650V 4A N-Channel Planar MOSFET

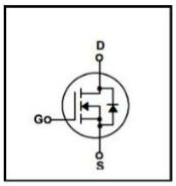
General Description

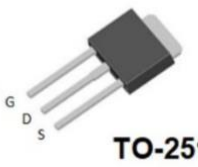
HS4N65 is Fortunatus high voltage MOSFET family based on advanced planar stripe DMOS technology. This advanced MOSFET family has optimized on-state resistance, and also provides superior switching performance and higher avalanche energy strength. This device family is suitable for high efficiency switch mode power supplies.

FEATURES

- RDSON≤3.0Ω @Vgs=10V, Id=2A
- Ultra Low gate Charge(typical 13 nC)
- Low Crss (typical 5pF)
- Fast switching capability
- 100% avalanche tested
- Improved dv/dt capability

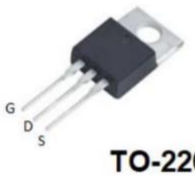
SYMBOL





TO-251

TO-252



TO-220

TO-220F

ASSEMBLY MESSAGE

Product Name	Marking	Package	Halogen Free	Packaging
HSD4N65	4N65UF	TO-251	YES	Tube
HSU4N65	4N65DF	TO-252	YES	Tube/Reel
HSP4N65	4N65CF	TO-220	YES	Tube
HSF4N65	4N65FF	TO-220F	YES	Tube

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

Parameter		Symbol	Rating			Unit
			HSD/U4N65	HSP4N65	HSF4N65	
Drain-Source Voltage		V_{DSS}	650			V
Drain Current	Continuous (T_C = 25°C)	I_D	4			A
	Continuous (T_C = 100°C)		2.7			A
Drain Current	Pulsed (Note1)	I_{DM}	16			A
Gate-Source Voltage		V_{GSS}	±30			V
Avalanche Energy	Single Pulse (Note2)	E_{AS}	232			mJ
	Repetitive (None1)	E_{AR}	15			mJ
Avalanche Current (None1)		I_{AR}	4			A
Peak Diode Recovery dv/dt (Note3)		dv/dt	5			V/ns
Power Dissipation (Note 2)	T_C =25°C	P_D	80	102	38	W
	Derate above 25°C		0.64	0.82	0.3	W/°C
Maximum Junction Temperature		T_J	150			°C
Storage Temperature Range		T_{STG}	-55 to 150			°C

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. L=29mH, I_{AS}=4.0A, V_{DD}=50V, RG=25 Ω, Starting TJ = 25°C

3. I_{SD} ≤ 4.0A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting TJ = 25°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.			Unit
		HSD/U4N65	HSP4N65	HSF4N65	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.56	1.23	3.29	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	110	62	120	°C/W

ELECTRICAL CHARACTERISTICS（T =25J ℃,unless otherwise Noted）

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V, ID=250μA	650			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=650V, VGS=0V			1	uA
		VDS=520V, TC = 125°C			100	uA
Gate-Body Leakage Current, Forward	I_{GSS}	VGS=30V			100	nA
Gate-Body Leakage Current, Reverse		VGS=-30V			-100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	ID = 250 μA		0.62		V/℃
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	VDS=VGS, ID=250μA	2		4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	VGS=10V, ID=2A		2.6	3.0	Ω
Forward Transconductance (Note4)	g_{FS}	VDS = 50V, ID = 2A		2.5		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	VDS=25V, VGS=0V, f=1.0MHz		545		pF
Output Capacitance	C_{OSS}			54		pF
Reverse Transfer Capacitance	C_{RSS}			5		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	VDD=325V, ID=4 A, VGS = 10V ,RG=10Ω (Note4,5)		11		ns
Turn-ON Rise Time	t_R			25		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			32.5		ns
Turn-OFF Fall-Time	t_F			7		ns
Total Gate Charge(Note)	Q_G	VDS =520V, VGS =10V, ID =4A (Note4,5)		13		nC
Gate Source Charge	Q_{GS}			3.4		nC
Gate Drain Charge	Q_{GD}			7		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	IS=4A, VGS=0V			1.4	V
Diode Continuous Forward Current	I_S				4	A
Pulsed Drain-Source Current	I_{SM}				16	A
Reverse Recovery Time	t_{RR}	VGS=0V,ISD=4A di/dt=100 A/μs (Note4,5)		510		ns
Reverse Recovery Charge	Q_{RR}			2.5		uC

