VISHAY IRF620 Siliconix Power MOSFET Instruction Manual

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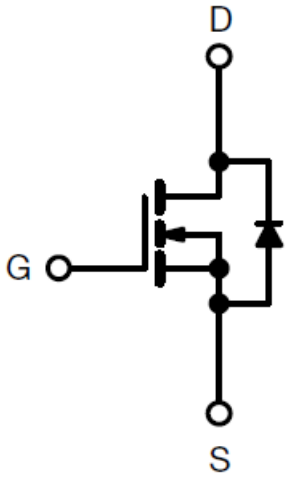
VISHAY IRF620 Siliconix Power MOSFET

FEATURES

- Dynamic dv/dt rating
- Repetitive avalanche rated
- Fast switching
- Ease of paralleling
- Simple drive requirements
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Note
This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

N-Channel MOSFET



N-Channel MOSFET

DESCRIPTION

Third generation power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness. The TO-220AB package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 W. The low thermal resistance and low package cost of the TO-220AB contribute to its wide acceptance throughout the industry

PRODUCT SUMMARY

V_{DS} (V)	200	
RDS(on) (W)	V_{GS} = 10 V	0.80
Q_g max. (nC)	14	
Q_{gs} (nC)	3.0	
Q_{gd} (nC)	7.9	
Configuration	Single	

ORDERING INFORMATION

Package	TO-220AB
Lead (Pb)-free	IRF620PbF
Lead (Pb)-free and halogen-free	IRF620PbF-BE3

ABSOLUTE MAXIMUM RATINGS (TC = 25 °C, unless otherwise noted)

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-source voltage			VDS	200	V
Gate-source voltage			VGS	± 20	
Continuous drain current	V_{GS} at 10 V	T_C = 25 °C	I_D	5.2	A
		T_C = 100 °C		3.3	
Pulsed drain current a			IDM	18	
Linear derating factor				0.40	W/°C
Single pulse avalanche energy b			EAS	110	mJ
Repetitive avalanche current a			IAR	5.2	A
Repetitive avalanche energy a			EAR	5.0	mJ
Maximum power dissipation	T_C = 25 °C		P_D	50	W
Peak diode recovery dV/dt c			dv/dt	5.0	V/ns
Operating junction and storage temperature range			TJ, Tstg	-55 to +150	°C
Soldering recommendations (peak temperature) d	For 10 s			300	
Mounting torque	6-32 or M3 screw			10	lbf · in
				1.1	N · m

Notes

1. **a**. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11)
2. **b**. VDD = 50 V, starting TJ = 25 °C, L = 6.1 mH, Rg = 25 Ω, IAS = 5.2 A (see fig. 12)
3. **c**. ISD ≤ 5.2 A, di/dt ≤ 95 A/μs, VDD ≤ VDS, TJ ≤ 150 °C
4. **d**. 1.6 mm from case

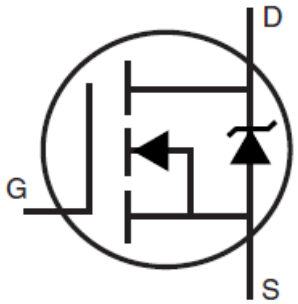
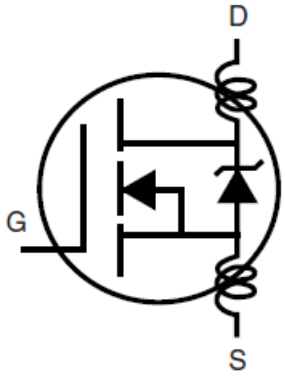
THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.
Maximum junction-to-ambient	RthJA	–	62
Case-to-sink, flat, greased surface	RthCS	0.50	–
Maximum junction-to-case (drain)	RthJC	–	2.5

