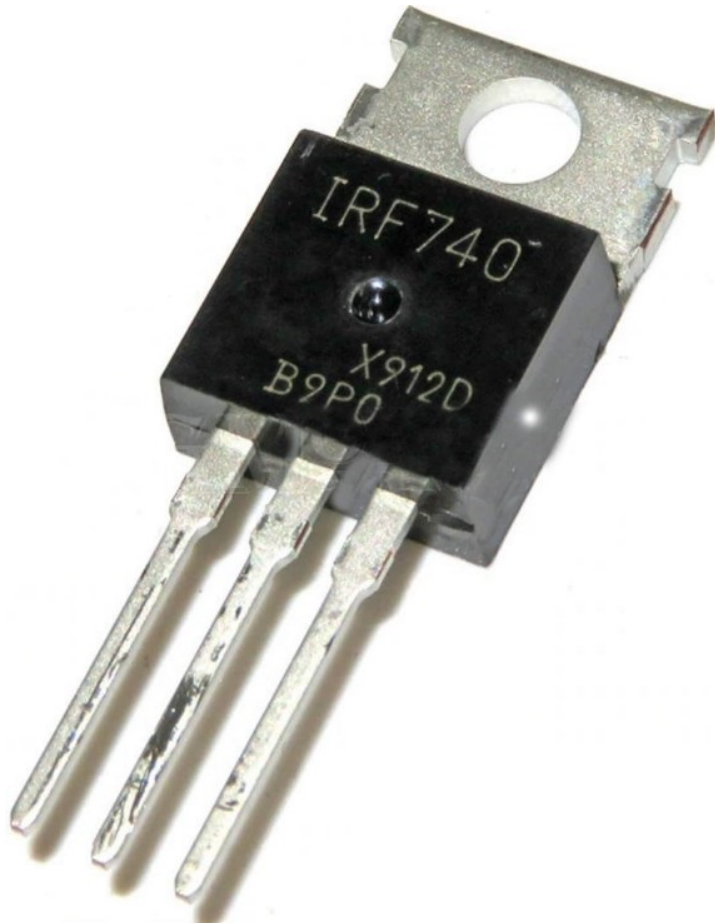


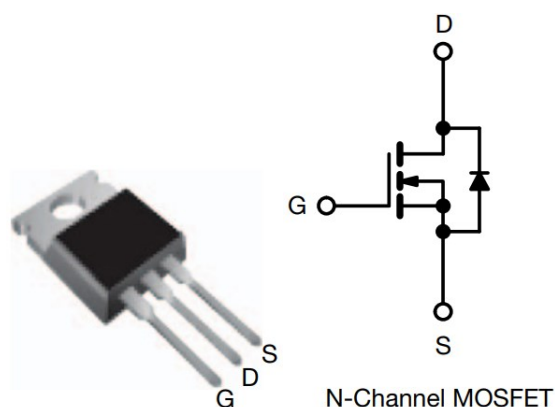
VISHAY IRF740B D Series Power MOSFET Owner's Manual

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VISHAY IRF740B D Series Power MOSFET Owner's Manual



PRODUCT SUMMARY		
V_{DS} (V) at T_J max.	450	
$R_{DS(on)}$ max. (W) at 25 °C	$V_{GS} = 10\text{ V}$	0.6
Q_g max. (nC)	30	
Q_{gs} (nC)	4	
Q_{gd} (nC)	7	
Configuration	Single	



Contents

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2 Disclaimer

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3.1 References

4 Related Posts

FEATURES

- Optimal design
 - Low area specific on-resistance
 - Low input capacitance (C_{iss})
 - Reduced capacitive switching losses
 - High body diode ruggedness
 - Avalanche energy rated (UIS)
- Optimal efficiency and operation
 - Low cost
 - Simple gate drive circuitry
 - Low figure-of-merit (FOM): $R_{on} \times Q_g$
 - Fast switching
- 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.

APPLICATIONS

- Consumer electronics
 - Displays (LCD or plasma TV)
- Server and telecom power supplies
 - SMPS
- Industrial
 - Welding
 - Induction heating
 - Motor drives
- Battery chargers

ORDERING INFORMATION

Package	TO-220AB
Lead (Pb)-free	IRF740BPbF

ABSOLUTE MAXIMUM RATINGS ($T_C = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V _{DS}	400	V
Gate-Source Voltage			V _{GS}	± 30	
Gate-Source Voltage AC (f > 1 Hz)				30	
Continuous Drain Current (T _J = 150 °C)	V _{GS} at 10 V	T _C = 25 °C	I _D	10	A
		T _C = 100 °C		6	
Pulsed Drain Current a			IDM	23	
Linear Derating Factor				1.2	W/°C
Single Pulse Avalanche Energy b			EAS	194	mJ
Maximum Power Dissipation			P _D	147	W
Operating Junction and Storage Temperature Range			T _J , T _{stg}	-55 to +150	°C
Drain-Source Voltage Slope	T _J = 125 °C		dV/dt	24	V/ns
Reverse Diode dV/dt d				0.6	
Soldering Recommendations (Peak temperature) c	for 10 s			300	°C

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature.

b. VDD = 50 V, starting TJ = 25 °C, L = 2.3 mH, Rg = 25 Ω , IAS = 13 A.

c. 1.6 mm from case.

d. ISD = ID, starting TJ = 25 °C.