Note： 4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

5. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

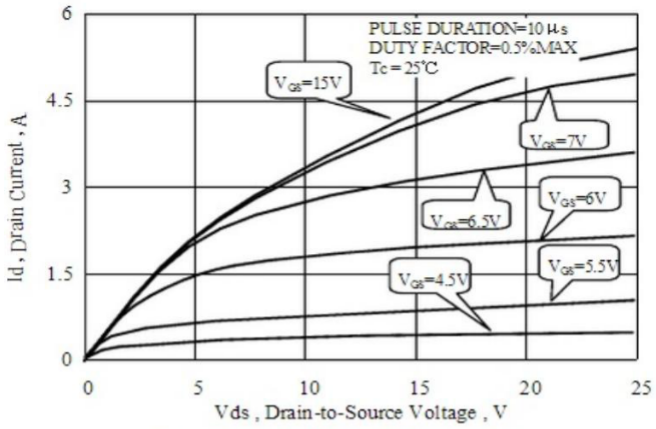


Figure 1. Typical Output Characteristics

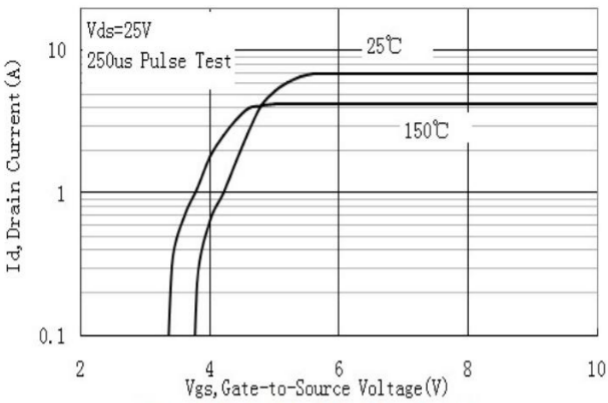


Figure2.Typical Transfer Characteristics

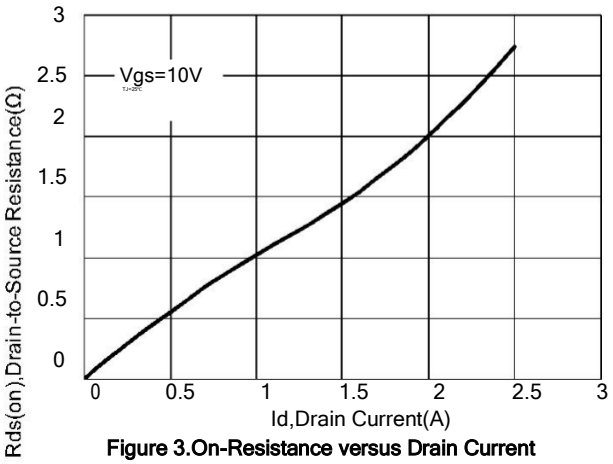


Figure 3.On-Resistance versus Drain Current

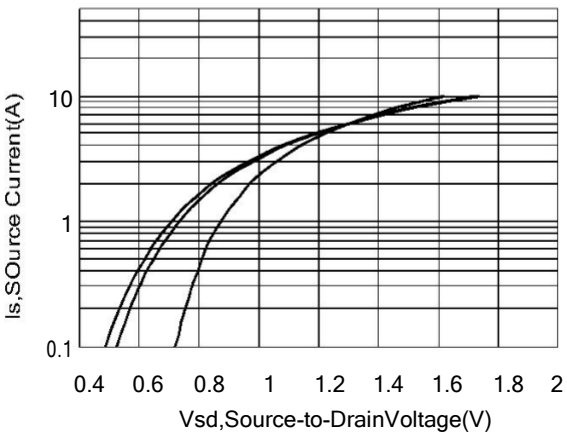


Figure4.Diode ForwardVoltage versus Current

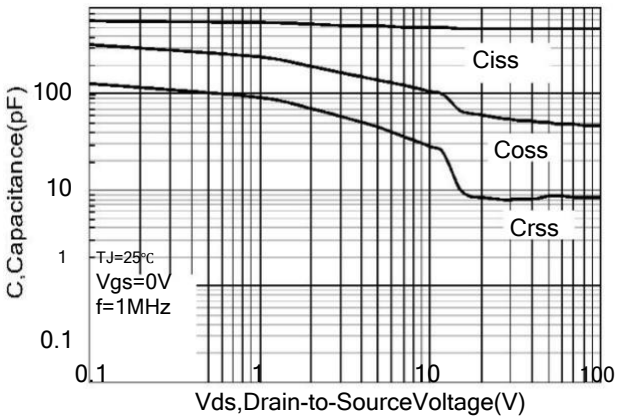


Figure 5.Typical Capacitance vs.Drian-to-Source Voltage

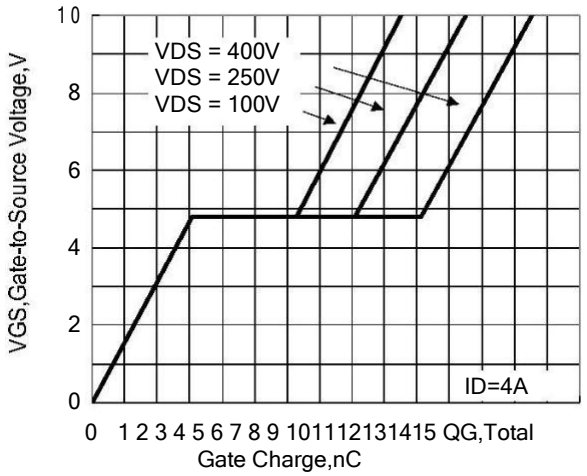


Figure 6.Typical Gate Charge vs.Vgs

TYPICAL CHARACTERISTICS(Cont.)

