized back and with small clip heatsink.

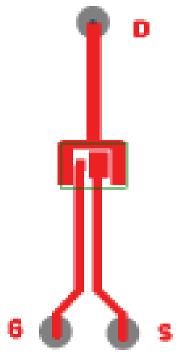
⓿ R_θ is measured at T_J of approximately 90°C.



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



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



⑩ Mounted on minimum footprint full size board with metalized back and with small clip heatsink (still air)

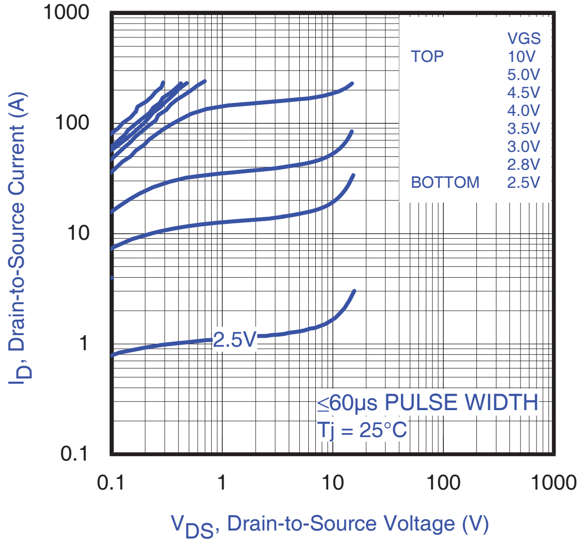


Fig 4. Typical Output Characteristics

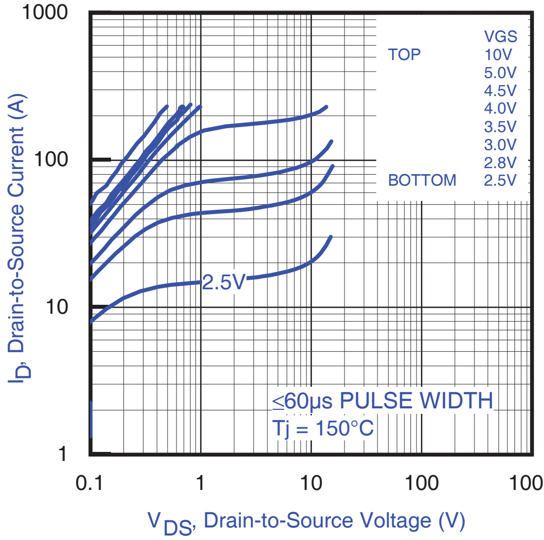


Fig 5. Typical Output Characteristics

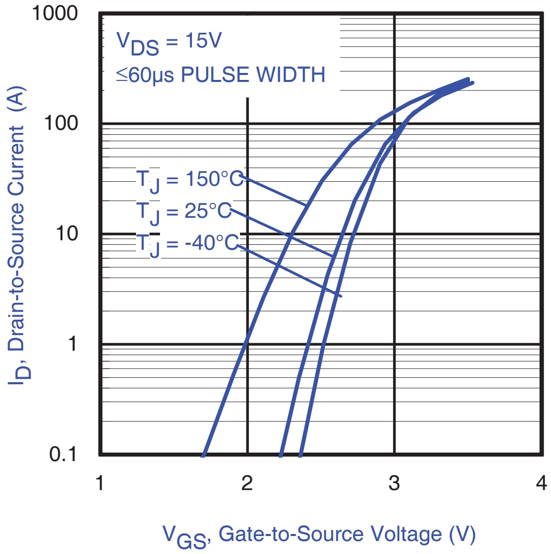


Fig 6. Typical Transfer Characteristics

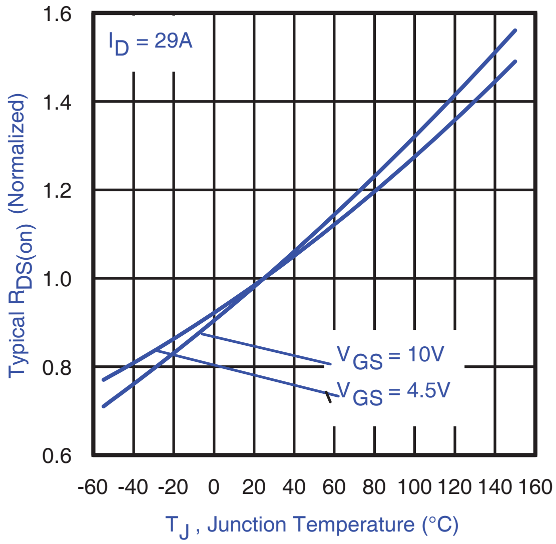


Fig 7. Normalized On-Resistance vs. Temperature

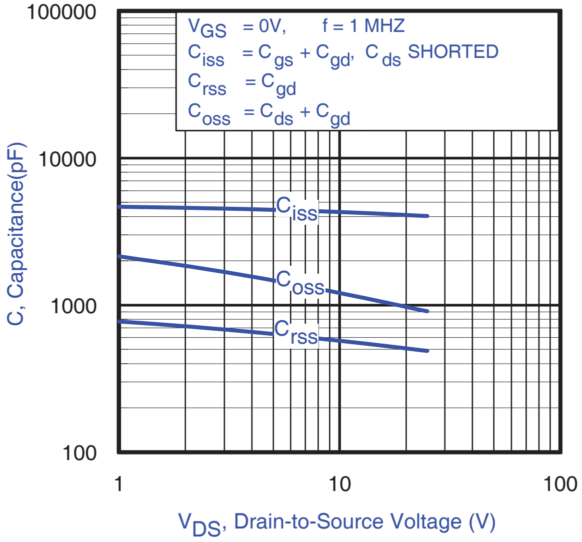


