

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	IRFB7440
▶ Overseas	Part Number	IRFB7440
▶ Equivalent	Part Number	IRFB7440

EV is the abbreviation of name EVVO

Description

40V /180A Power MOSFET
Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=4.5\text{ V}$
Pb-free lead plating; RoHS compliant

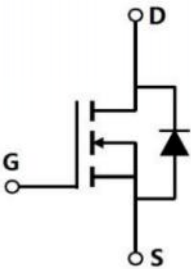
TO-220-3L Pin Configuration



40V N-Channel Enhancement Mode MOSFET

General Features

V_{DS}	40	V
$R_{DS(on),TYP@V_{GS}=10V}$	2.6	mΩ
$R_{DS(on),TYP@V_{GS}=4.5}$	3.5	mΩ
I_D	180	A



Absolute Maximum Ratings ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	40	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾	I_D	180	A
Pulsed drain current ²⁾	$I_{D,pulse}$	390	A
Power dissipation ³⁾	P_D	140	W
Single pulsed avalanche energy ⁴⁾	E_{AS}	200	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$
Thermal resistance, junction-case	$R_{\theta JC}$	0.89	$^{\circ}\text{C/W}$
Thermal resistance, junction-ambient ⁵⁾	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	40			V	$V_{GS}=0\text{ V}$, $I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.0		2.5	V	$V_{DS}=V_{GS}$, $I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		2.6	2.8	$\text{m}\Omega$	$V_{GS}=10\text{ V}$, $I_D=55\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		3.0	3.5	$\text{m}\Omega$	$V_{GS}=4.5\text{ V}$, $I_D=55\text{ A}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=20\text{ V}$
				-100		$V_{GS}=-20\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=40\text{ V}$, $V_{GS}=0\text{ V}$
Input capacitance	C_{iss}		6587.4		pF	$V_{GS}=0\text{ V}$, $V_{DS}=20\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oss}		2537.3		pF	
Reverse transfer capacitance	C_{rss}		178.8		pF	
Turn-on delay time	$t_{d(on)}$		26.6		ns	$V_{GS}=10\text{ V}$, $V_{DS}=20\text{ V}$, $R_G=2\text{ }\Omega$, $I_D=20\text{ A}$
Rise time	t_r		9.3		ns	
Turn-off delay time	$t_{d(off)}$		96		ns	
Fall time	t_f		39.3		ns	
Total gate charge	Q_g		96.8		nC	$I_D=20\text{ A}$, $V_{DS}=20\text{ V}$, $V_{GS}=10\text{ V}$
Gate-source charge	Q_{gs}		14.5		nC	
Gate-drain charge	Q_{gd}		18.4		nC	
Gate plateau voltage	$V_{plateau}$		2.7		V	
Diode forward current	I_S			130	A	$V_{GS}<V_{th}$
Pulsed source current	I_{SP}			390		
Diode forward voltage	V_{SD}			1.3	V	$I_S=20\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		205		ns	$I_S=20\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		557.4		nC	
Peak reverse recovery current	I_{rrm}		4.3		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=30\text{ V}$, $R_G=50\text{ }\Omega$, $L=0.3\text{ mH}$, starting $T_J=25^{\circ}\text{C}$.
- 5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25^{\circ}\text{C}$.