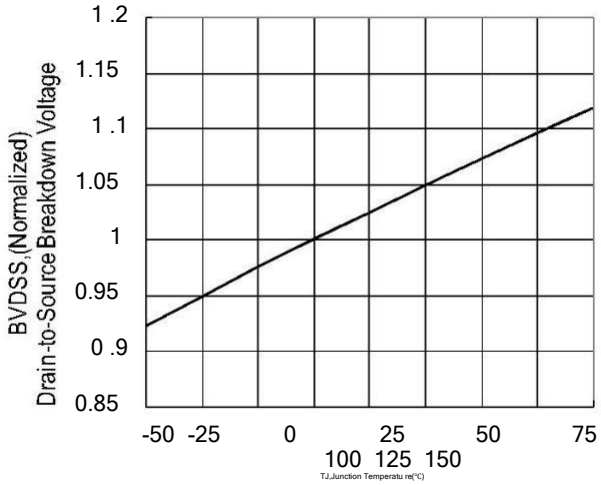


Figure 7.Bvdss Variation with Temperature

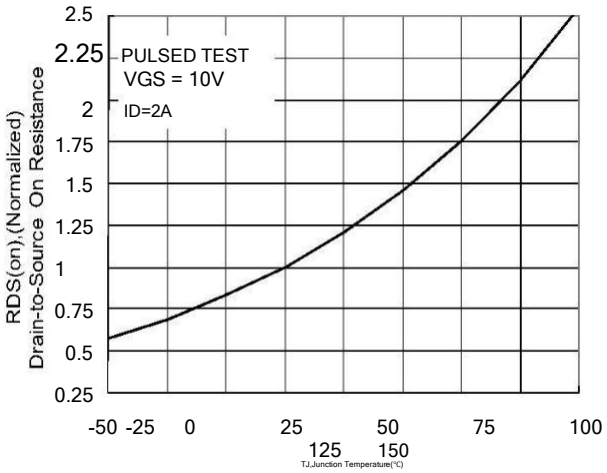


Figure 8.On-Resistance Variation with Temperature

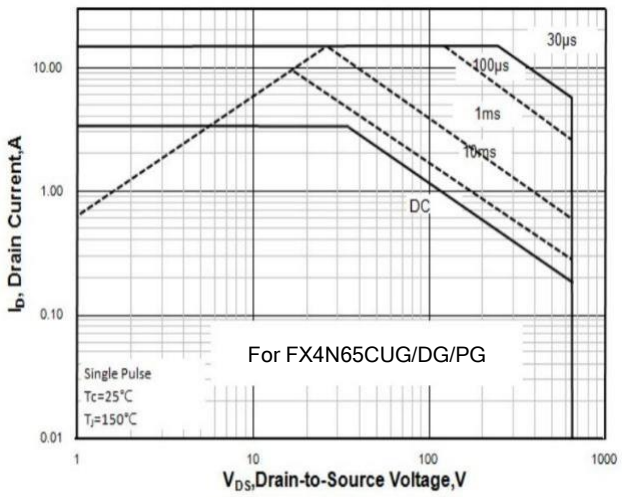