Fig 8. Typical Capacitance vs.Drain-to-Source Voltage

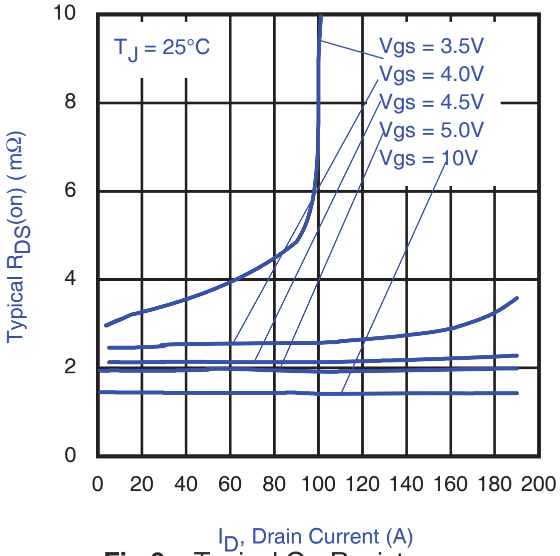


Fig 9. Typical On-Resistance vs.
Drain Current and Gate Voltage

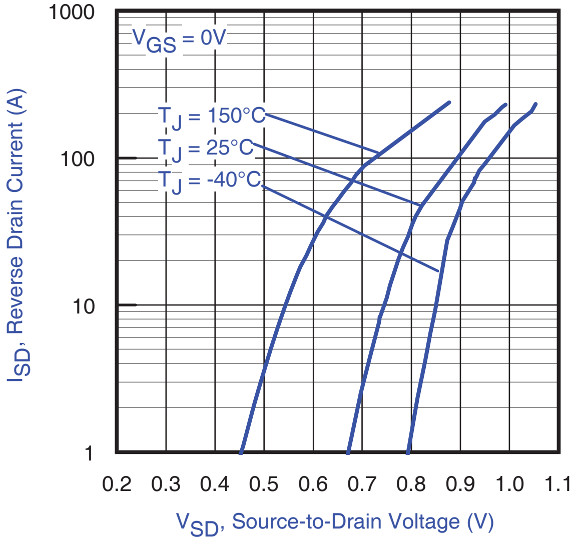


Fig 10. Typical Source-Drain Diode Forward Voltage

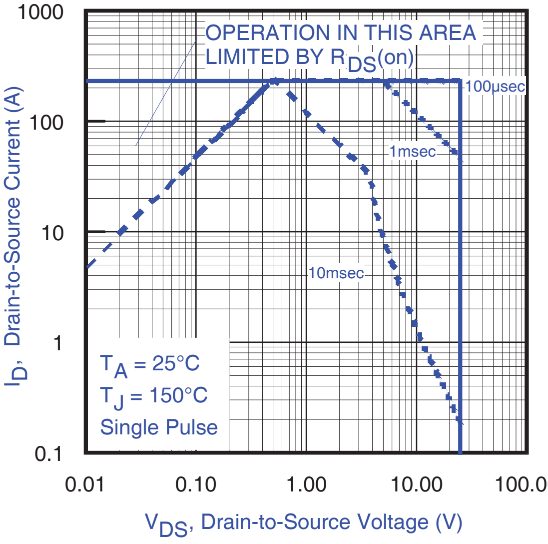


Fig 11. Maximum Safe Operating Area

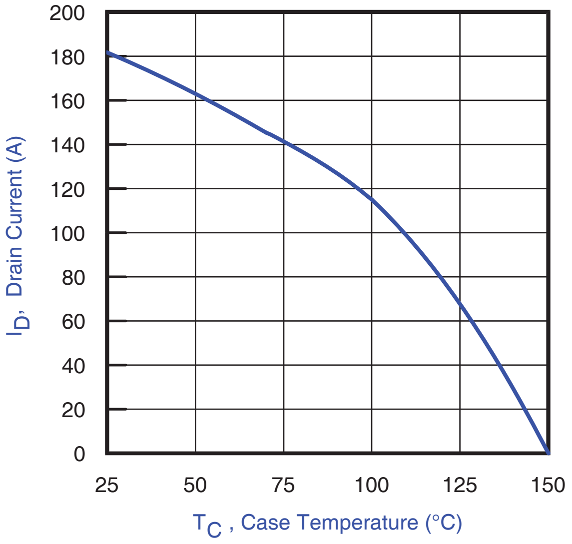


