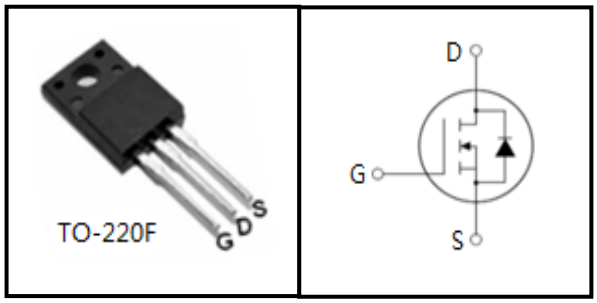
700V N-Channel MOSFET

FEATURES

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



APPLICATIONS

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

Device Marking and Package Information

Device	Package	Marking
CS15N70F	TO-220F	CS15N70F

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)		V_{DSS}	700	V
Continuous Drain Current		I_D	15	A
Pulsed Drain Current	(note1)	I_{DM}	60	A
Gate-Source Voltage		V_{GSS}	±30	V
Single Pulse Avalanche Energy	(note2)	E_{AS}	520	mJ
Avalanche Current	(note1)	I_{AS}	10.2	A
Repetitive Avalanche Energy	(note1)	E_{AR}	312	mJ
Power Dissipation (T_C = 25ºC)		P_D	70	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.78	ºC/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

Specifications T_J = 25ºC, 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	700	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 700V, V_{GS} = 0V, T_J = 25ºC	--	--	1	uA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 7.5A	--	0.56	0.66	Ω
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	1990	--	pF
Output Capacitance	C_{oss}		--	197	--	
Reverse Transfer Capacitance	C_{rss}		--	25	--	
Total Gate Charge	Q_g	V_{DD} = 560V, I_D = 15A, V_{GS} = 10V	--	65	--	nC
Gate-Source Charge	Q_{gs}		--	9.5	--	
Gate-Drain Charge	Q_{gd}		--	34	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 350V, I_D =15A, R_G = 25 Ω	--	48	--	ns
Turn-on Rise Time	t_r		--	39.5	--	
Turn-off Delay Time	$t_{d(off)}$		--	260	--	
Turn-off Fall Time	t_f		--	68	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	15	A
Pulsed Diode Forward Current	I_{SM}		--	--	60	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 7.5A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_S = 15A, di_F/dt =100A /μs	--	777	--	ns
Reverse Recovery Charge	Q_{rr}		--	4	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 10.0mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J = 25ºC)