Figure 9. Maximum Safe Operating Area

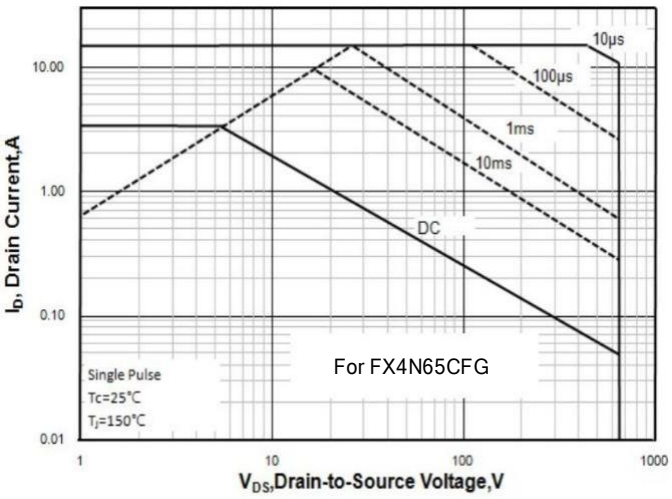


Figure 9. Maximum Safe Operating Area

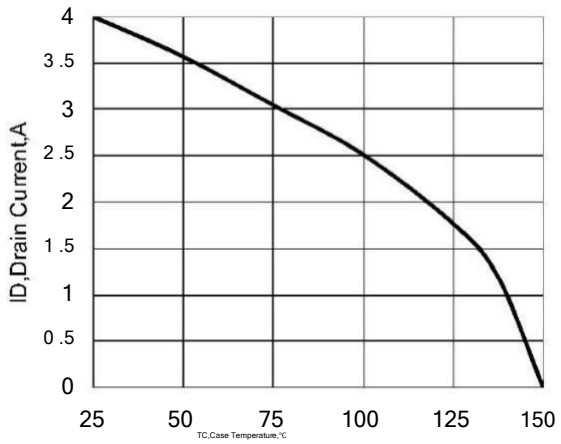
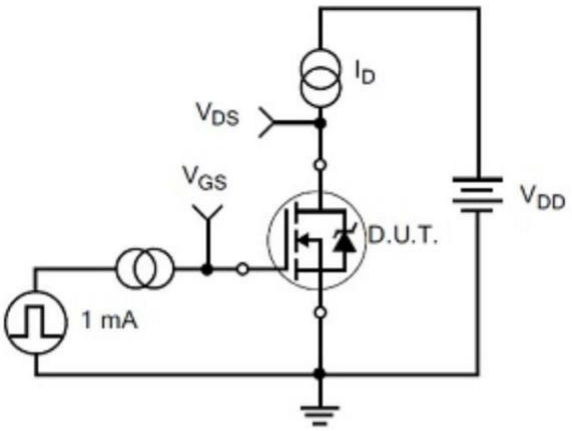
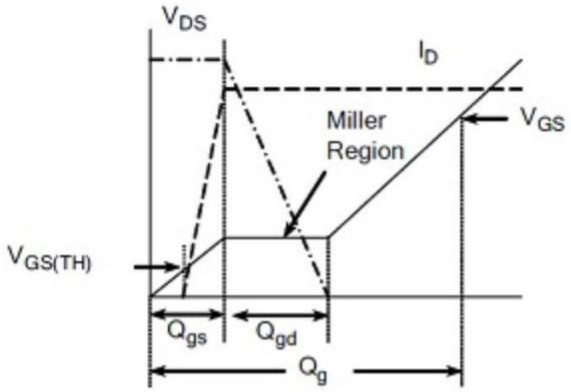


