

IXFH16N90Q-VB Datasheet

Super Junction Power MOSFET

PRODUCT SUMMARY

V_{DS} (V) at T_J max.	900	
$R_{DS(on)}$ typ. (Ω) at 25 °C	$V_{GS} = 10$ V	0.27
Q_g max. (nC)	122	
Q_{gs} (nC)	14	
Q_{gd} (nC)	23	
Configuration	Single	

FEATURES

- Low figure-of-merit (FOM) $R_{on} \times Q_g$
- Low input capacitance (C_{iss})
- Reduced switching and conduction losses
- Ultra low gate charge (Q_g)
- Avalanche energy rated (UIS)

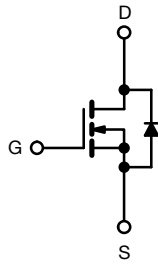
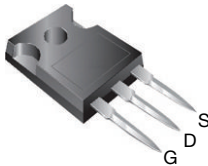


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HALOGEN
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APPLICATIONS

- Server and telecom power supplies
- Switch mode power supplies (SMPS)
- Power factor correction power supplies (PFC)
- Lighting
 - High-intensity discharge (HID)
 - Fluorescent ballast lighting
- Industrial
 - Welding
 - Induction heating
 - Motor drives
 - Battery chargers
 - Renewable energy
 - Solar (PV inverters)

TO-247AC



N-Channel MOSFET

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

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-source voltage			V_{DS}	900	V
Gate-source voltage			V_{GS}	± 30	
Continuous drain current ($T_J = 150\text{ }^{\circ}\text{C}$)	V_{GS} at 10 V	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	20	A
		$T_C = 100\text{ }^{\circ}\text{C}$		10	
Pulsed drain current ^a			I_{DM}	60	
Linear derating factor				1.7	W/ $^{\circ}\text{C}$
Single pulse avalanche energy ^b			E_{AS}	383	mJ
Maximum power dissipation			P_D	218	W
Operating junction and storage temperature range			T_J, T_{stg}	-55 to +150	$^{\circ}\text{C}$
Drain-source voltage slope	$T_J = 125\text{ }^{\circ}\text{C}$		dV/dt	70	V/ns
Reverse diode dV/dt ^d				5.1	
Soldering recommendations (peak temperature) ^c	For 10 s			300	$^{\circ}\text{C}$


Notes

- Repetitive rating; pulse width limited by maximum junction temperature
- $V_{DD} = 140$ V, starting $T_J = 25$ °C, $L = 28.2$ mH, $R_g = 25$ Ω , $I_{AS} = 5.0$ A
- 1.6 mm from case
- $I_{SD} \leq I_D$, $dI/dt = 100$ A/ μ s, starting $T_J = 25$ °C