Fig 12. Maximum Drain Current vs. Case Temperature

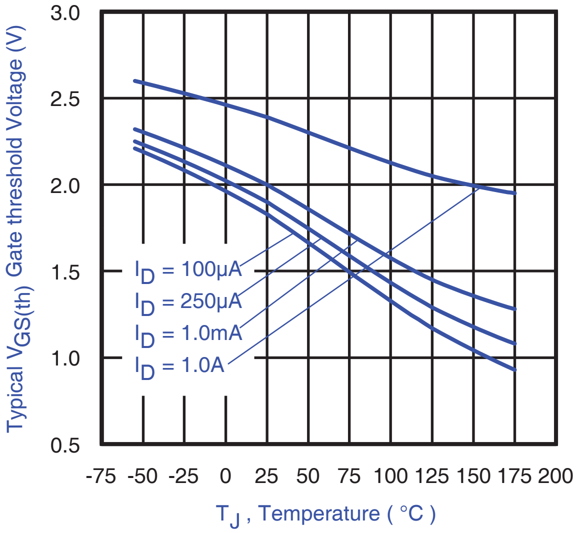


Fig 13. Typical Threshold Voltage vs. Junction Temperature

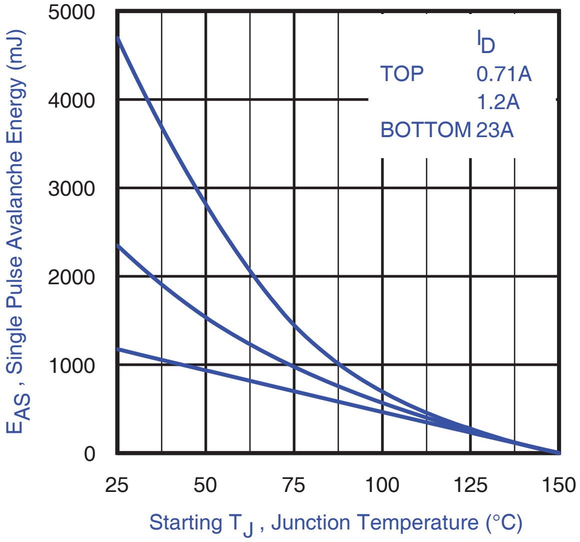


Fig 14. Maximum Avalanche Energy vs. Drain Current

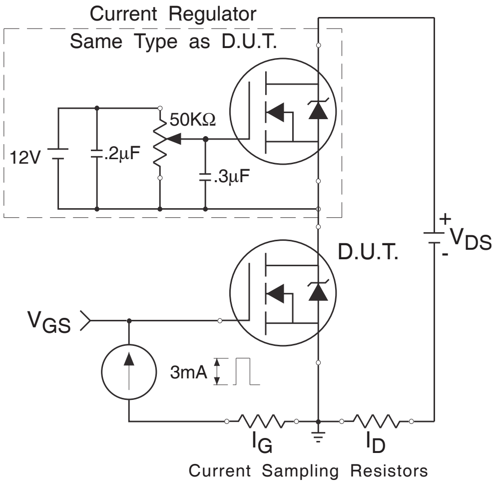


Fig 15a. Gate Charge Test Circuit

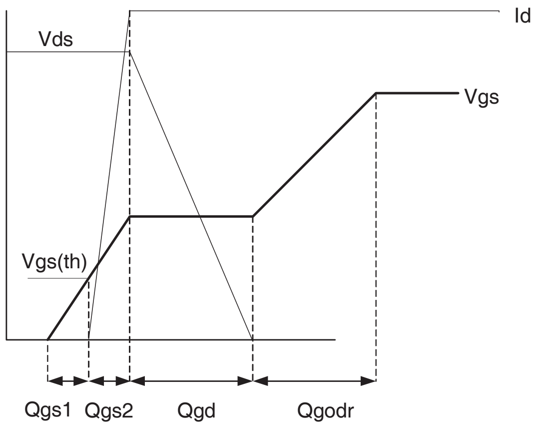