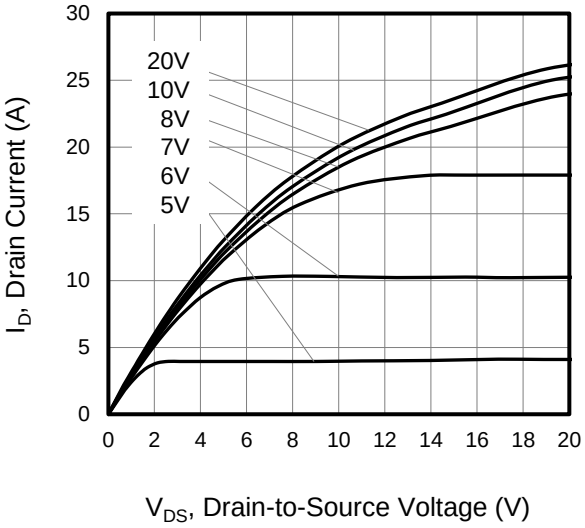


Figure 2. Body Diode Forward Voltage

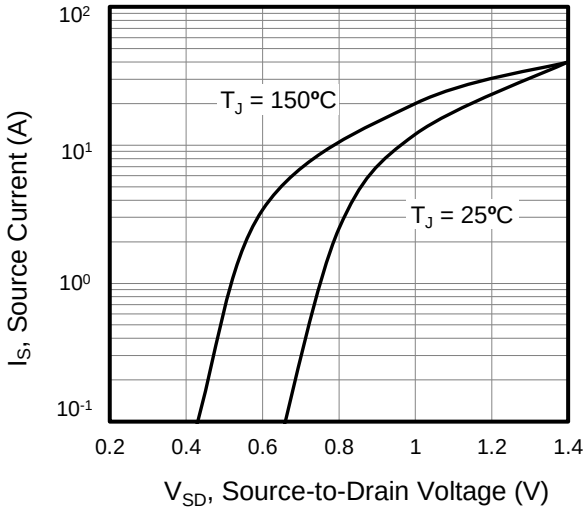


Figure 3. Drain Current vs. Temperature

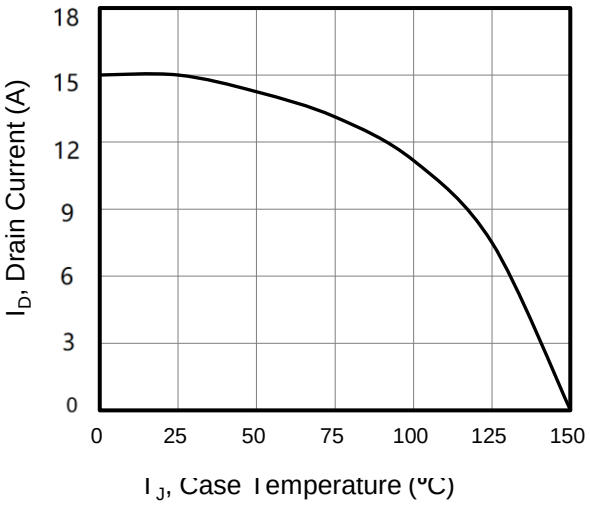


Figure 4. BV_{DSS} Variation vs. Temperature

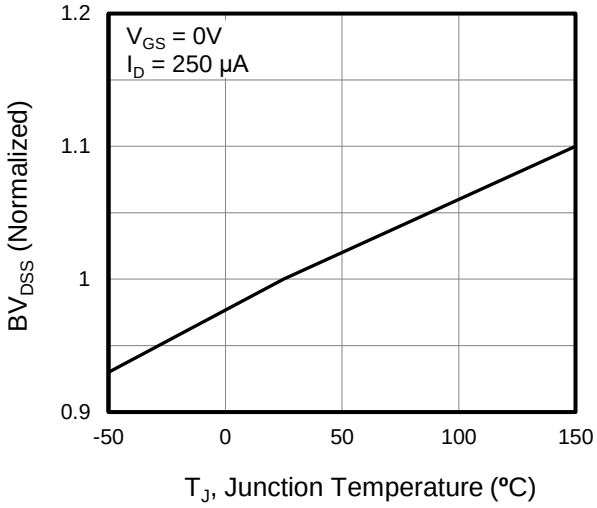


Figure 5. Transfer Characteristics

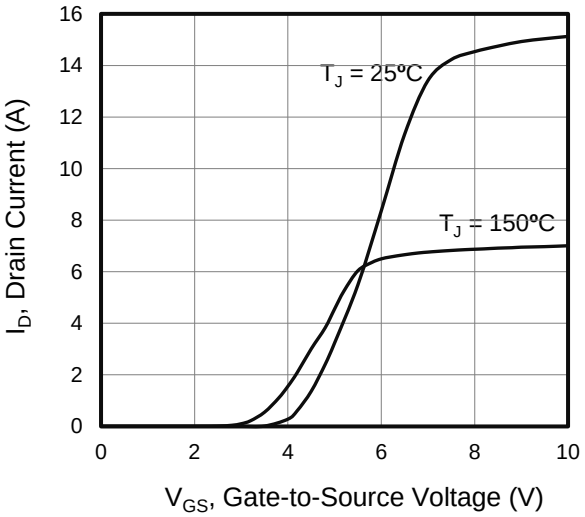
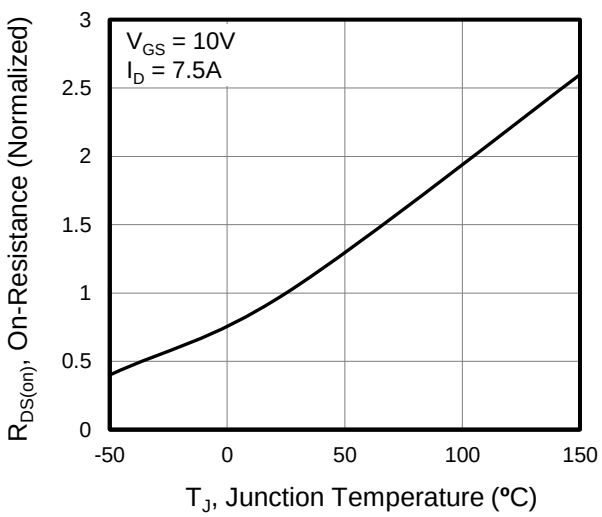