40V N-Channel Enhancement Mode MOSFET

Typical Characteristics

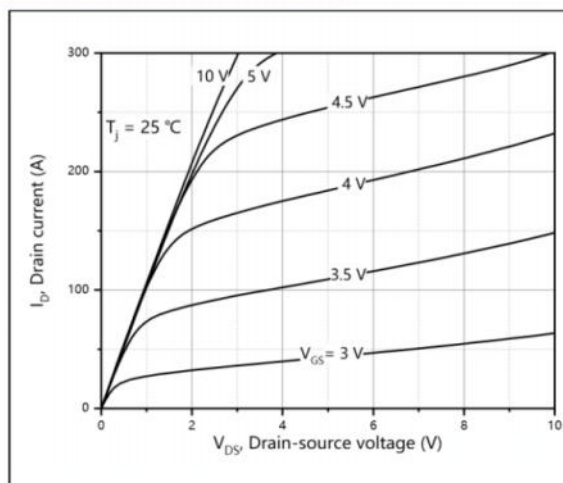


Figure 1, Typ. output characteristics

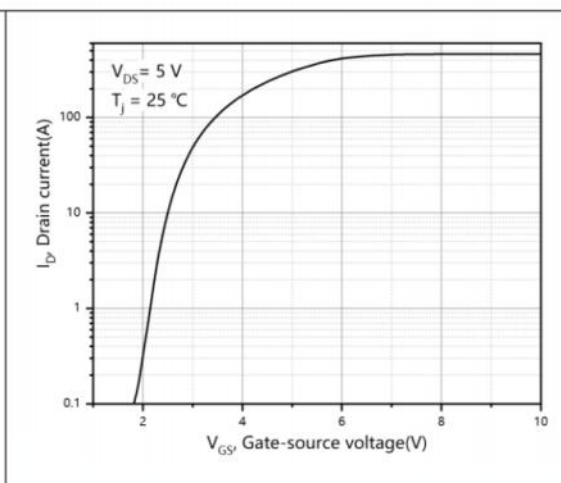


Figure 2, Typ. transfer characteristics

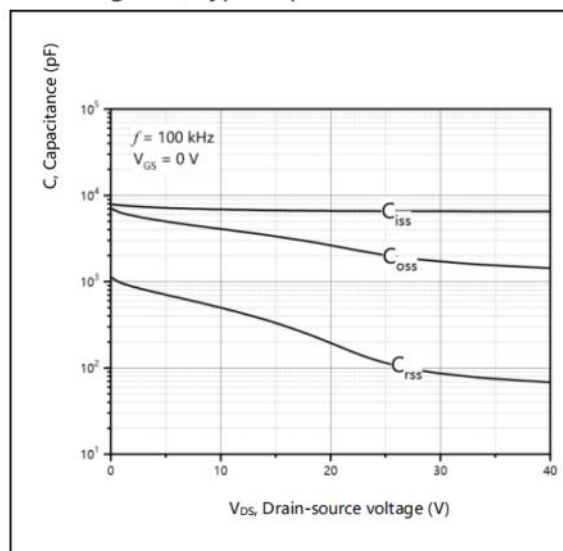


Figure 3, Typ. capacitances