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	RthJA	–	62	°C/W
Maximum Junction-to-Case (Drain)	RthJC	–	0.85	

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA		400	–	–	V
V _{DS} Temperature Coefficient	DV _{DS} /T _J	Reference to 25 °C, I _D = 250 μA		–	0.53	–	V/°C
Gate-Source Threshold Voltage (N)	V _{GS} (th)	V _{DS} = V _{GS} , I _D = 250 μA		3	–	5	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 30 V		–	–	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 400 V, V _{GS} = 0 V		–	–	1	μA
		V _{DS} = 320 V, V _{GS} = 0 V, T _J = 125 °C		–	–	10	
Drain-Source On-State Resistance	R _{DS} (on)	V _{GS} = 10 V	I _D = 5 A	–	0.5	0.6	W
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 5 A		–	2.7	–	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 100 V, f = 1 MHz		–	526	–	pF
Output Capacitance	C _{oss}			–	59	–	
Reverse Transfer Capacitance	C _{rss}			–	9	–	
Effective Output Capacitance, Energy Related a	Co(er)	V _{GS} = 0 V, V _{DS} = 0 V to 320 V		–	66	–	
Effective Output Capacitance, Time Related b	Co(tr)			–	84	–	
Total Gate Charge	Q _g	V _{GS} = 10 V	I _D = 5 A, V _{DS} = 320 V	–	15	30	nC
Gate-Source Charge	Q _{gs}			–	4	–	

Gate-Drain Charge	Qgd		–	7	–	
Turn-On Delay Time	td(on)	$V_{DD} = 400\text{ V}, I_D = 10\text{ A}, V_{GS} = 10\text{ V}, R_g = 9.1\text{ }\Omega$	–	12	24	ns
Rise Time	t _r		–	18	36	
Turn-Off Delay Time	td(off)		–	18	36	
Fall Time	t _f		–	14	28	
Gate Input Resistance	R _g	f = 1 MHz, open drain	0.9	1.8	3.6	W
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p – n junction diode G S	–	–	10	A
Pulsed Diode Forward Current	I _{SM}		–	–	40	
Diode Forward Voltage	V _{SD}	T _J = 25 °C, I _S = 5 A, V _{GS} = 0 V	–	–	1.2	V
Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = I _S = 5 A, di/dt = 100 A/μs, V _R = 25 V	–	230	–	ns
Reverse Recovery Charge	Q _{rr}		–	1.6	–	μC
Reverse Recovery Current	I _{RRM}		–	14	–	A

Notes

- a. Coss(er) is a fixed capacitance that gives the same energy as Coss while VDS is rising from 0 % to 80 % VDS.
b. Coss(tr) is a fixed capacitance that gives the same charging time as Coss while VDS is rising from 0 % to 80 % VDS.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 – Typical Output Characteristics