Fig 15b. Gate Charge Waveform

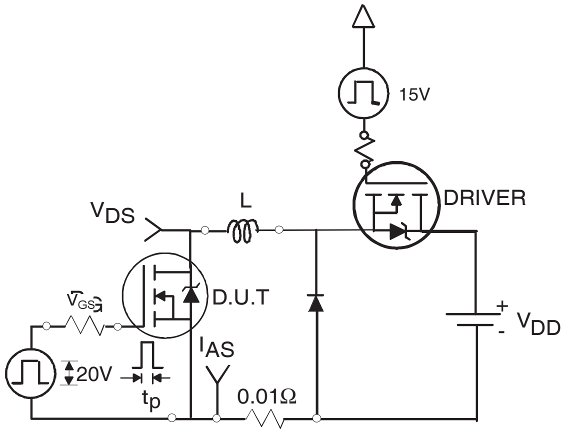


Fig 16a. Unclamped Inductive Test Circuit

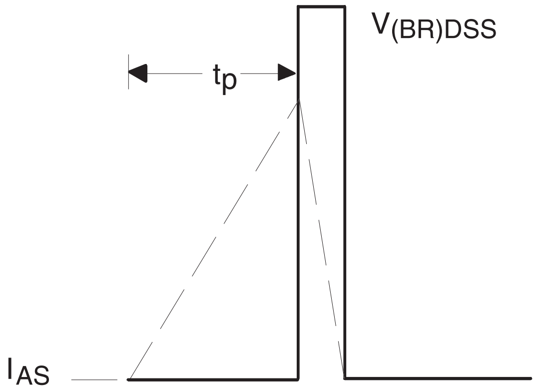


Fig 16b. Unclamped Inductive Waveforms

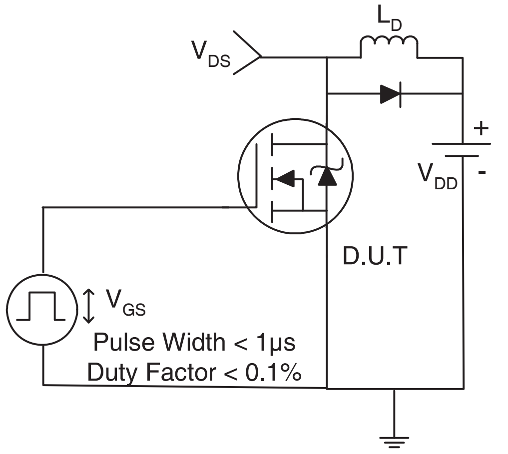


Fig 17a. Switching Time Test Circuit

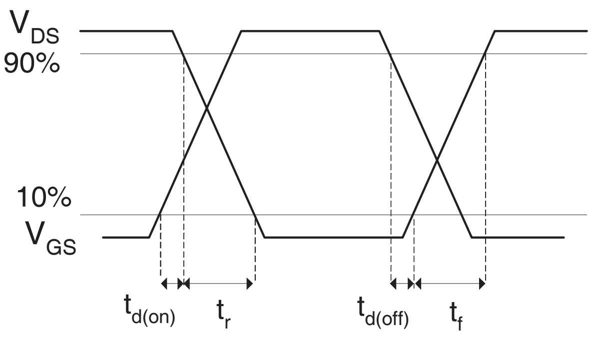
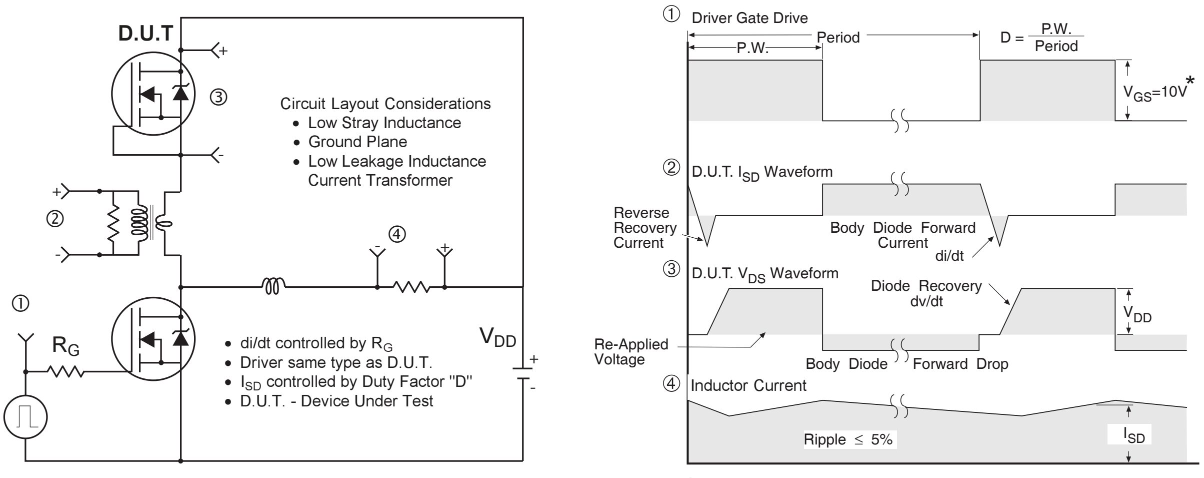