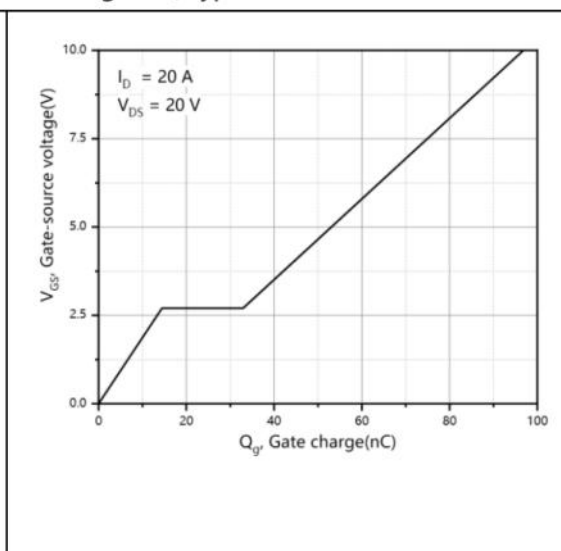


Figure 4, Typ. gate charge

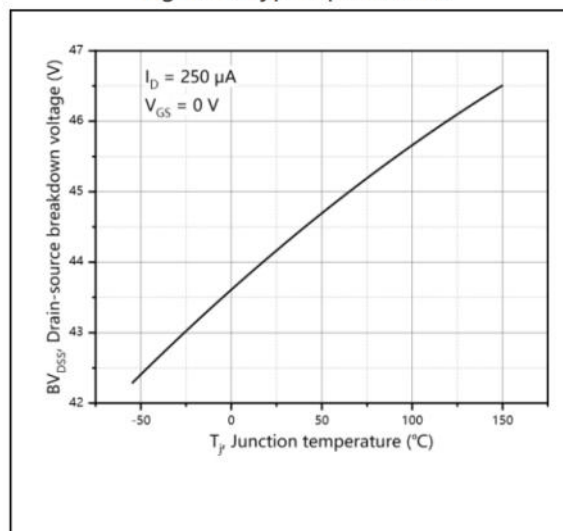


Figure 5, Drain-source breakdown voltage

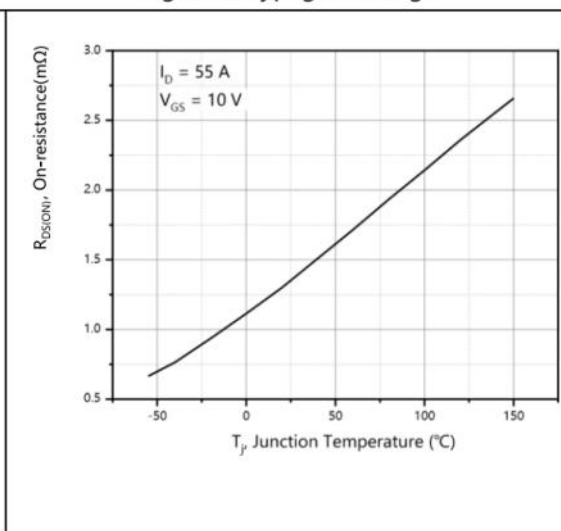


Figure 6, Drain-source on-state resistance

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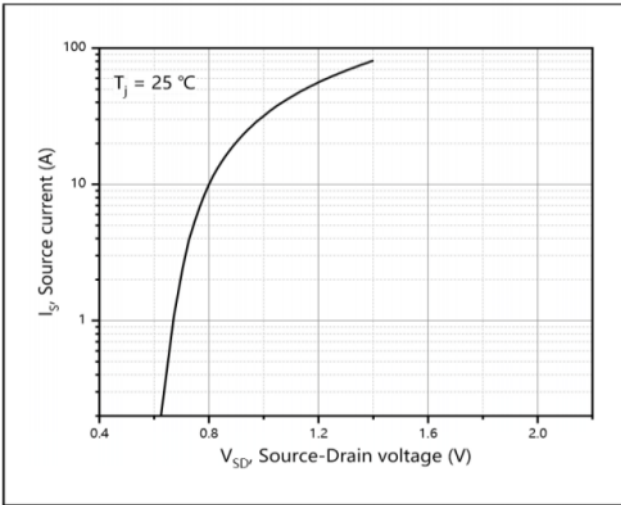


