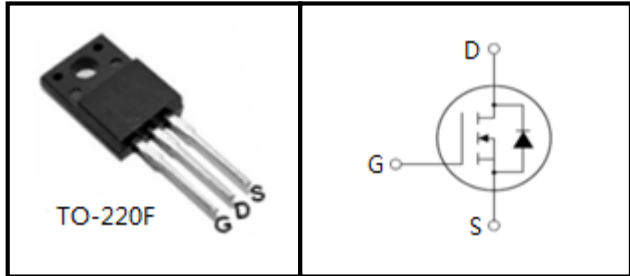# 800V N-Channel MOSFET

FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

TO-220F

Device Marking and Package Information

Device	Package	Marking
HF10N80	TO-220F	HF10N80

Absolute Maximum Ratings $T_C = 25^{\circ}C$, unless otherwise noted

Parameter		Symbol	Value TO-220F	Unit
Drain-Source Voltage (V_{GS} = 0V)		V_{DSS}	800	V
Continuous Drain Current		I_D	10	A
Pulsed Drain Current	(note1)	I_{DM}	38	A
Gate-Source Voltage		V_{GSS}	± 30	V
Single Pulse Avalanche Energy	(note2)	E_{AS}	281	mJ
Avalanche Current	(note1)	I_{AR}	7.5	A
Repetitive Avalanche Energy	(note1)	E_{AR}	45	mJ
Power Dissipation ($T_C = 25^{\circ}C$)		P_D	65	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	℃

Thermal Resistance

Parameter	Symbol	Value TO-220F	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.92	ºC/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

Specifications T_J = 25℃ , unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 800V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
		VDS = 640V, VGS = 0V, TJ = 125ºC	--	--	100	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, V_{DS} = 250μA	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 5.0A	--	0.8	1.0	Ω
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	1979	--	pF
Output Capacitance	C_{oss}		--	133	--	
Reverse Transfer Capacitance	C_{rss}		--	53	--	
Total Gate Charge	Q_g	V_{DD} = 640V, I_D = 10.0A, V_{GS} = 10V	--	83	--	nC
Gate-Source Charge	Q_{gs}		--	9	--	
Gate-Drain Charge	Q_{gd}		--	49	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 400V, I_D =10.0A, R_G = 25 Ω	--	23	--	ns
Turn-on Rise Time	t_r		--	15	--	
Turn-off Delay Time	$t_{d(off)}$		--	90	--	
Turn-off Fall Time	t_f		--	30	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	10	A
Pulsed Diode Forward Current	I_{SM}		--	--	38	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 10.0A, V_{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_S = 10.0A, di_F/dt =100A /μs	--	320	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.2	--	μC

Notes

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

2. I_{AS} = 7.5A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ℃

3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25**⁰**C, unless otherwise noted

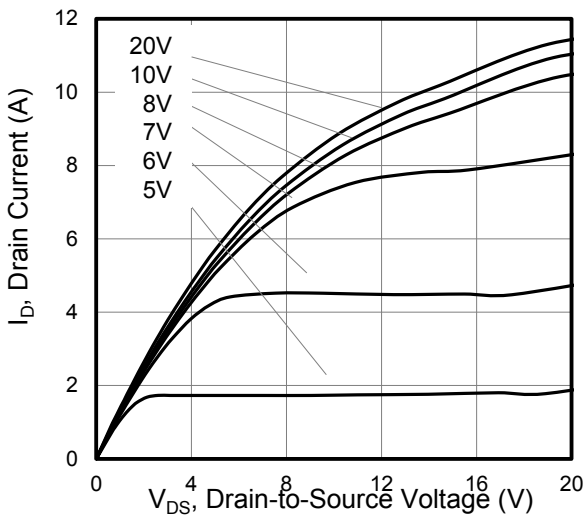### Figure 1. Output Characteristics (T_J = 25⁰C)