Fig 17b. Switching Time Waveforms

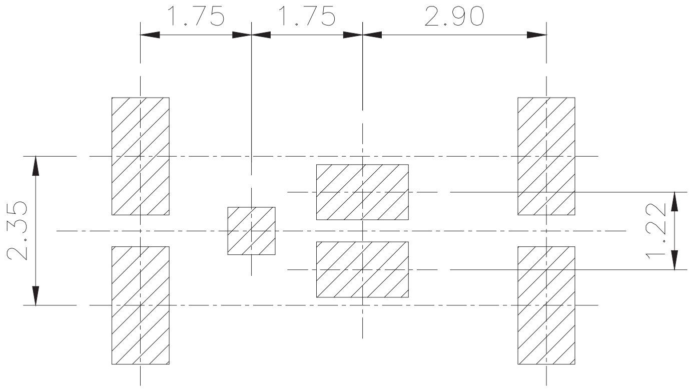


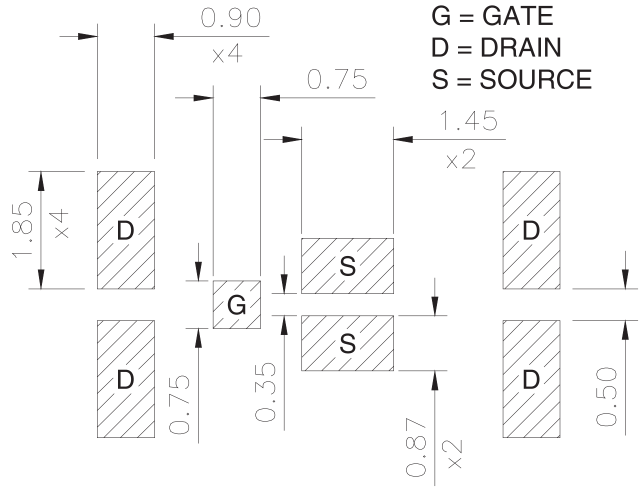
* V_{GS} = 5V for Logic Level Devices

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

DirectFET™ Board Footprint, MX Outline ③ (Medium Size Can, X-Designation).

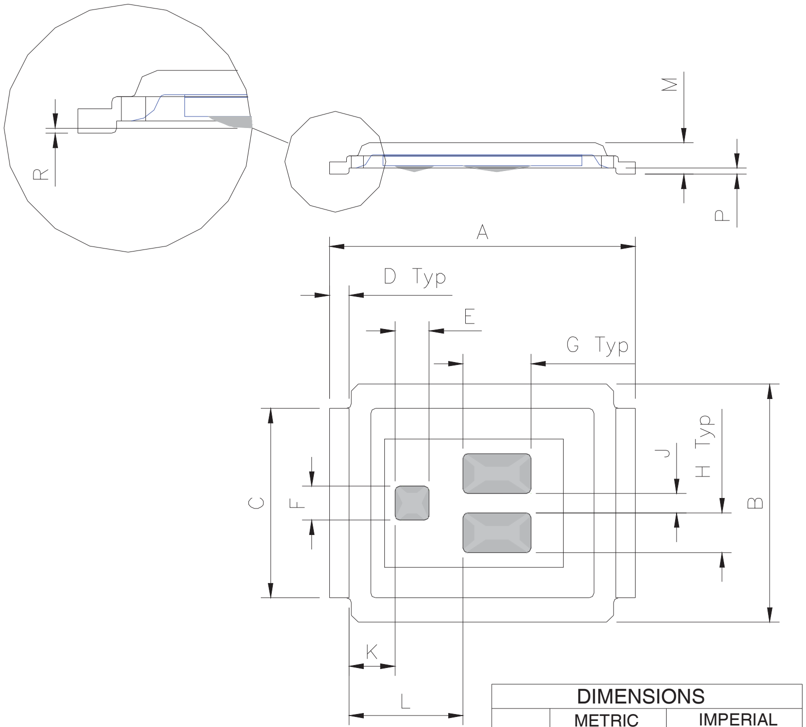
Please see DirectFET application note AN-1035 for all details regarding the assembly of DirectFET. This includes all recommendations for stencil and substrate designs.





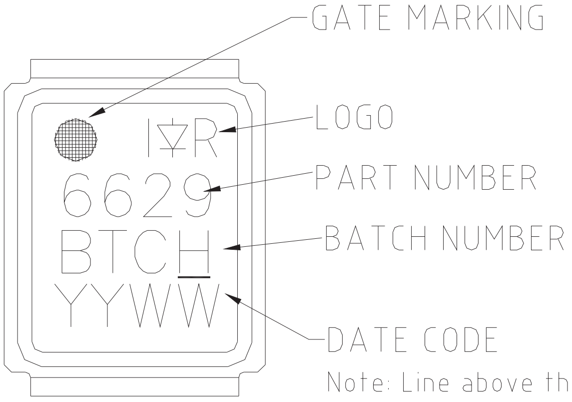
DirectFET™ Outline Dimension, MX Outline (Medium Size Can, X-Designation).