SPECIFICATIONS

(TJ = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	VDS	V_{GS} = 0 V, I_D = 250 µA		200	–	–	V
V_{DS} temperature coefficient	DV_{DS}/T_J	Reference to 25 °C, I_D = 1 mA		–	0.29	–	V/°C
Gate-source threshold voltage	VGS(th)	V_{DS} = V_{GS}, I_D = 250 µA		2.0	–	4.0	V
Gate-source leakage	IGSS	V_{GS} = ± 20 V		–	–	± 100	nA
Zero gate voltage drain current	IDSS	V_{DS} = 200 V, V_{GS} = 0 V		–	–	25	µA
		V_{DS} = 160 V, V_{GS} = 0 V, T_J = 125 °C		–	–	250	
Drain-source on-state resistance	RDS(on)	V_{GS} = 10 V	I_D = 3.1 A b	–	–	0.80	W
Forward transconductance	gfs	V_{DS} = 50 V, I_D = 3.1 A		1.5	–	–	S
Dynamic							
Input capacitance	Ciss	V_{GS} = 0 V, V_{DS} = 25 V, f = 1.0 MHz, see fig. 5		–	260	–	pF
Output capacitance	Coss			–	100	–	
Reverse transfer capacitance	Crss			–	30	–	
Total gate charge	Q_g	V_{GS} = 10 V	I_D = 4.8 A, V_{DS} = 160 V, see fig. 6 and 13 b	–	–	14	nC
Gate-source charge	Qgs			–	–	3.0	
Gate-drain charge	Qgd			–	–	7.9	
Turn-on delay time	td(on)			–	7.2	–	
Rise time	t_r			–	22	–	
Turn-off delay time	td(off)			–	19	–	

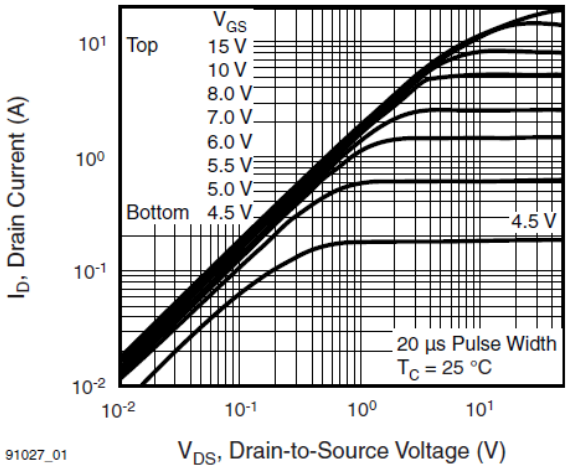
Fall time	t_f		–	13	–	ns
Gate input resistance	R_g	V_{DD} = 100 V, I_D = 4.8 A, f = 1 MHz, open drain	0.8	–	3.5	W
Internal drain inductance	L_D	R_g = 18 W, R_D = 20 W, see fig. 1 Between lead, 6 mm (0.25″) from package and center of die contact	–	4.5	–	nH
Internal source inductance	L_S		–	7.5	–	nH
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	MOSFET symbol showing the integral reverse p – n junction diode	–	–	5.2	A
Pulsed diode forward current a	ISM		–	–	18	A
Body diode voltage	VSD	T_J = 25 °C, I_S = 5.2 A, V_{GS} = 0 V b	–	–	1.8	V
Body diode reverse recovery time	trr	T_J = 25 °C, I_F = 4.8 A, dI/dt = 100 A/ms	–	150	300	ns
Body diode reverse recovery charge	Qrr		–	0.91	1.8	µC
Forward turn-on time	ton	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)				