THERMAL RESISTANCE RATINGS

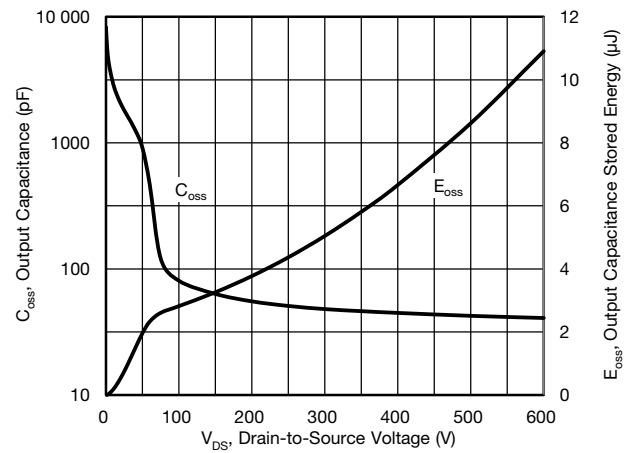
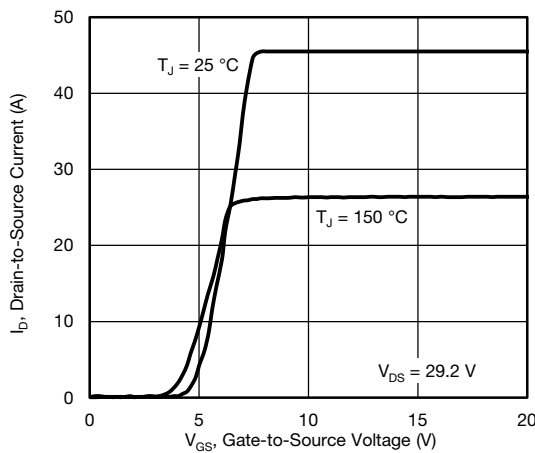
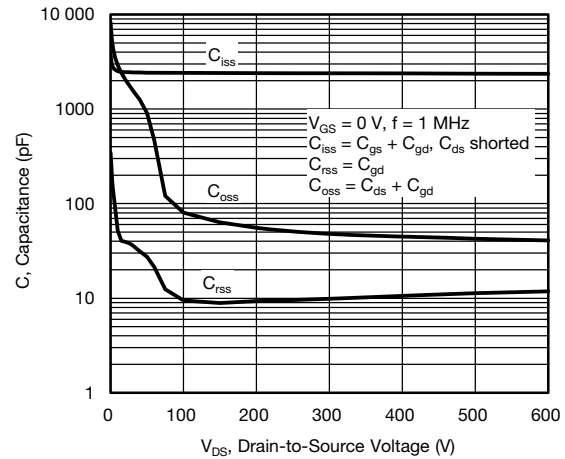
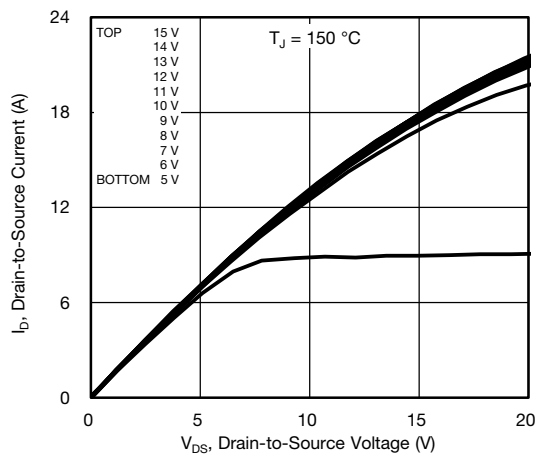
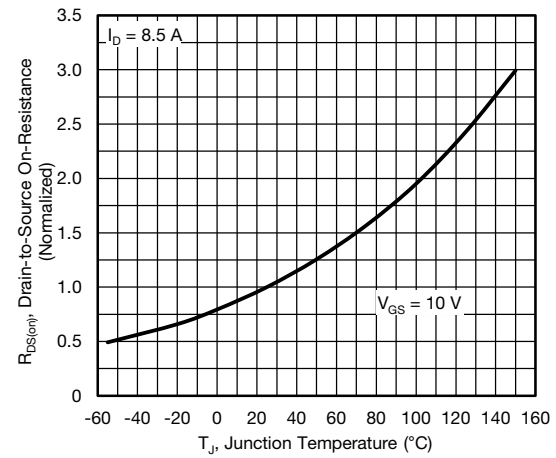
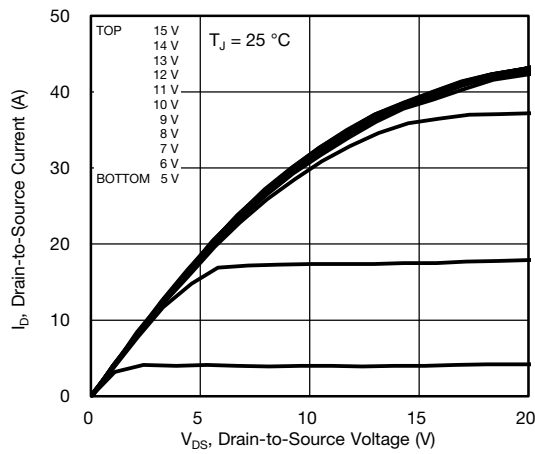
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum junction-to-ambient	R_{thJA}	-	62	°C/W
Maximum junction-to-case (drain)	R_{thJC}	-	0.6	

SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, 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		900	-	-	V
V _{DS} temperature coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA		-	1.08	-	V/°C
Gate-source threshold Voltage (N)	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		2.0	-	4.0	V
Gate-source leakage	I _{GSS}	V _{GS} = ± 20 V		-	-	± 100	nA
		V _{GS} = ± 30 V		-	-	± 1	μA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 800 V, V _{GS} = 0 V		-	-	1	μA
		V _{DS} = 640 V, V _{GS} = 0 V, T _J = 125 °C		-	-	10	
Drain-source on-state resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 8.5 A	-	0.27	-	Ω
Forward transconductance	g _{fs}	V _{DS} = 30 V, I _D = 8.5 A		-	8.7	-	S
Dynamic							
Input capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 100 V, f = 1 MHz		-	2408	-	pF
Output capacitance	C _{oss}			-	81	-	
Reverse transfer capacitance	C _{rss}			-	9	-	
Effective output capacitance, energy related ^a	C _{o(er)}	V _{DS} = 0 V to 480 V, V _{GS} = 0 V		-	58	-	
Effective output capacitance, time related ^b	C _{o(tr)}			-	296	-	
Total gate charge	Q _g	V _{GS} = 10 V	I _D = 8.5 A, V _{DS} = 480 V	-	61	122	nC
Gate-source charge	Q _{gs}			-	14	-	
Gate-drain charge	Q _{gd}			-	23	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 480 V, I _D = 8.5 A, V _{GS} = 10 V, R _g = 9.1 Ω		-	22	44	ns
Rise time	t _r			-	24	48	
Turn-off delay time	t _{d(off)}			-	71	142	
Fall time	t _f			-	26	52	
Gate input resistance	R _g	f = 1 MHz, open drain		0.3	0.7	1.4	Ω
Drain-Source Body Diode Characteristics							
Continuous source-drain diode current	I _S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	15	A
Pulsed diode forward current	I _{SM}			-	-	45	
Diode forward voltage	V _{SD}	T _J = 25 °C, I _S = 8.5 A, V _{GS} = 0 V		-	-	1.2	V
Reverse recovery time	t _{rr}	T _J = 25 °C, I _F = I _S = 8.5 A, dI/dt = 100 A/μs, V _R = 25 V		-	416	832	ns
Reverse recovery charge	Q _{rr}			-	6.4	12.8	μC
Reverse recovery current	I _{RRM}			-	27	-	A

Notes

- a. $C_{oss(er)}$ is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS}
 b. $C_{oss(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS}