Figure 7, Forward characteristic of body diode

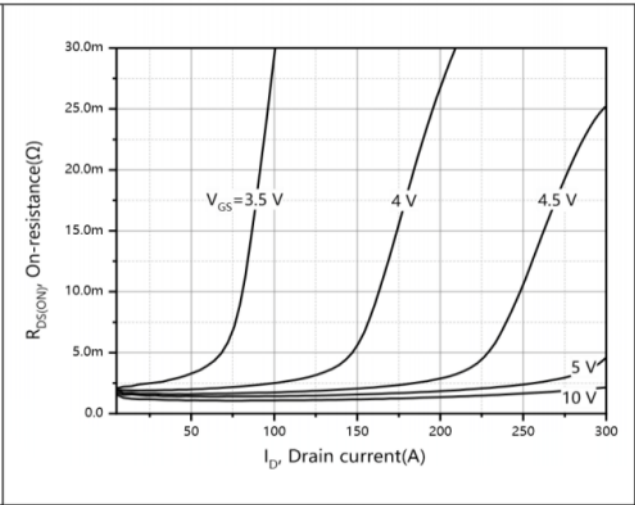


Figure 8, Drain-source on-state resistance

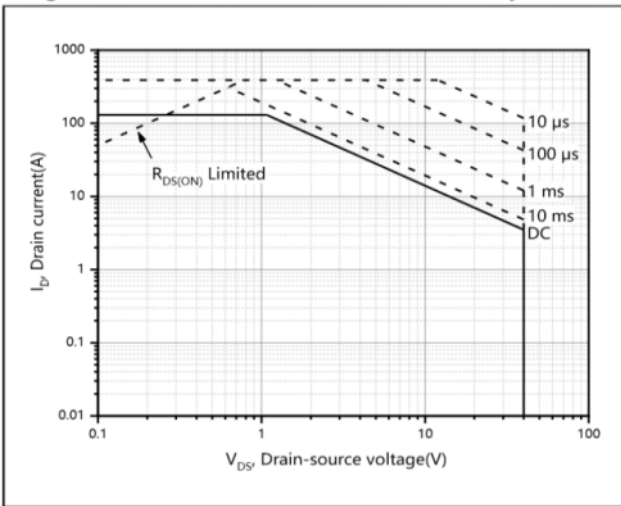


Figure 9, Safe operation area $T_C=25\text{ }^{\circ}\text{C}$

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Test circuits and waveforms

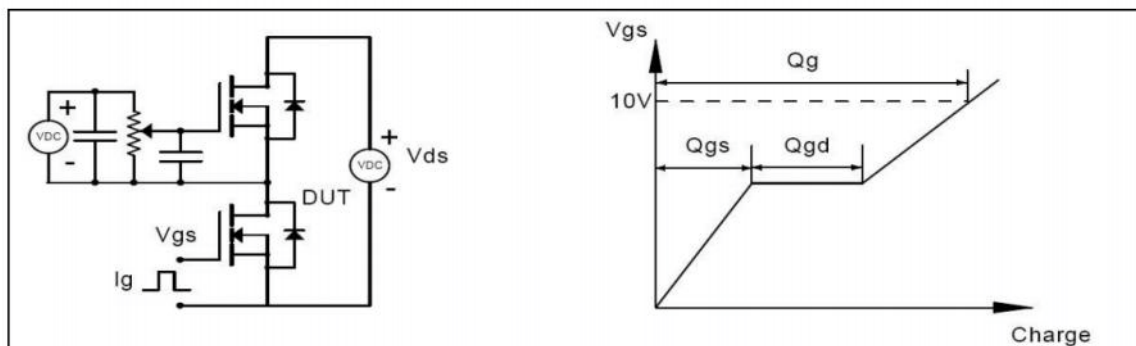


Figure 1. Gate charge test circuit & waveform

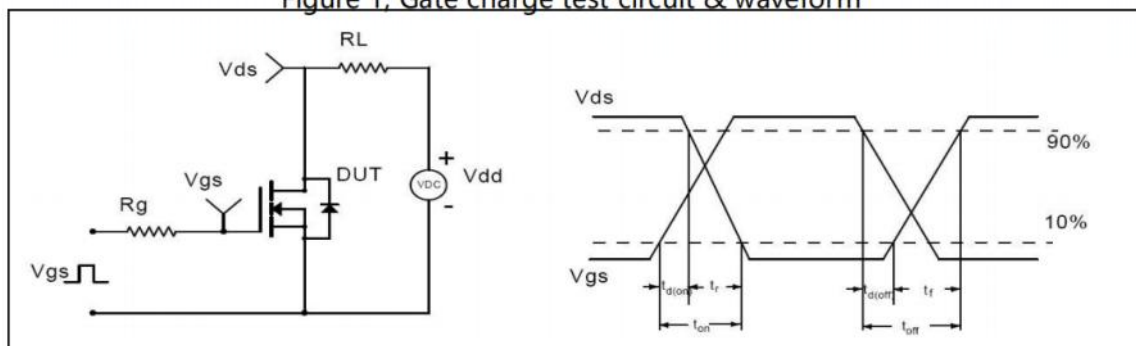