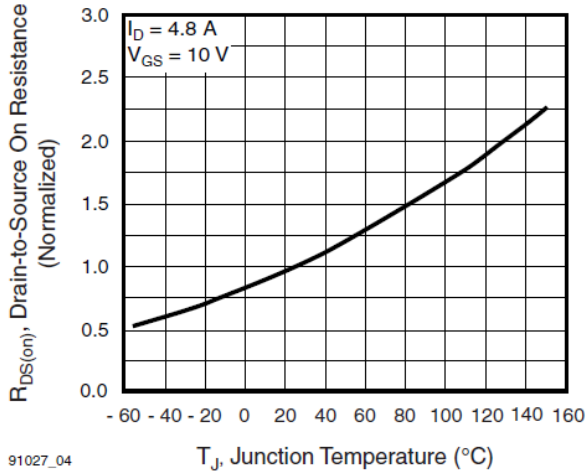
Notes

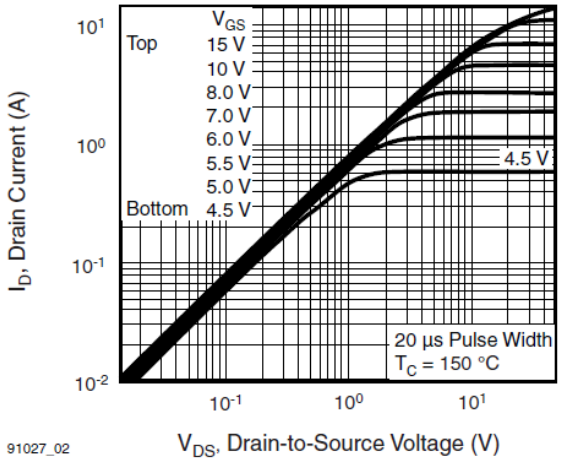
1. **a**. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11)
2. **b**. Pulse width ≤ 300 µs; duty cycle ≤ 2 %

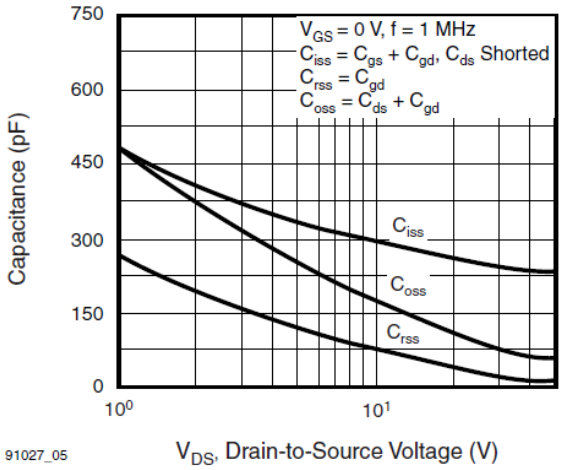
TYPICAL CHARACTERISTICS

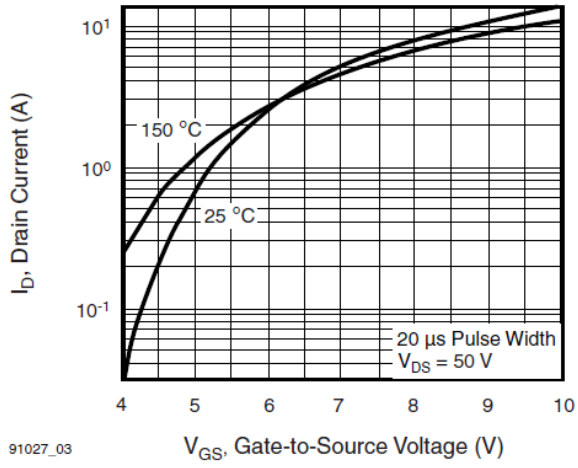
(25 °C, unless otherwise noted)