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



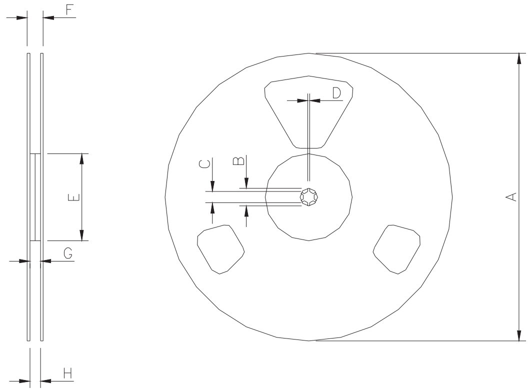
DIMENSIONS				
	METRIC		IMPERIAL	
CODE	MIN	MAX	MIN	MAX
A	6.25	6.35	0.246	0.250
B	4.80	5.05	0.189	0.201
C	3.85	3.95	0.152	0.156
D	0.35	0.45	0.014	0.018
E	0.68	0.72	0.027	0.028
F	0.68	0.72	0.027	0.028
G	1.38	1.42	0.054	0.056
H	0.80	0.84	0.032	0.033
J	0.38	0.42	0.015	0.017
K	0.89	1.02	0.035	0.040
L	2.29	2.42	0.090	0.095
M	0.616	0.676	0.0235	0.0274
R	0.020	0.080	0.0008	0.0031
P	0.08	0.17	0.003	0.007

DirectFET™ Part Marking



Note: Line above the last character of the date-code indicates "Lead-Free".

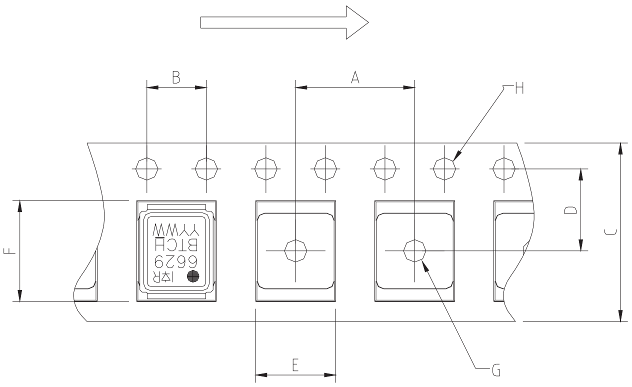
DirectFET™ Tape & Reel Dimension (Showing component orientation).



NOTE: Controlling dimensions in mm
Std reel quantity is 4800 parts. (ordered as IRF6629TRPBF). For 1000 parts on 7" reel, order IRF6629TR1PBF

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



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	5.10	5.30	0.201	0.209
F	6.50	6.70	0.256	0.264
G	1.50	N.C	0.059	N.C
H	1.50	1.60	0.059	0.063

International
IOR Rectifier
IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7903
Visit us at www.irf.com for sales contact information.07/06

DiGi
Electronics

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DCI.
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GB/T 19001-2016 idt ISO9001:2015
DCI Certification Ltd

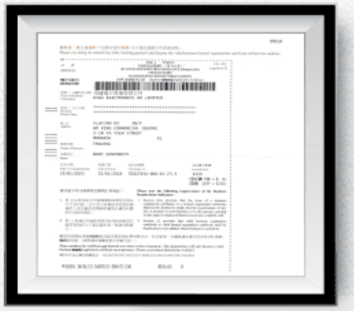
DCI.
ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE
DIGI ELECTRONICS HK LIMITED
GB/T 24001-2016 idt ISO14001:2015
DCI Certification Ltd

DCI.
OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM CERTIFICATE
DIGI ELECTRONICS HK LIMITED
GB/T45001-2020 idt ISO45001:2018
DCI Certification Ltd

CR
CERTIFICATE OF INCORPORATION
I hereby certify that
DIGI ELECTRONICS HK LIMITED
is this day incorporated in Hong Kong under the Companies Ordinance (Chapter 622 of the Laws of Hong Kong), and that this company is a limited company.
Registrar of Companies
Hong Kong Special Administrative Region

ASA
MEMBERSHIP
Certificate
The Aviation Suppliers Association has enrolled as a Regular Member
DIGI ELECTRONICS HK LIMITED
Michele Dickstein
President

dun & bradstreet
A Dun & Bradstreet
D-U-N-S® Registered™ Business
This is to certify that the following entity is a D-U-N-S® Registered™ business in the Dun & Bradstreet global database with information verified and validated:



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.