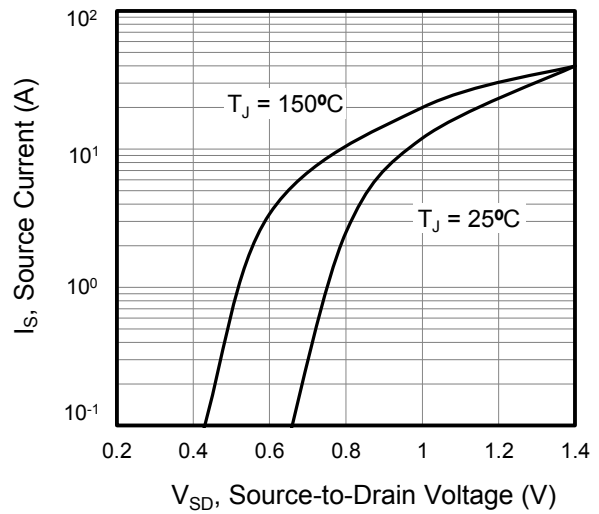### Figure 2. Body Diode Forward Voltage
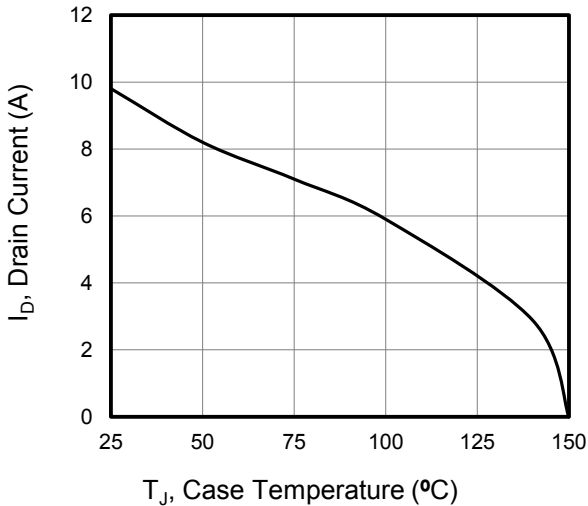
Figure 3. Drain Current vs. Temperature
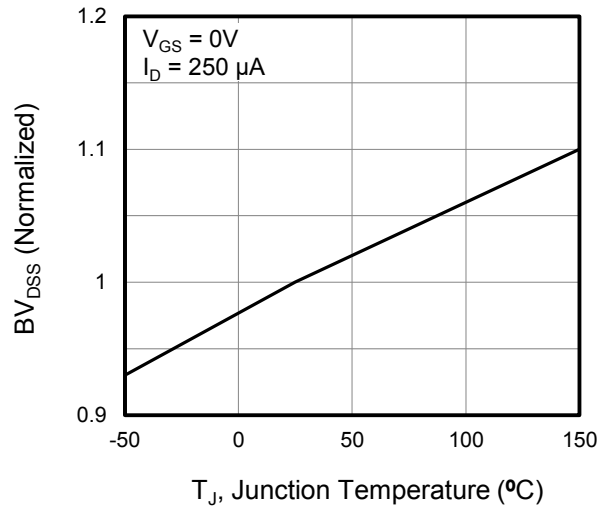
Figure 4. BV$_{DSS}$ Variation vs. Temperature
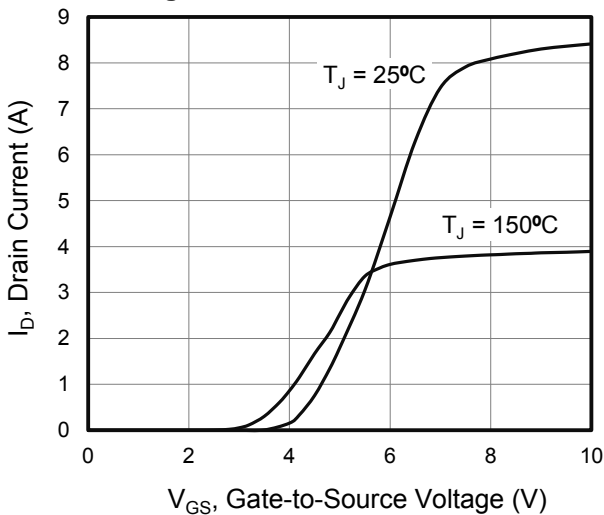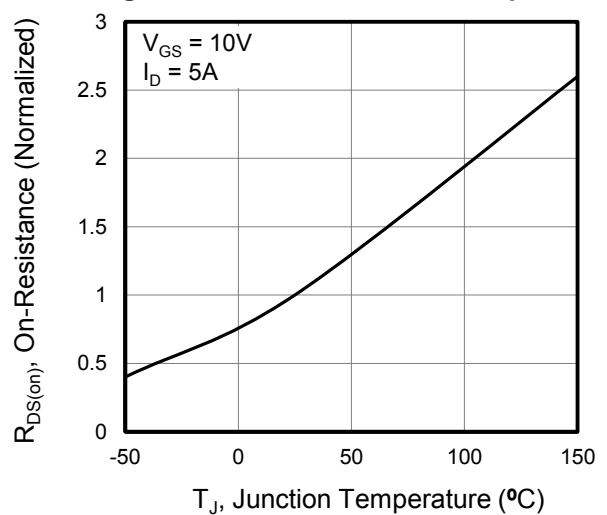
Figure 5. Transfer Characteristics