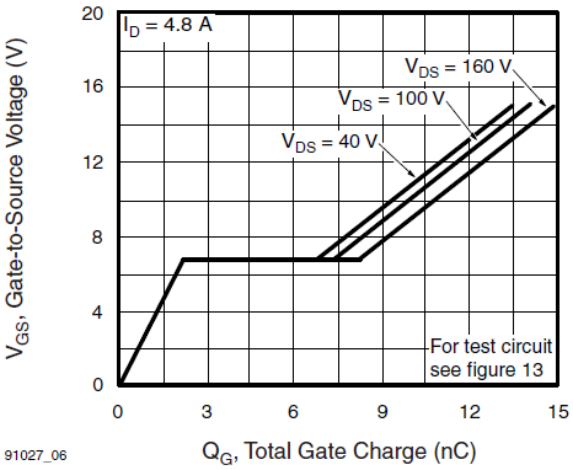


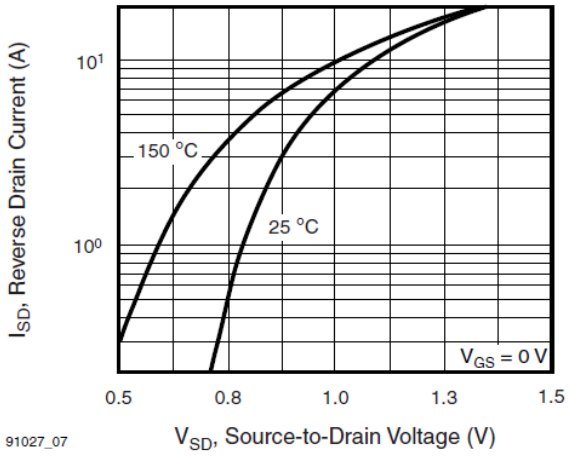












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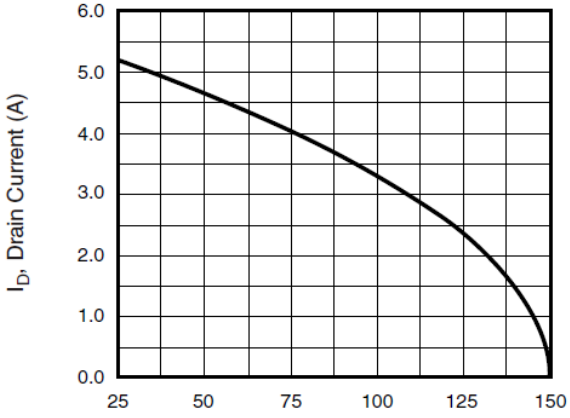

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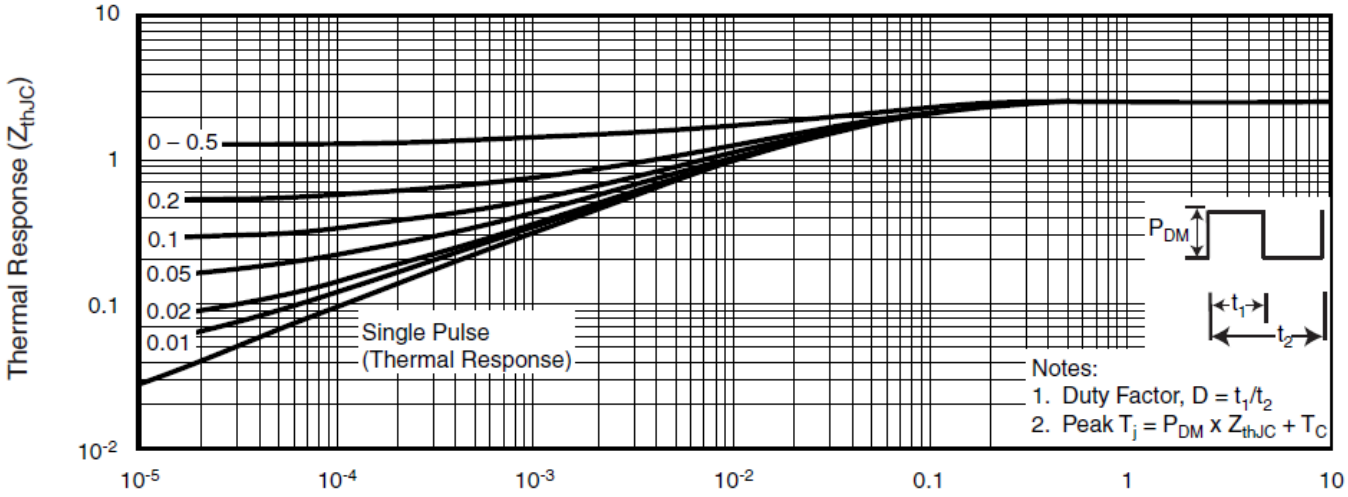

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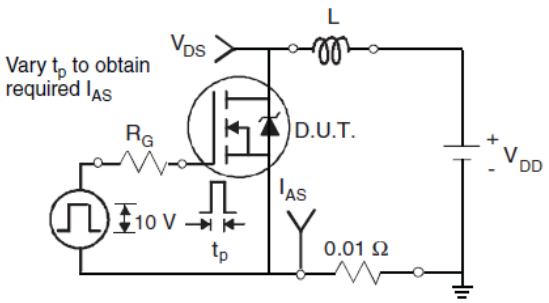