Figure 6. On-Resistance vs. Temperature



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

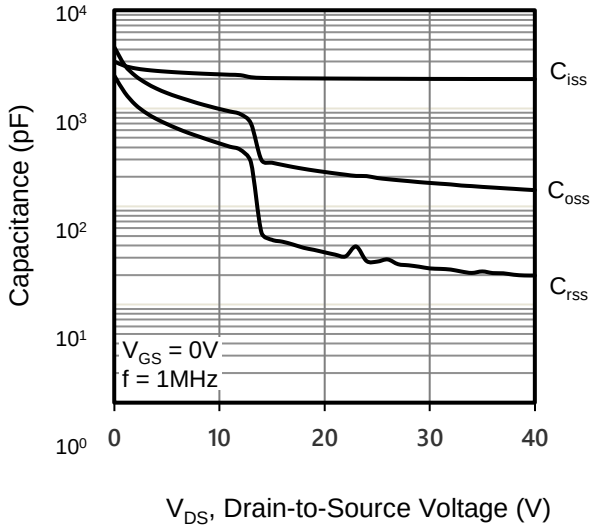


Figure 8. Gate Charge

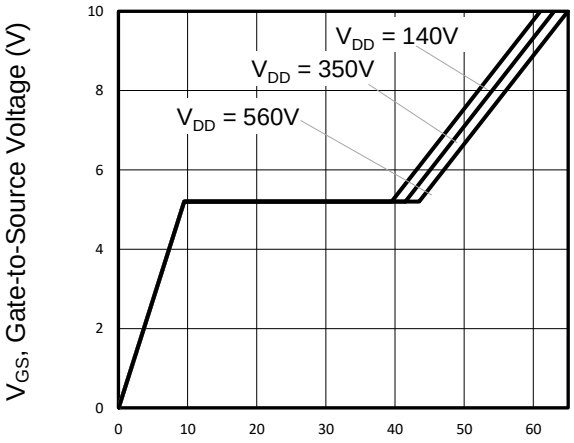


Figure 9. Transient Thermal Impedance TO-220F

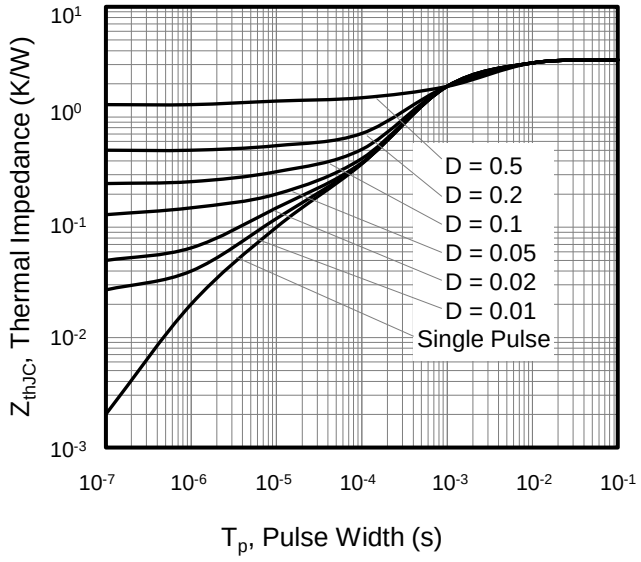