Figure 6. On-Resistance vs. Temperature

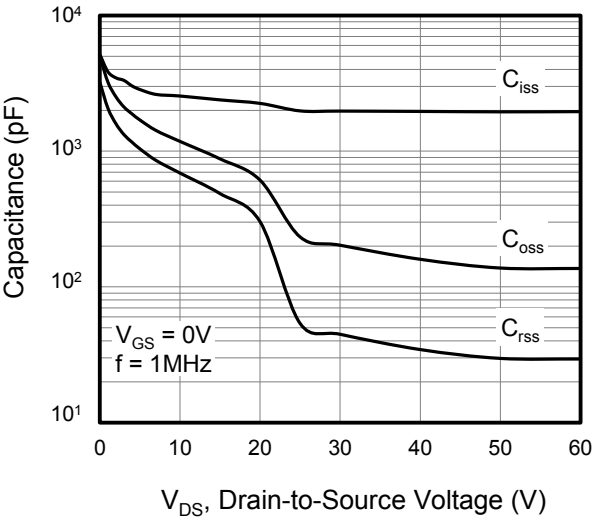**Typical Characteristics** T_J = 25**⁰**C, unless otherwise noted
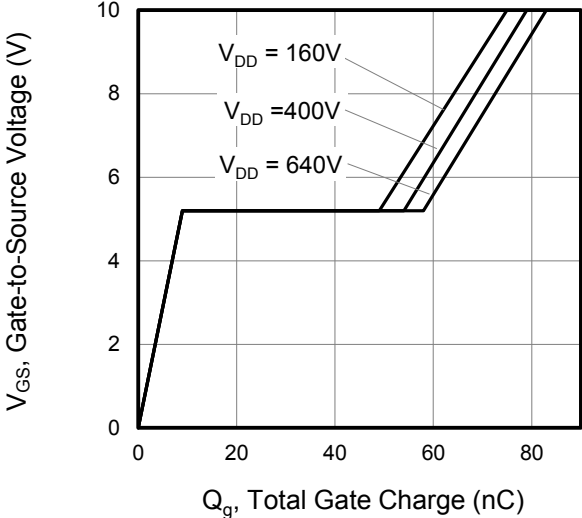
Figure 7. Capacitance