Fig. 12a - Unclamped Inductive Test Circuit

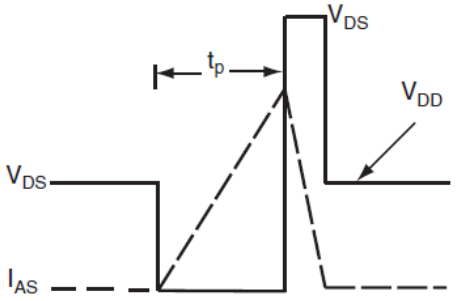


Fig. 12b - Unclamped Inductive Waveforms

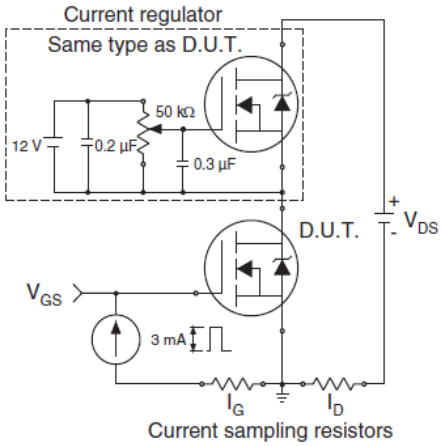
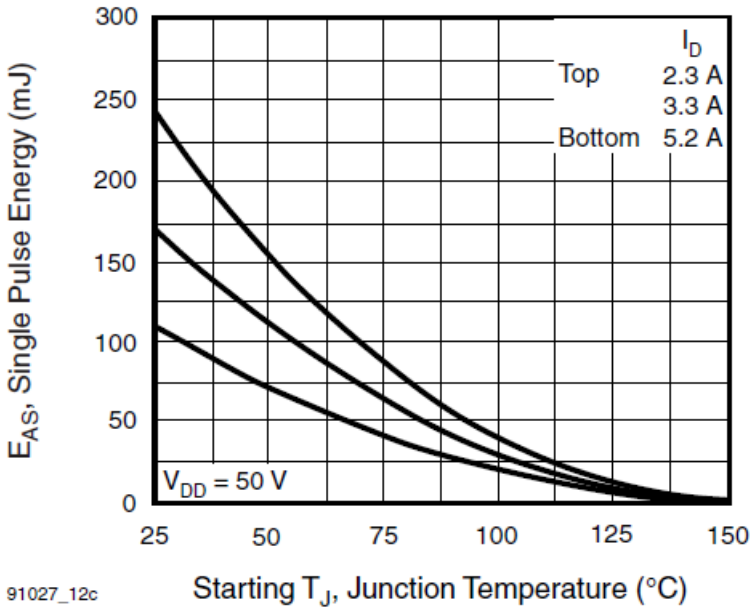
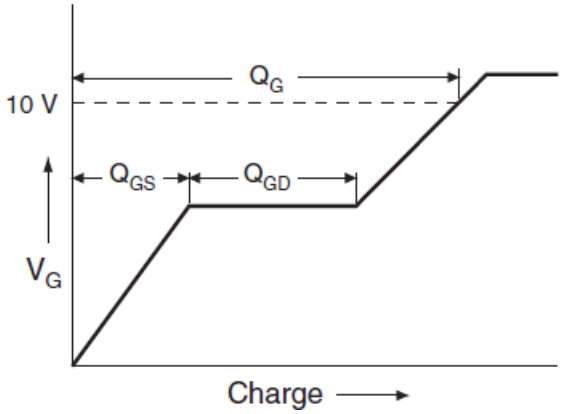
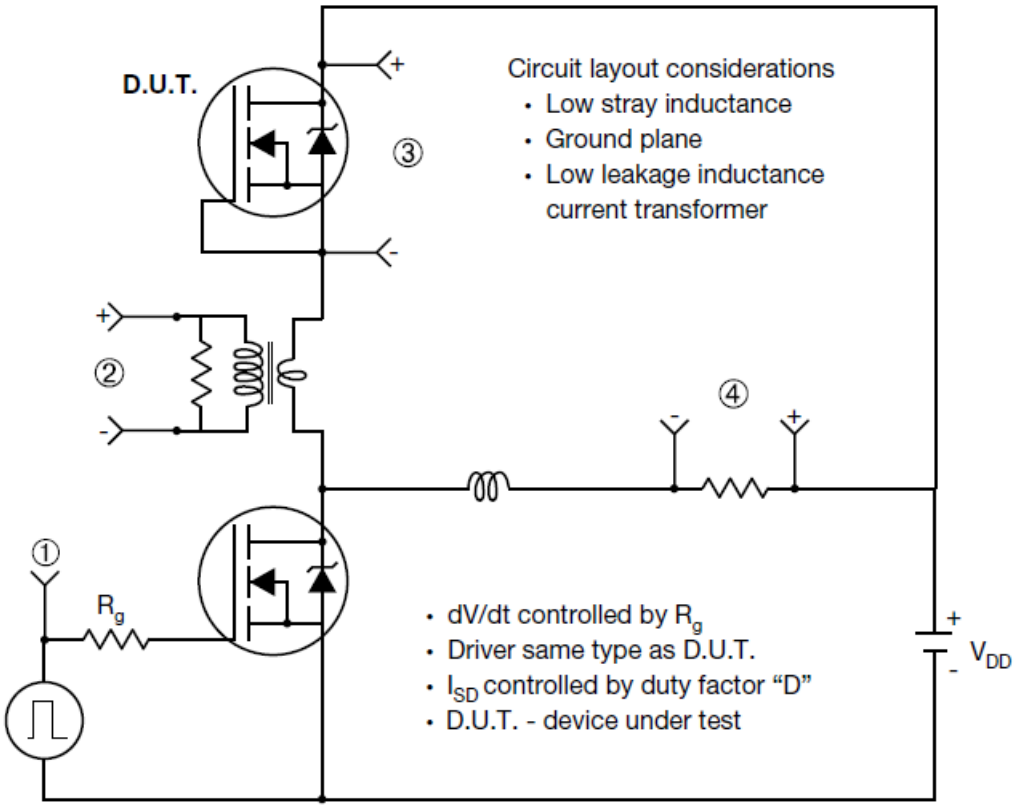