Figure 2. Switching time test circuit & waveforms

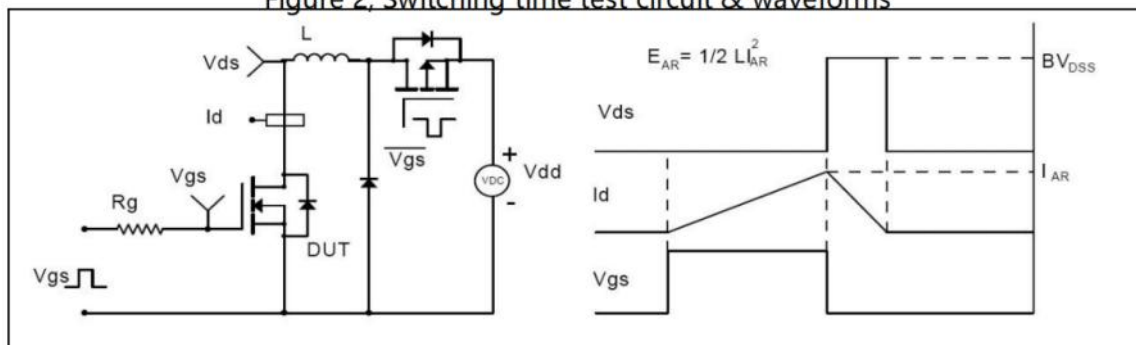


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

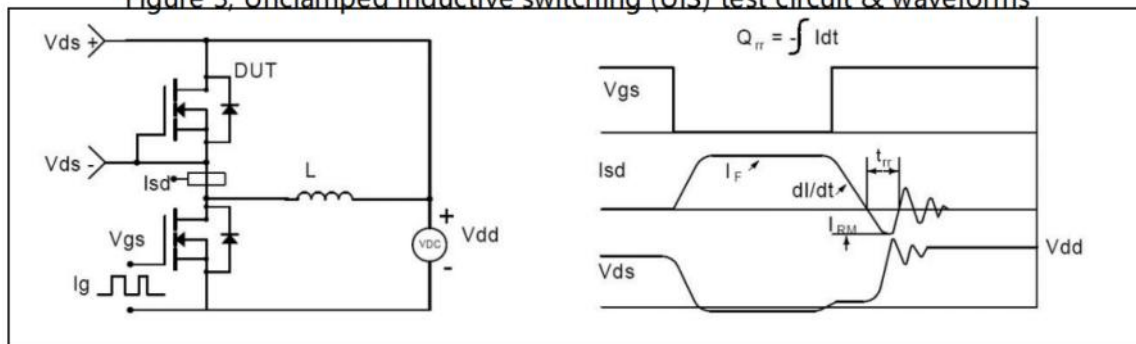
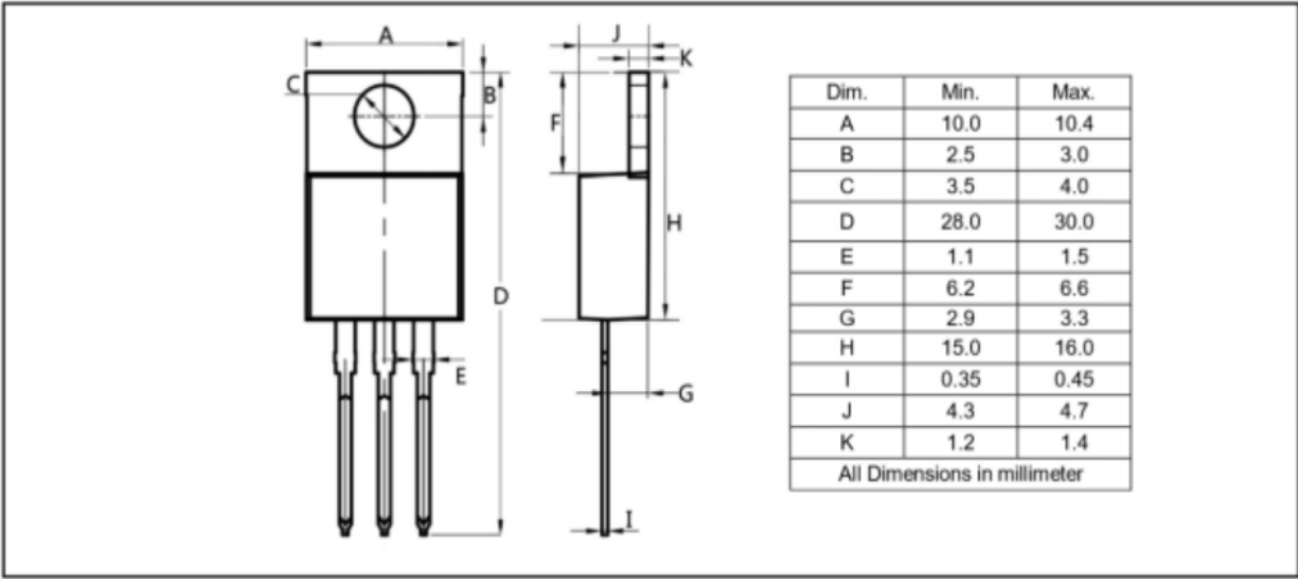


Figure 4. Diode reverse recovery test circuit & waveforms

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Package Mechanical Data-TO-220-3L



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