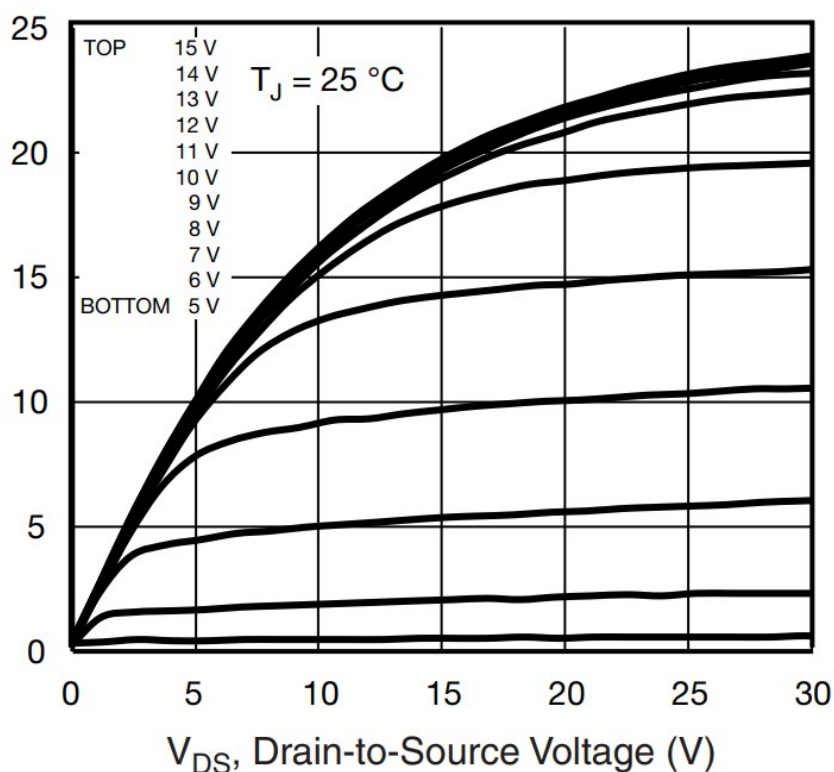


Fig. 2 – Typical Output Characteristics

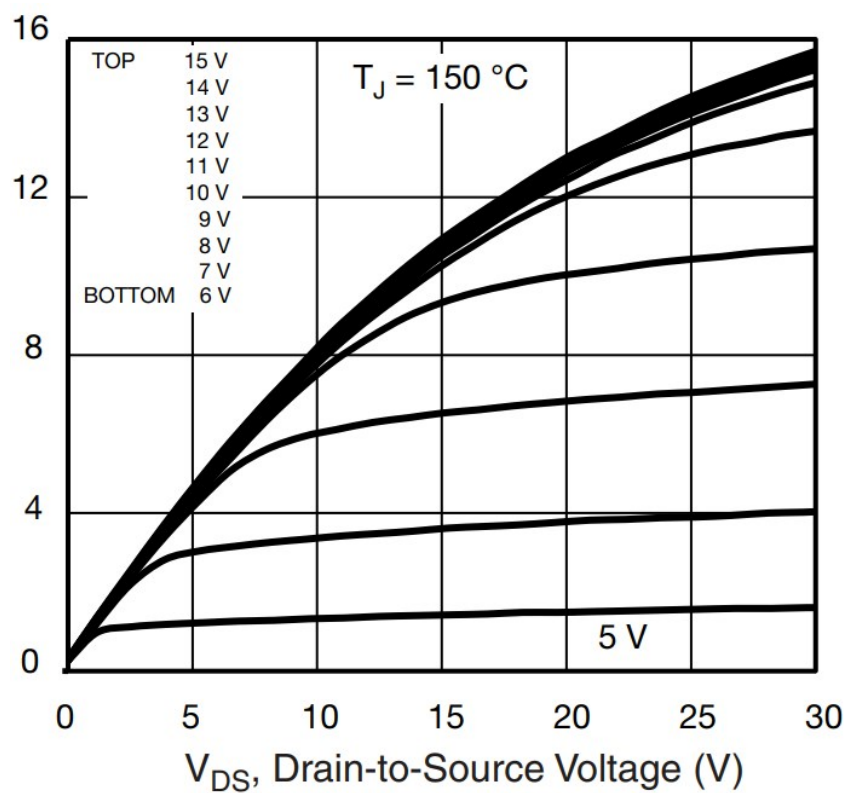


Fig. 3 – Typical Transfer Characteristics

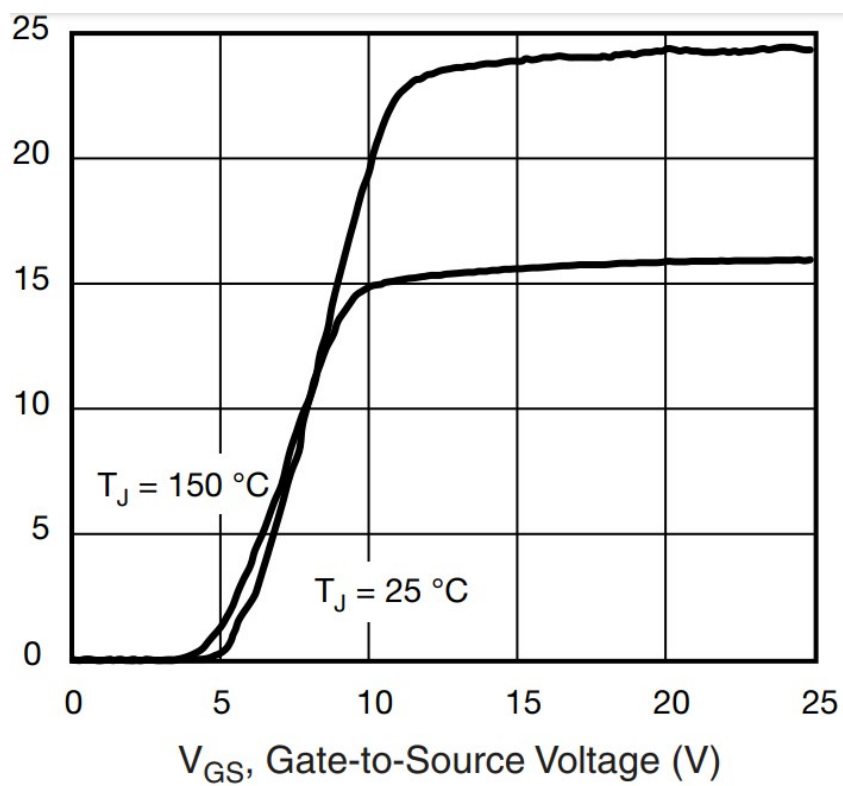


Fig. 4 – Normalized On-Resistance vs. Temperature

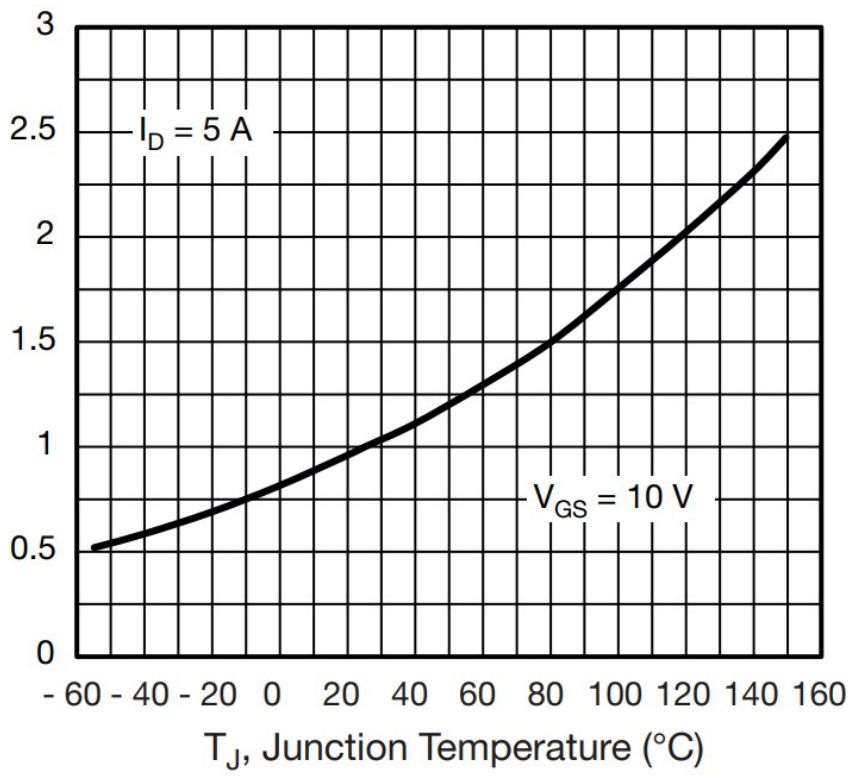


Fig. 5 – Typical Capacitance vs. Drain-to-Source Voltage

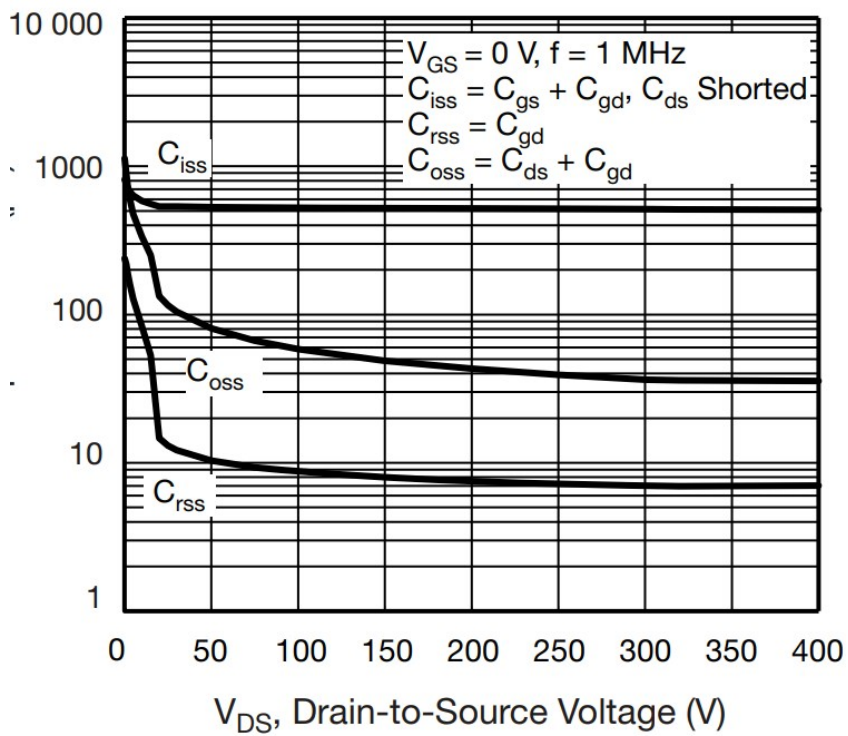