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


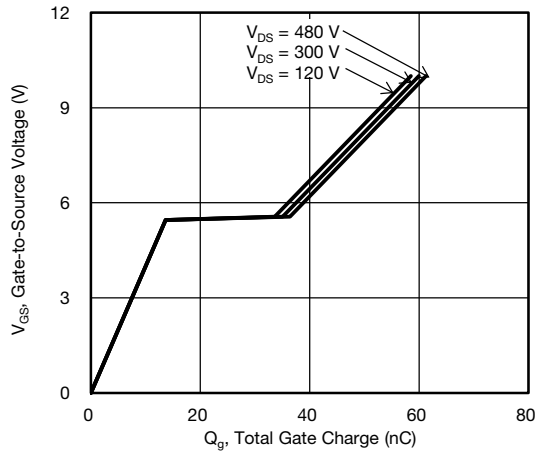


Fig. 7 - Typical Gate Charge vs. Gate-to-Source Voltage

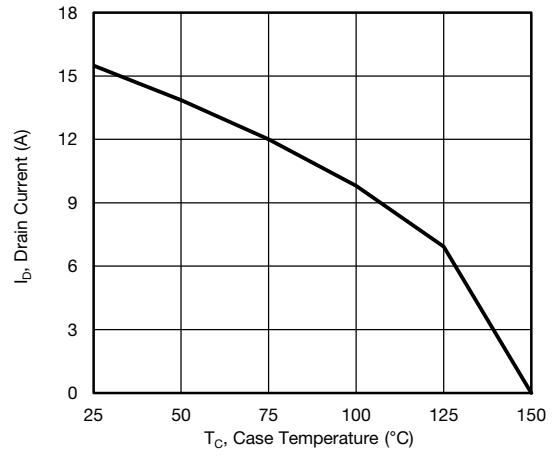


Fig. 10 - Maximum Drain Current vs. Case Temperature

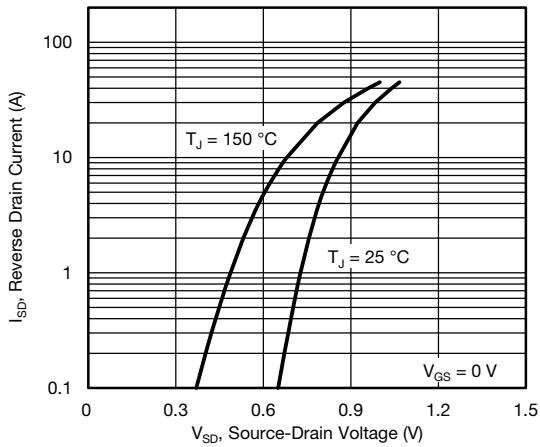


Fig. 8 - Typical Source-Drain Diode Forward Voltage

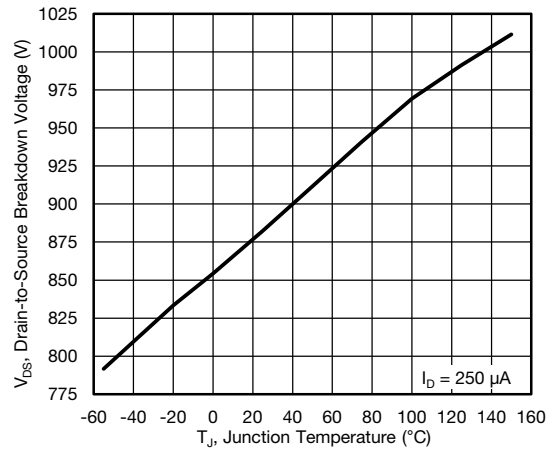


Fig. 11 - Temperature vs. Drain-to-Source Voltage