Figure 10. Maximum Continuous Drain Current vs Case Temperature

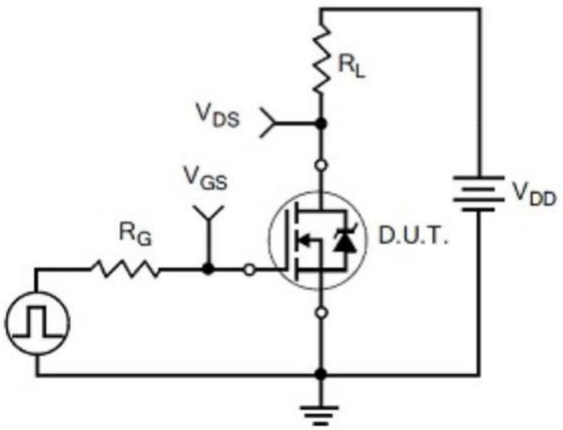
TEST CIRCUITS AND WAVEFORMS



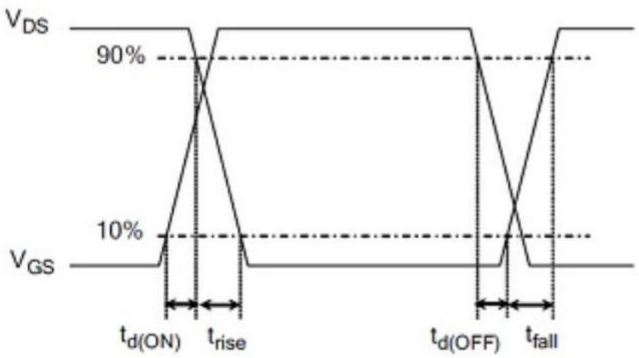
Gate Charge Test Circuit



Gate Charge Waveform

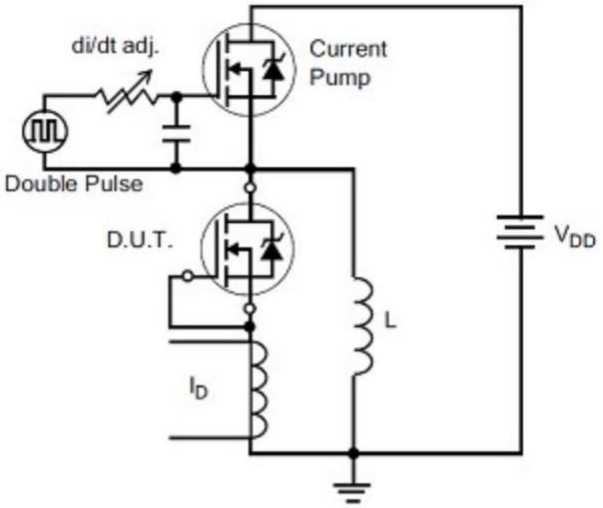


Resistive Switching Test Circuit

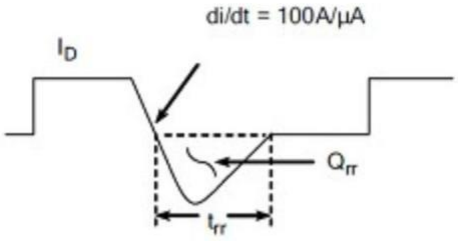


Resistive Switching Waveforms

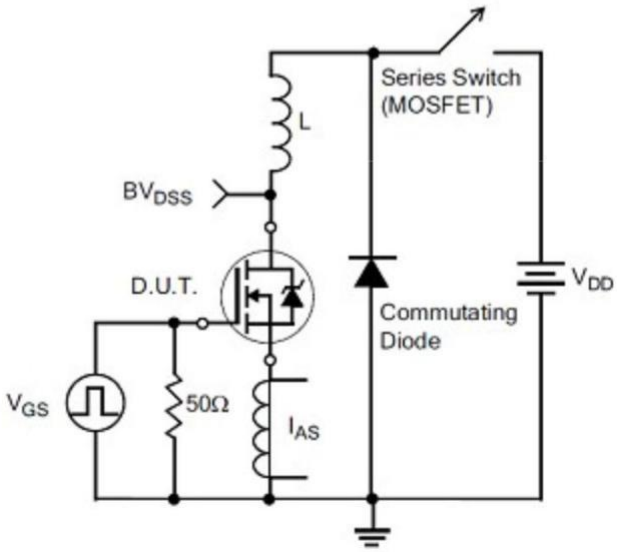
TEST CIRCUITS AND WAVEFORMS(Cont.)



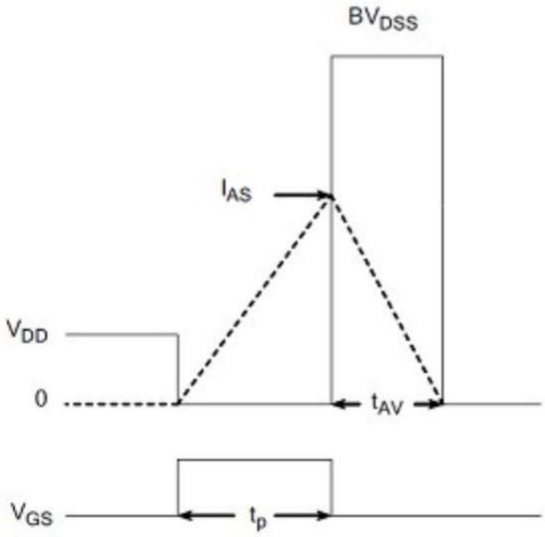
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Unclamped Inductive Switching Waveforms

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET ***category:***

Click to view products by HUASHUO ***manufacturer:***

Other Similar products are found below :

614233C 648584F MCH3443-TL-E MCH6422-TL-E FDPF9N50NZ FW216A-TL-2W FW231A-TL-E APT5010JVR NTNS3A92PZT5G IRF100S201 JANTX2N5237 2SK2464-TL-E 2SK3818-DL-E FCA20N60_F109 FDZ595PZ STD6600NT4G FSS804-TL-E 2SJ277-DL-E 2SK1691-DL-E 2SK2545(Q,T) D2294UK 405094E 423220D MCH6646-TL-E TPCC8103,L1Q(CM 367-8430-0972-503 VN1206L 424134F 026935X 051075F SBVS138LT1G 614234A 715780A NTNS3166NZT5G 751625C 873612G IRF7380TRHR IPS70R2K0CEAKMA1 RJK60S3DPP-E0#T2 RJK60S5DPK-M0#T0 APT5010JVFR APT12031JFLL APT12040JVR DMN3404LQ-7 NTE6400 JANTX2N6796U JANTX2N6784U JANTXV2N5416U4 SQM110N05-06L-GE3 SIHF35N60E-GE3