Figure 8. Gate Charge
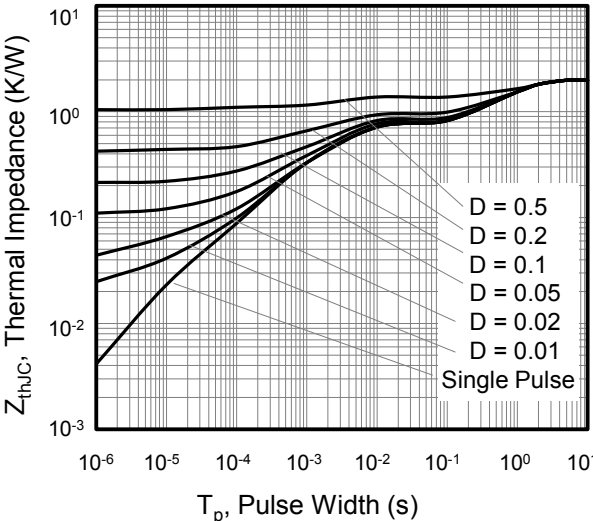

Figure 9. Transient Thermal Impedance

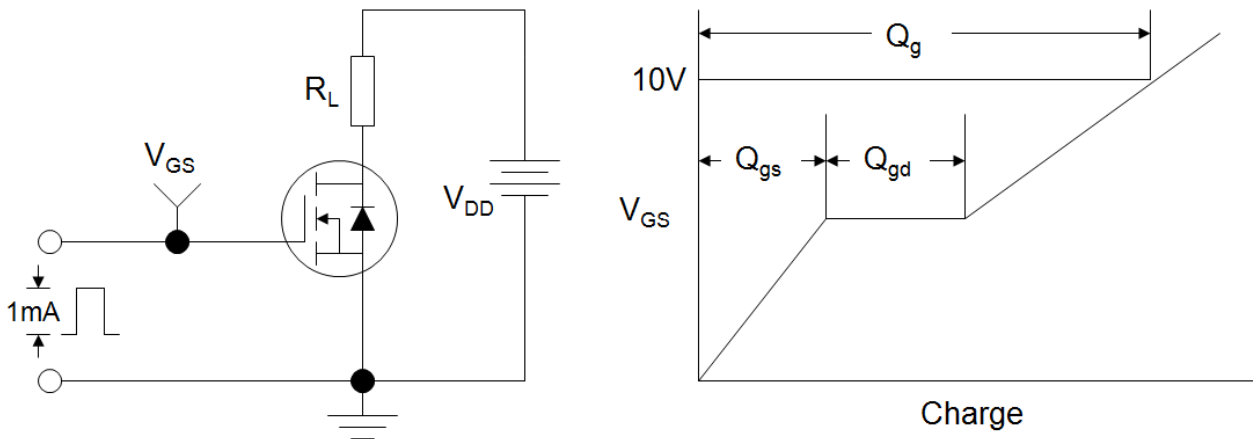**Figure A：Gate Charge Test Circuit and Waveform**