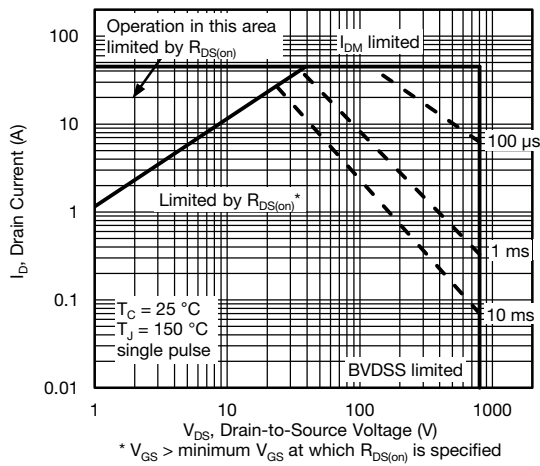


Fig. 9 - Maximum Safe Operating Area

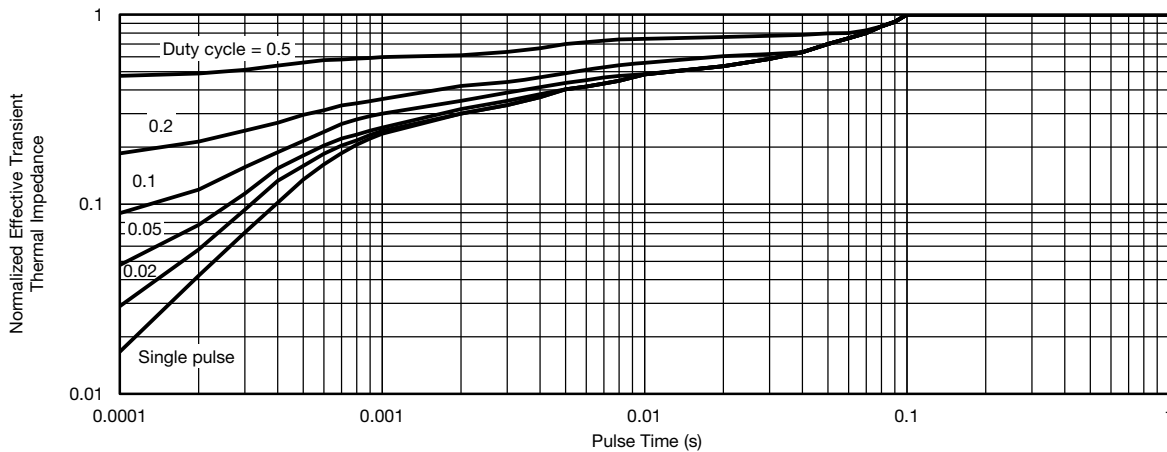


Fig. 12 - Normalized Thermal Transient Impedance, Junction-to-Case

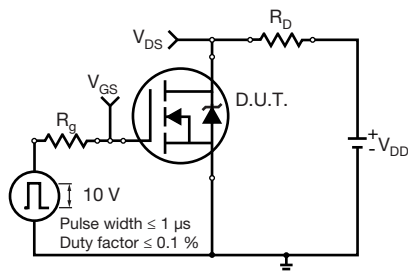


Fig. 13 - Switching Time Test Circuit

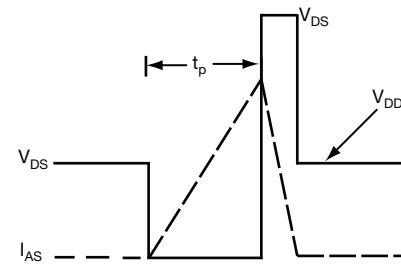


Fig. 16 - Unclamped Inductive Waveforms

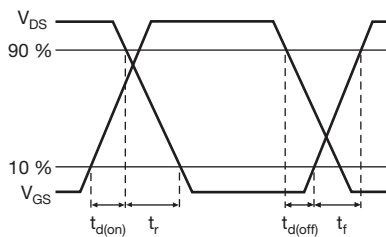