Fig. 6 – Typical Gate Charge vs. Gate-to-Source Voltage

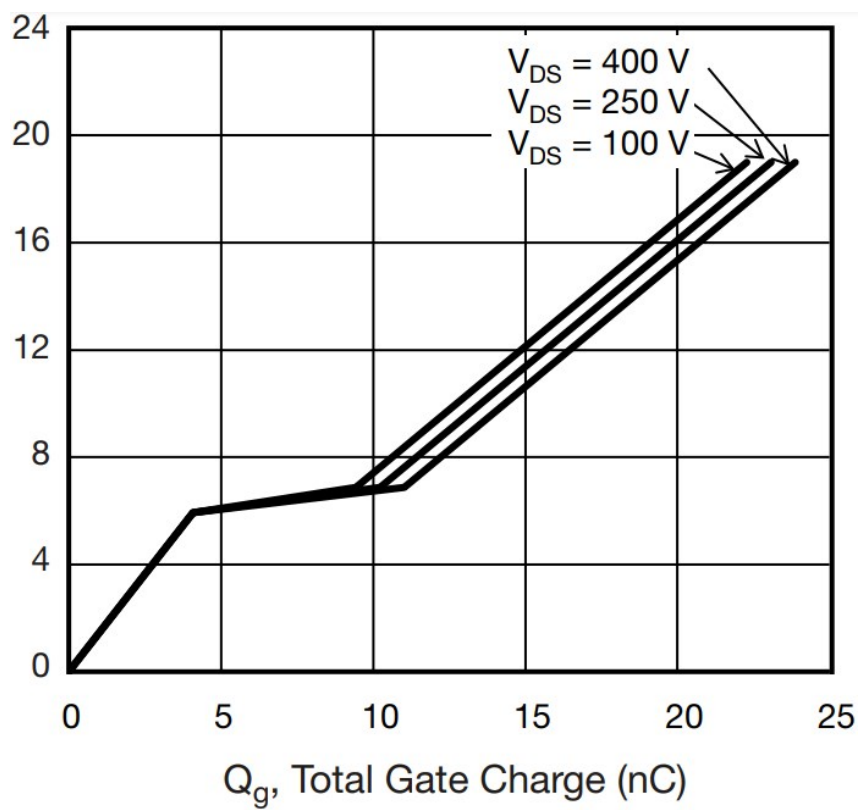


Fig. 7 – Typical Source-Drain Diode Forward Voltage

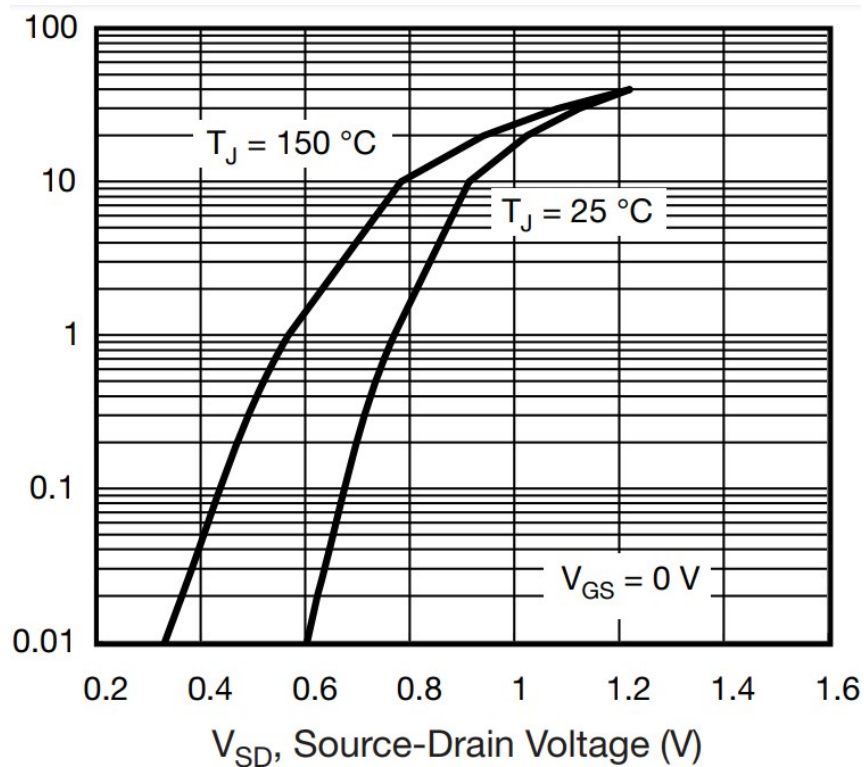


Fig. 8 – Maximum Safe Operating Area

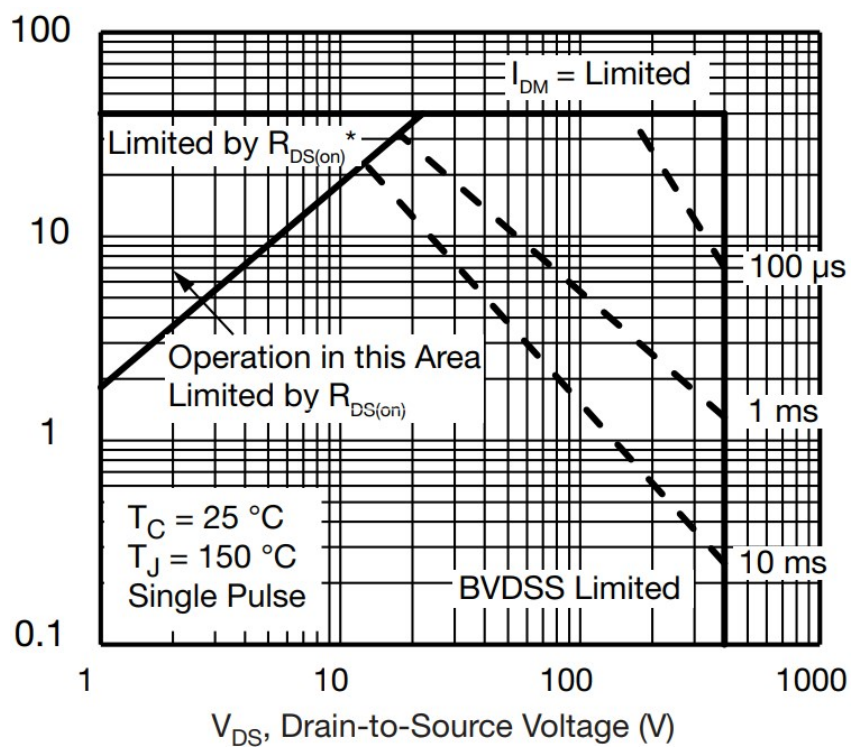


Fig. 9 – Maximum Drain Current vs. Case Temperature

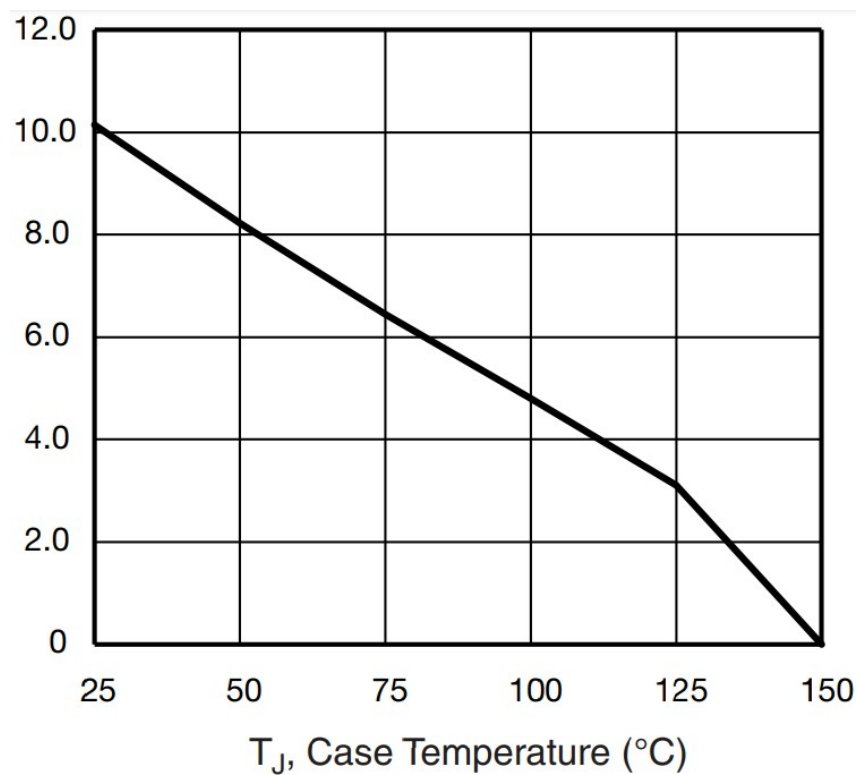


Fig. 10 – Temperature vs. Drain-to-Source Voltage