Figure B：Resistive Switching Test Circuit and Waveform
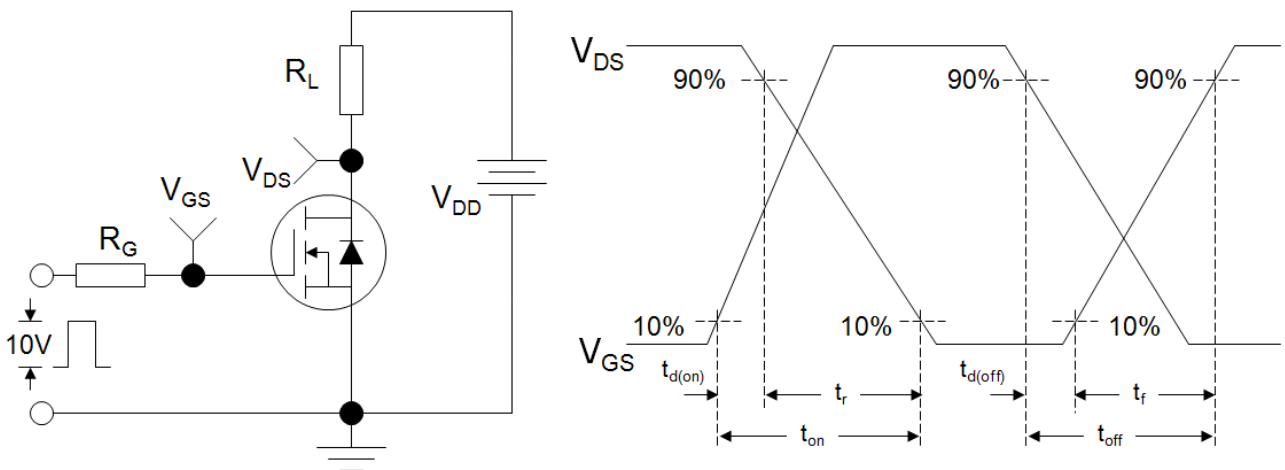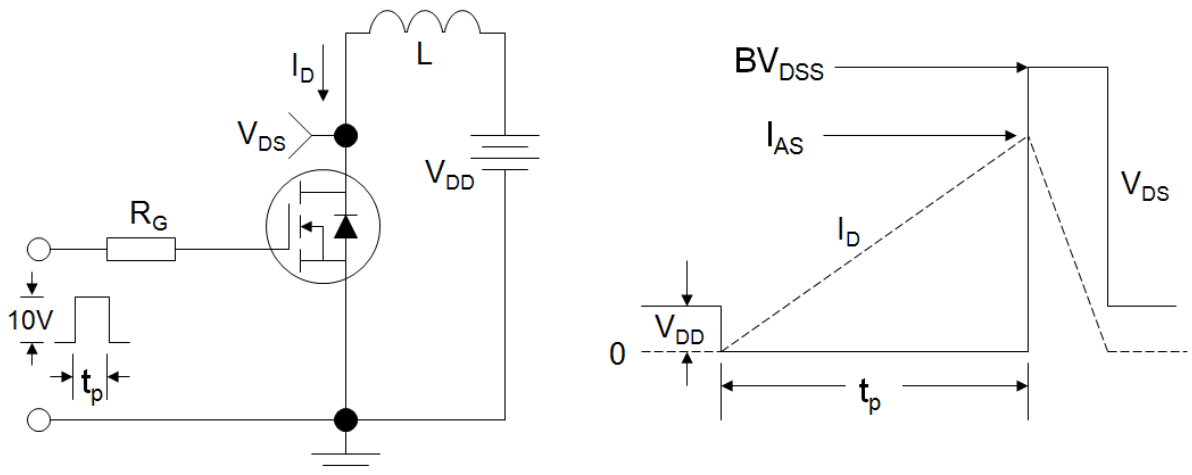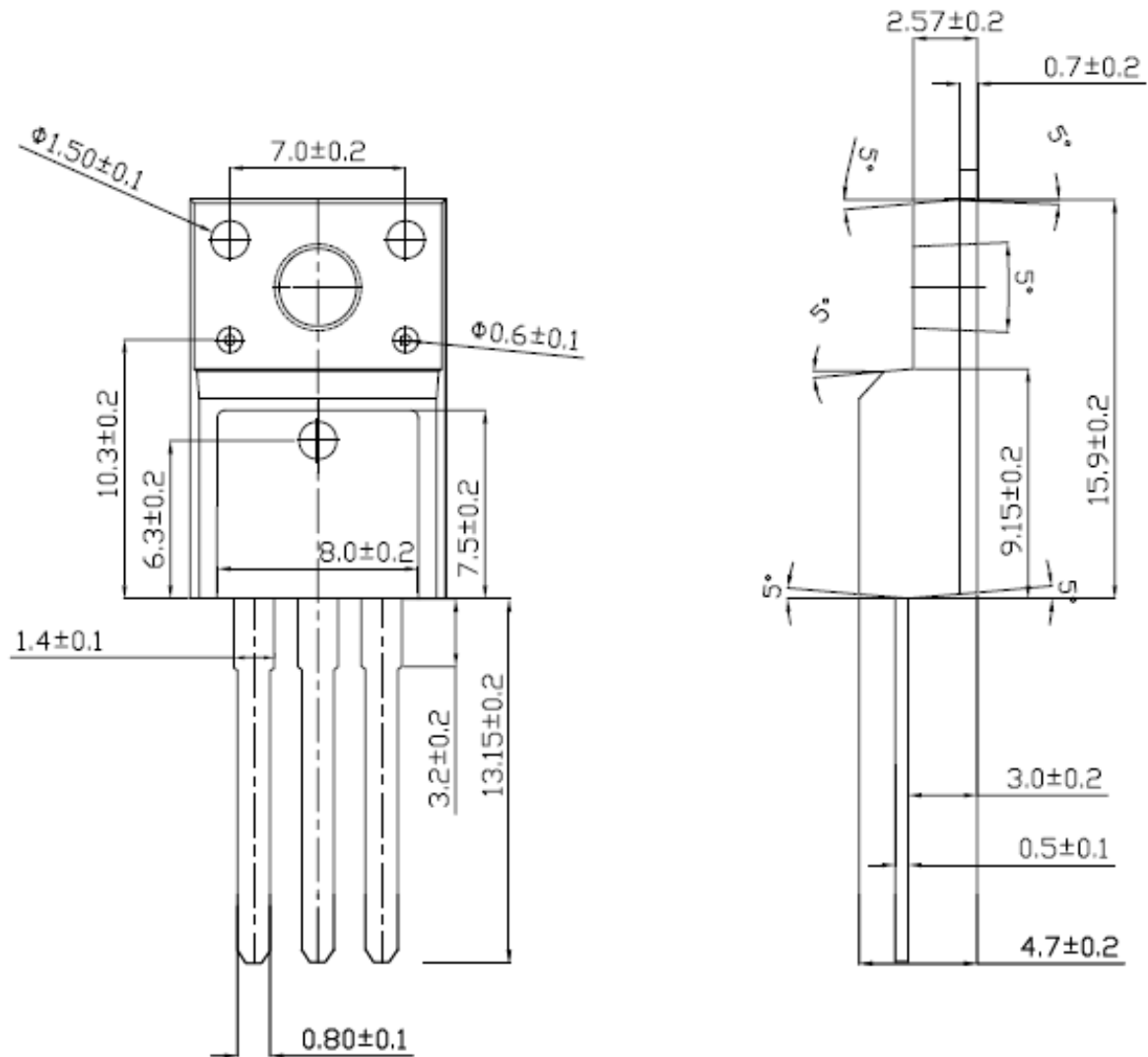

Figure C：Unclamped Inductive Switching Test Circuit and Waveform

TO-220F

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