Fig. 14 - Switching Time Waveforms

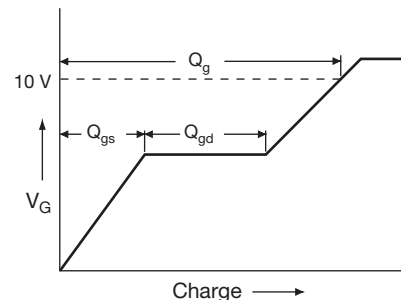


Fig. 17 - Basic Gate Charge Waveform

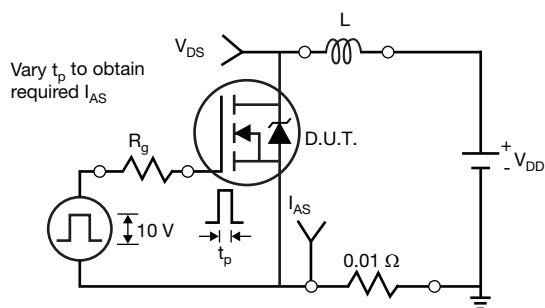


Fig. 15 - Unclamped Inductive Test Circuit

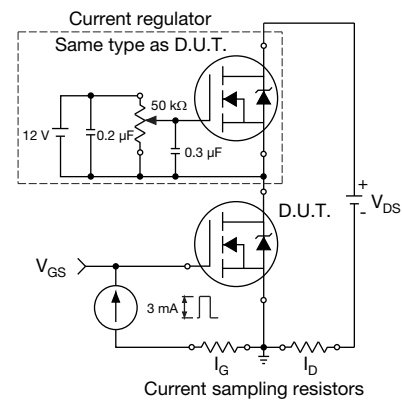


Fig. 18 - Gate Charge Test Circuit

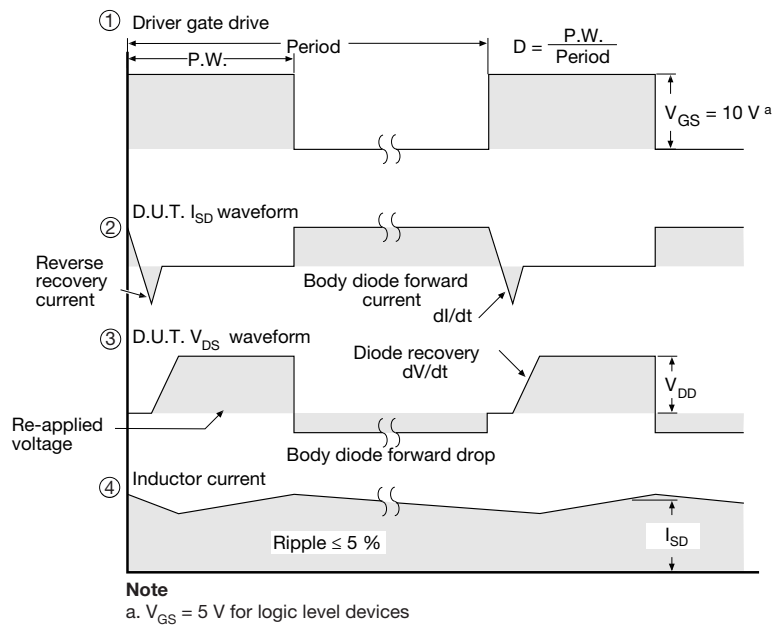
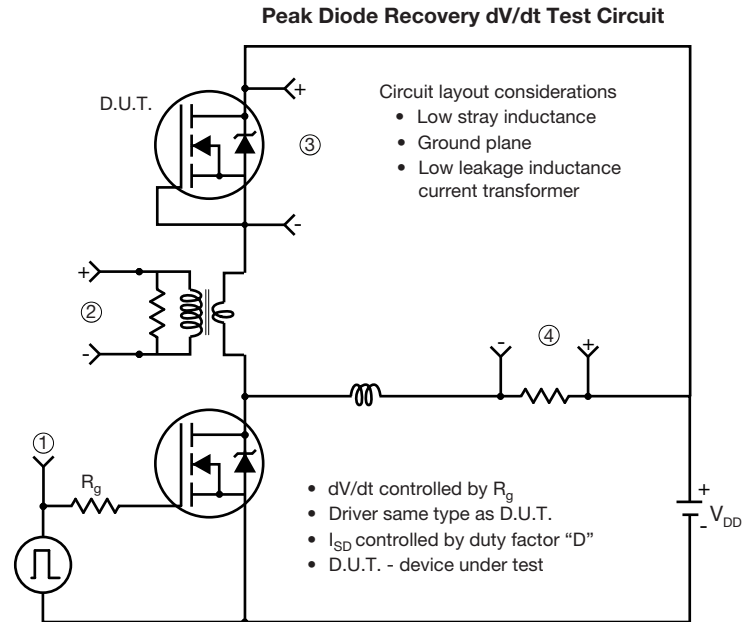


Fig. 19 - For N-Channel

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