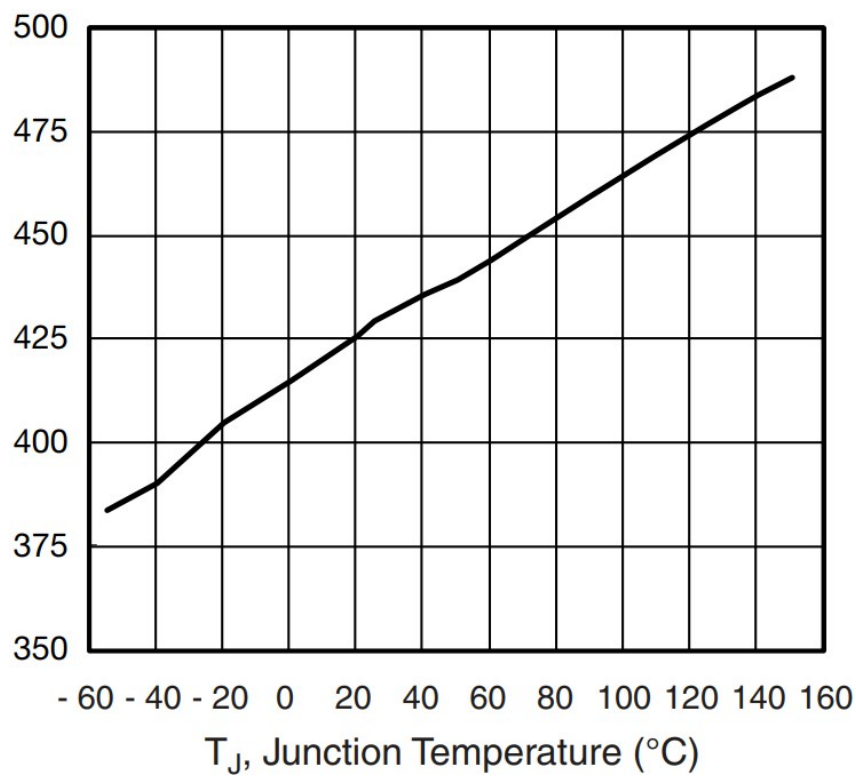


Fig. 11 – Normalized Thermal Transient Impedance, Junction-to-Case

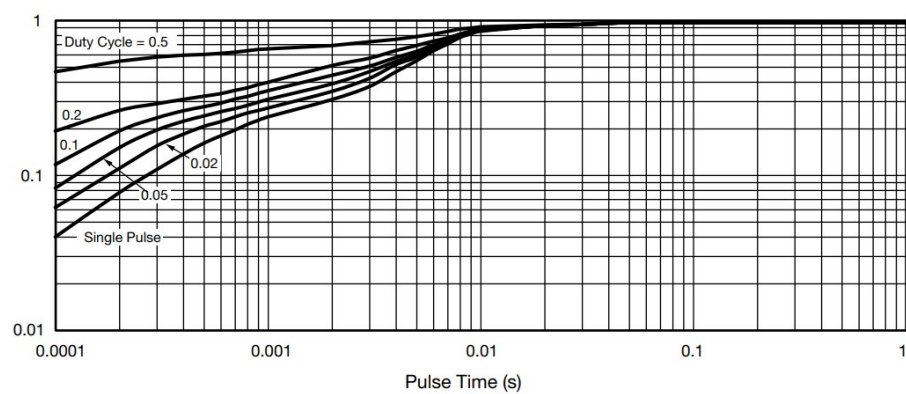


Fig. 12 – Switching Time Test Circuit

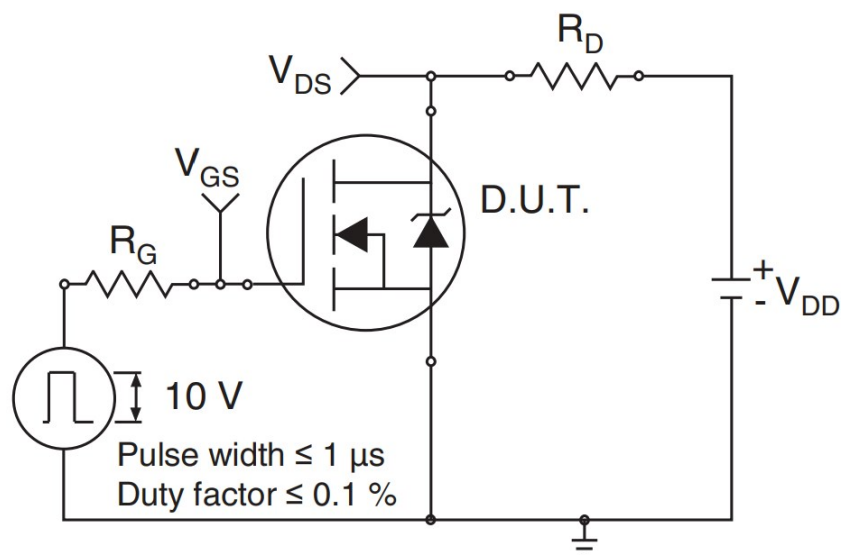


Fig. 13 – Switching Time Waveforms

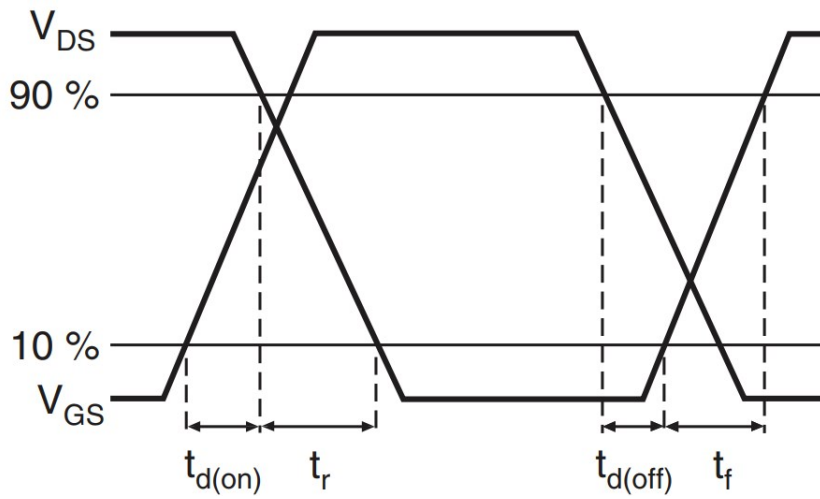


Fig. 14 – Unclamped Inductive Test Circuit

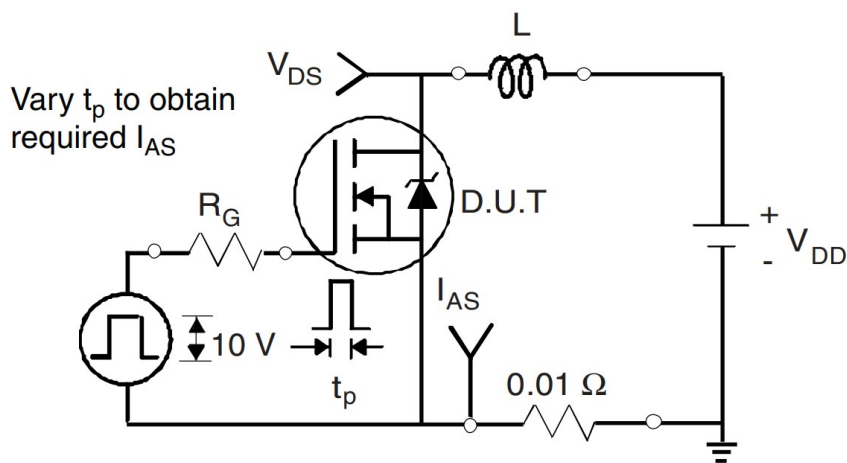