Figure A：Gate Charge Test Circuit and Waveform

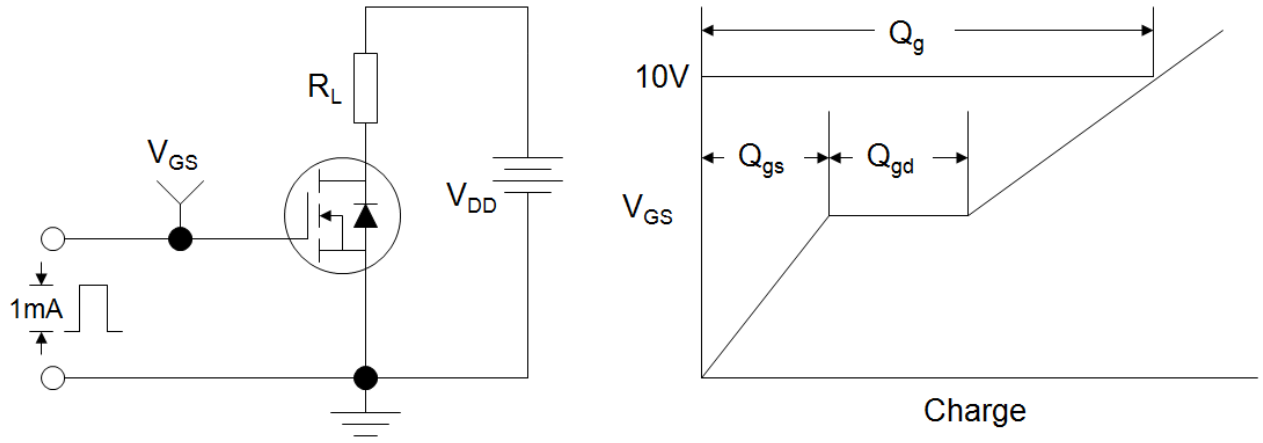


Figure B：Resistive Switching Test Circuit and Waveform

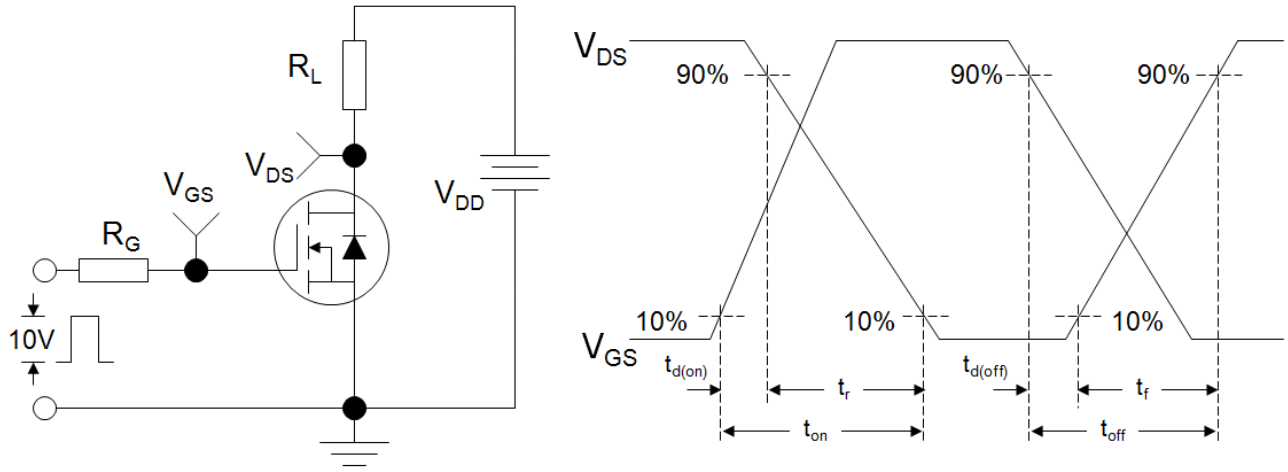
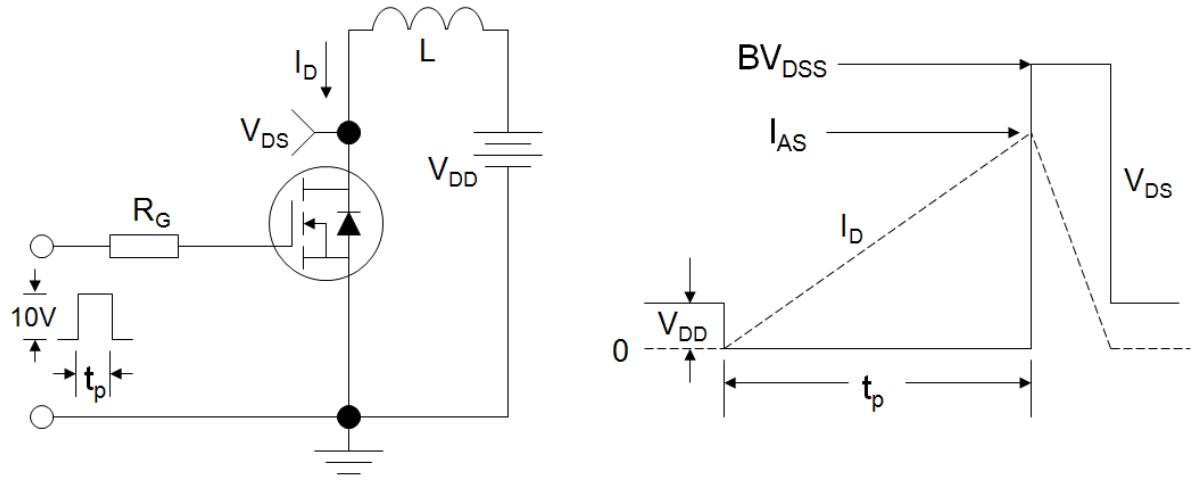
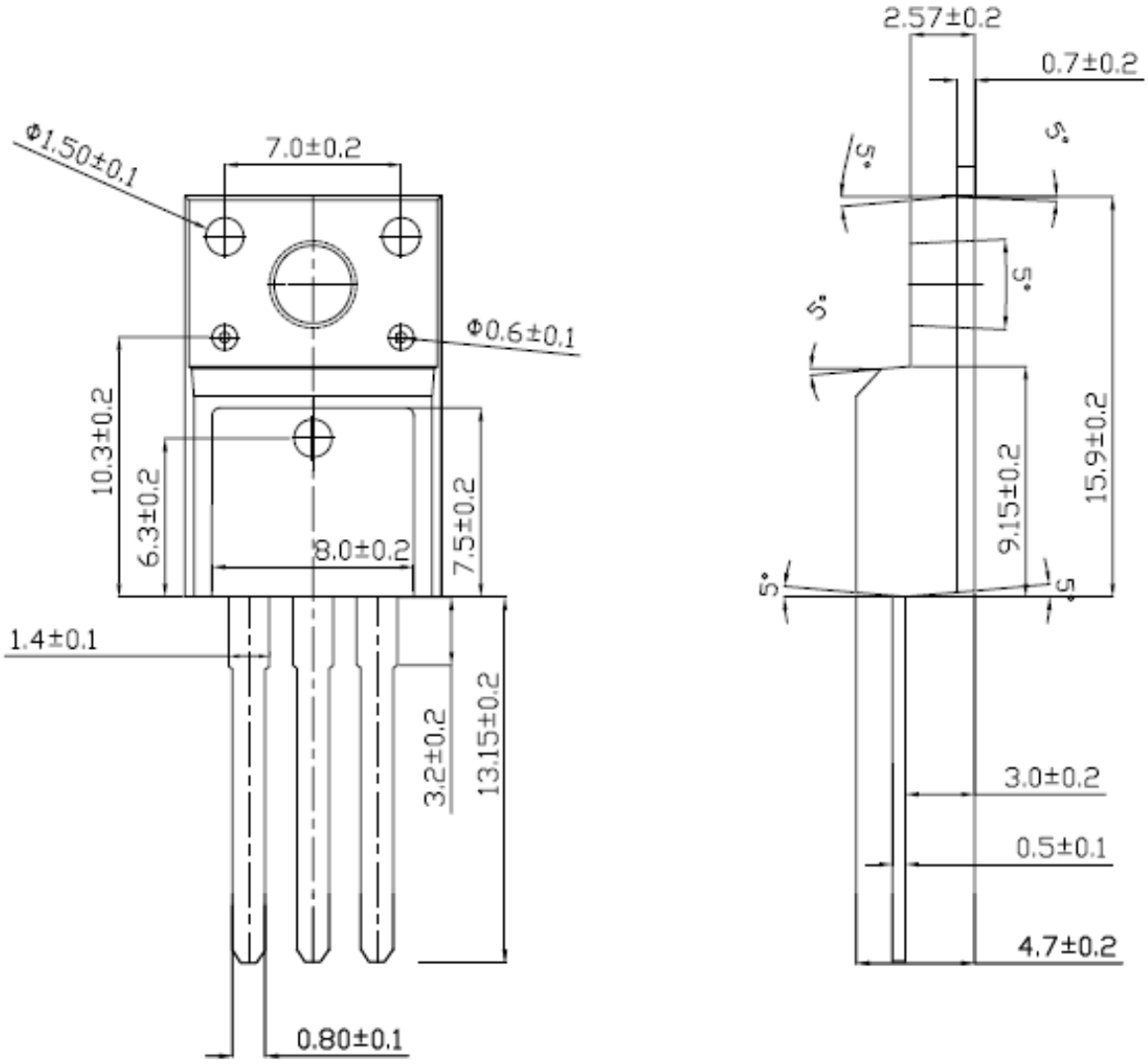


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



TO-220F


2.57±0.2
0.7±0.2
5°
5°
5°
5°
5°
5°
Φ1.50±0.1
7.0±0.2
Φ0.6±0.1
10.3±0.2
6.3±0.2
8.0±0.2
7.5±0.2
15.9±0.2
9.15±0.2
1.4±0.1
3.2±0.2
13.15±0.2
3.0±0.2
0.5±0.1
4.7±0.2
0.80±0.1

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