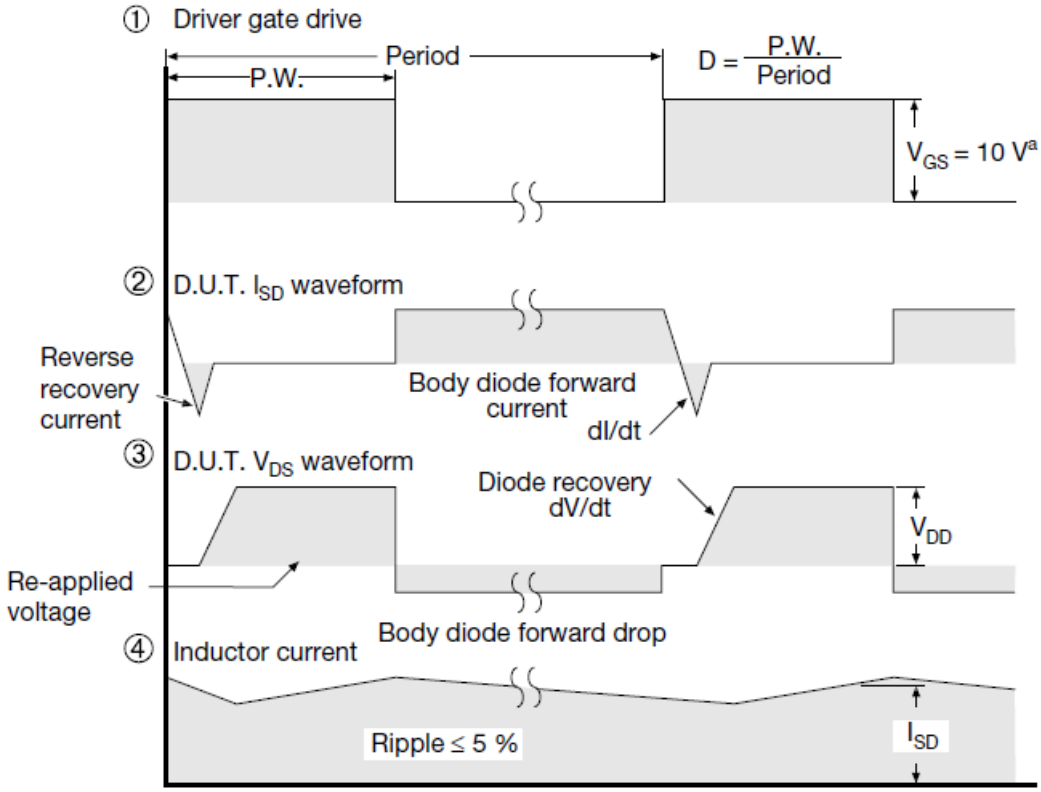
Fig. 13b - Gate Charge Test Circuit





Peak Diode Recovery dV/dt Test Circuit

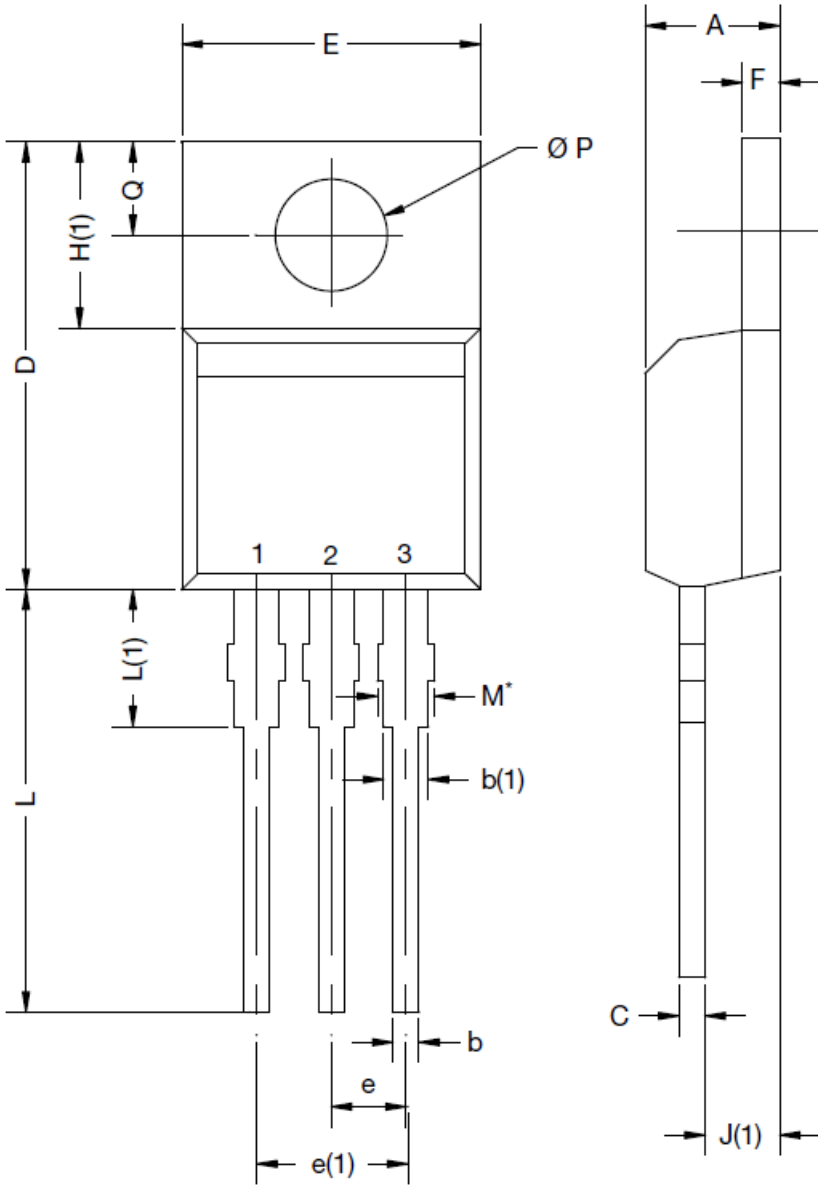




Note

a. V_{GS} = 5 V for logic level devices

DIMENSIONS


E
A
F
Ø P
Q
H(1)
D
1
2
3
L(1)
M*
b(1)
L
C
b
e
e(1)
J(1)

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.24	4.65	0.167	0.183
b	0.69	1.02	0.027	0.040
b(1)	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.33	15.85	0.564	0.624
E	9.96	10.52	0.392	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.10	6.71	0.240	0.264
J(1)	2.41	2.92	0.095	0.115
L	13.36	14.40	0.526	0.567
L(1)	3.33	4.04	0.131	0.159
Ø P	3.53	3.94	0.139	0.155
Q	2.54	3.00	0.100	0.118
ECN: E21-0621-Rev. D, 04-Nov-2021 DWG: 6031				

Note
M* = 0.052 inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM

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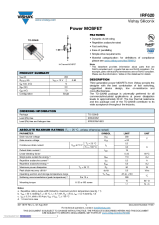	**VISHAY IRF620 Siliconix Power MOSFET** [pdf] Instruction Manual IRF620, Siliconix Power MOSFET, IRF620 Siliconix Power MOSFET, Power MOSFET, MOSFET

References

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