Fig. 15 – Unclamped Inductive Waveforms

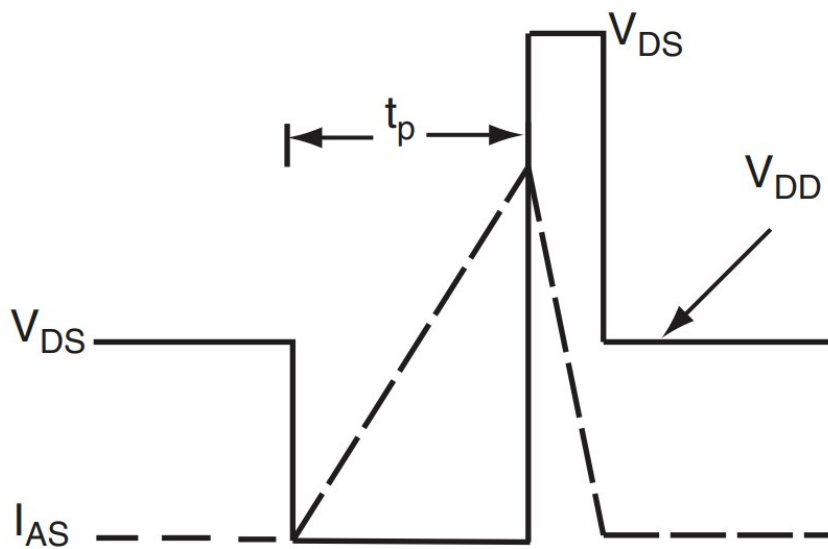


Fig. 16 – Basic Gate Charge Waveform

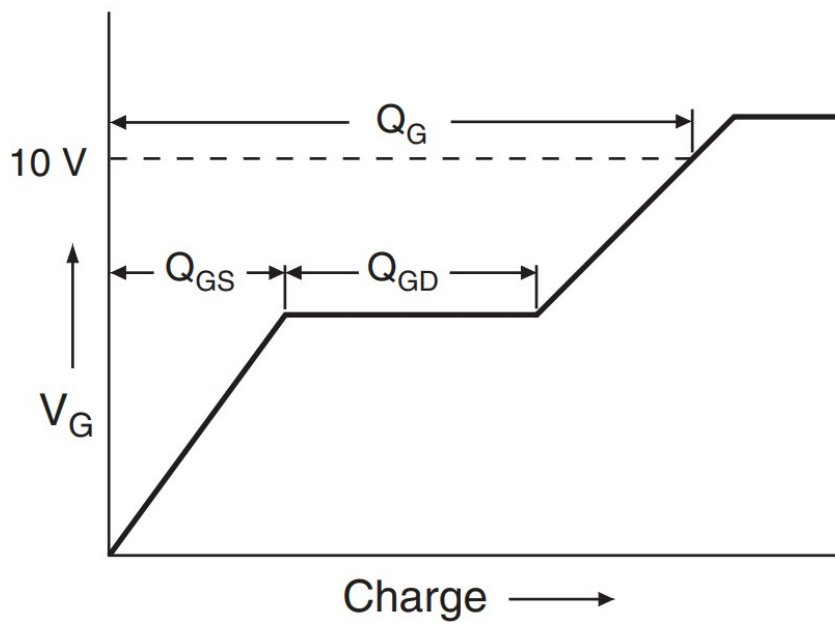


Fig. 17 – Gate Charge Test Circuit

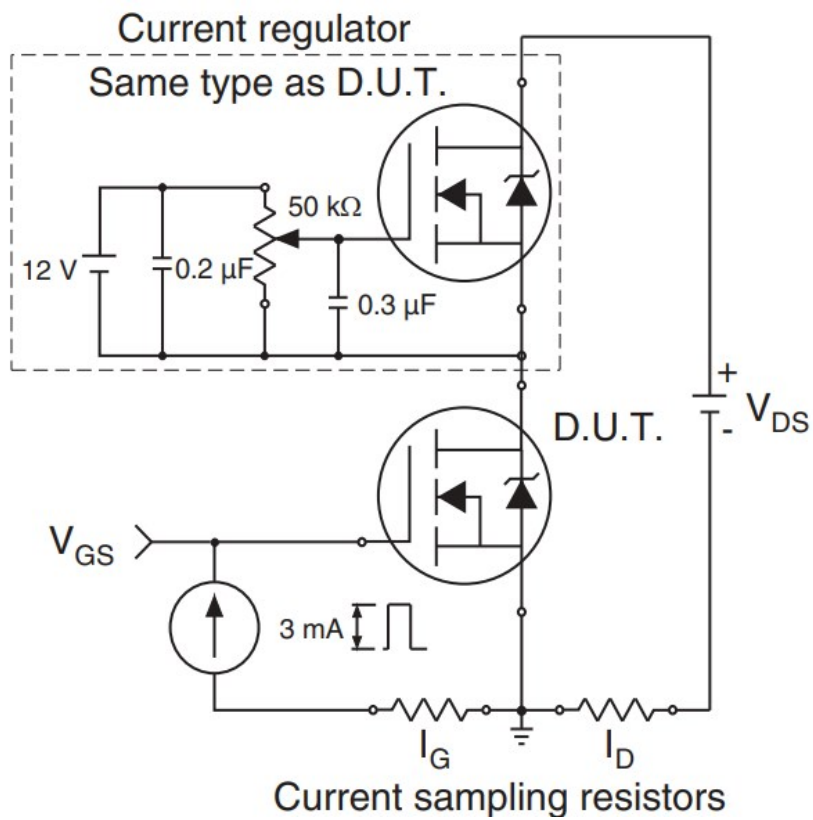
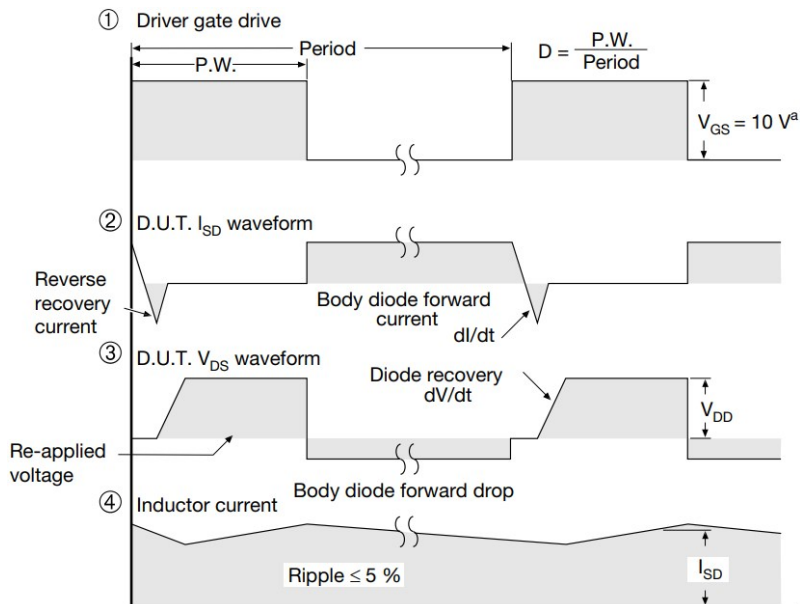
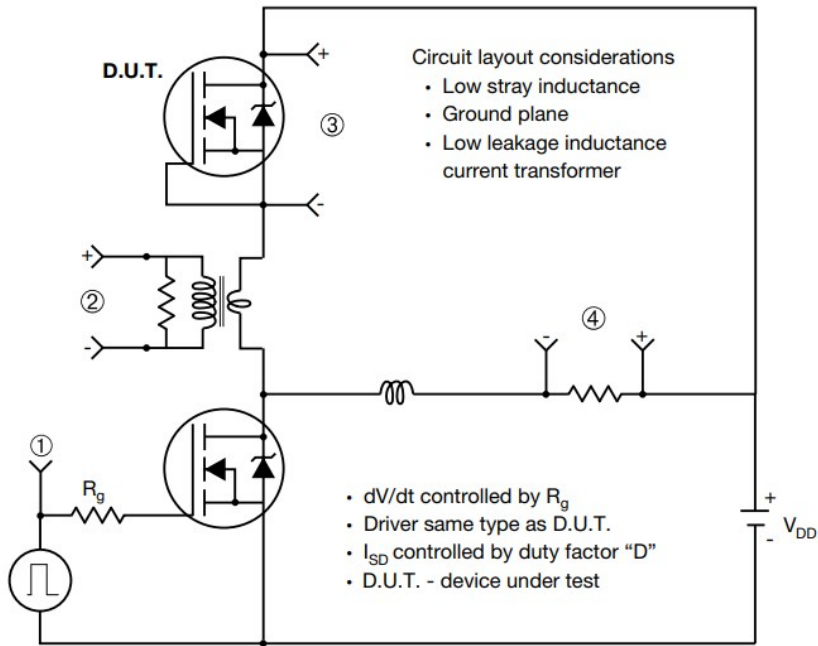
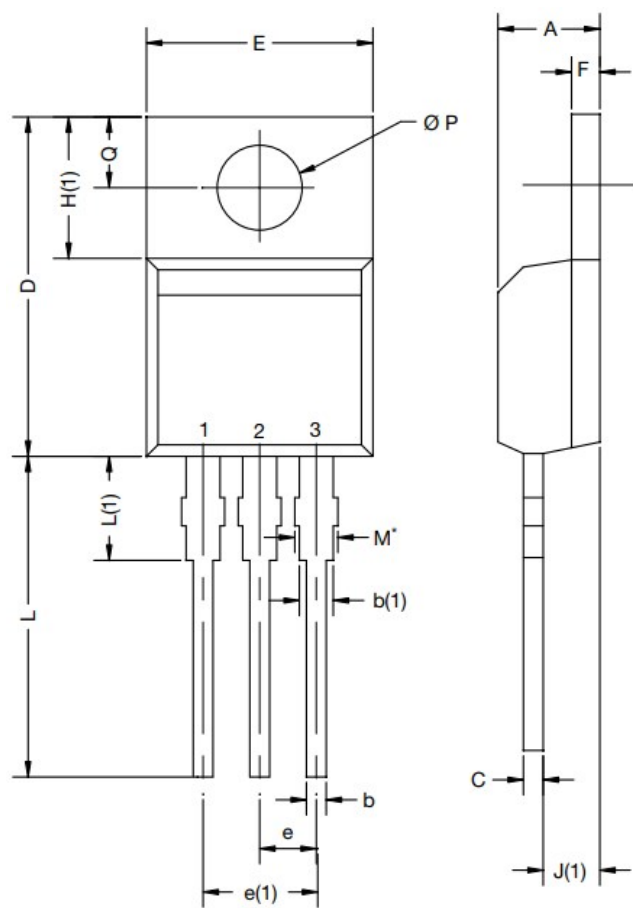


Fig. 18 – For N-Channel

Peak Diode Recovery dV/dt Test Circuit





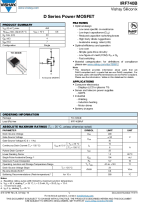
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.24	4.65	0.167	0.183
b	0.69	1.02	0.027	0.040
b(1)	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.33	15.85	0.564	0.624
E	9.96	10.52	0.392	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.10	6.71	0.240	0.264
J(1)	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				

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Documents / Resources

	<p>VISHAY IRF740B D Series Power MOSFET [pdf] Owner's Manual</p> <p>IRF740B D Series Power MOSFET, IRF740B, D Series Power MOSFET, Power MOSFET, MOSFET</p>
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References

- [applications.no](https://www.vishay.com/applications/no)
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