

1000V N-Channel MOSFET

FEATURES

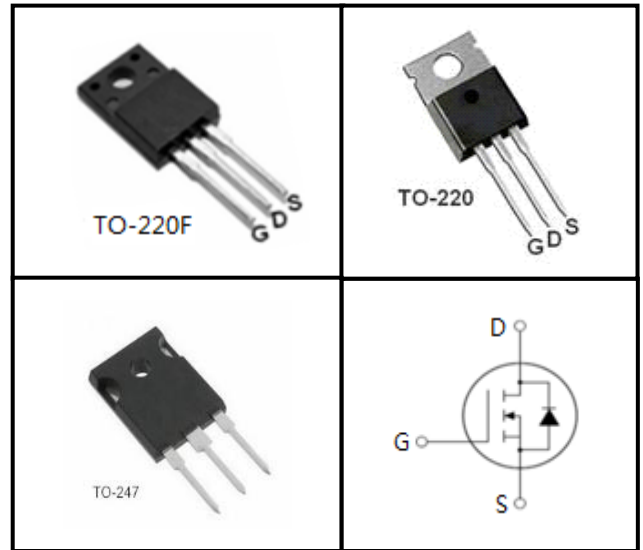
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

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

Device Marking and Package Information

Device	Package	Marking
CS6N100F	TO-220F	CS6N100F
CS6N100P	TO-220	CS6N100P
CS6N100W	TO-247	CS6N100W



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

Parameter	Symbol	Value			Unit
		TO-220F	TO-220	TO-247	
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	1000			V
Continuous Drain Current	I_D	6			A
Pulsed Drain Current (note1)	I_{DM}	24			A
Gate-Source Voltage	V_{GSS}	± 30			V
Single Pulse Avalanche Energy (note2)	E_{AS}	405			mJ
Avalanche Current (note1)	I_{AS}	9			A
Repetitive Avalanche Energy (note1)	E_{AR}	243			mJ
Power Dissipation ($T_C = 25^{\circ}C$)	P_D	65	147		W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150			$^{\circ}C$

Thermal Resistance

Parameter	Symbol	Value			Unit
		TO-220F	TO-220	TO-247	
Thermal Resistance, Junction-to-Case	R _{thJC}	1.92	0.85		°C/W
Thermal Resistance, Junction-to-Ambient	R _{thJA}	62.5	60		

Specifications $T_J = 25^{\circ}\text{C}$, 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	1000	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 1000V, V _{GS} = 0V, T _J = 25°C	--	--	1	μA
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 = 3A	--	1.2	1.5	Ω
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz	--	1994	--	pF
Output Capacitance	C _{oss}		--	180	--	
Reverse Transfer Capacitance	C _{rss}		--	35	--	
Gate Resistance	R _g	V _{GS} = 0V,V _{DS} = 0V,f = 1.0MHz	--	0.7	--	Ω
Total Gate Charge	Q _g	V _{DD} = 800V, I _D = 6.0A, V _{GS} = 10V	--	83	--	nC
Gate-Source Charge	Q _{gs}		--	9	--	
Gate-Drain Charge	Q _{gd}		--	46	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 500V, I _D = 6.0A, R _G = 25 Ω	--	48	--	ns
Turn-on Rise Time	t _r		--	28	--	
Turn-off Delay Time	t _{d(off)}		--	360	--	
Turn-off Fall Time	t _f		--	70	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25 °C	--	--	6	A
Pulsed Diode Forward Current	I _{SM}		--	--	24	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 3A, V _{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t _{rr}	V _R = 500V,I _S = 6A, di _F /dt =100A /μs	--	541	--	ns
Reverse Recovery Charge	Q _{rr}		--	8.5	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L=10mH, V_{DD} = 70V, R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

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

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

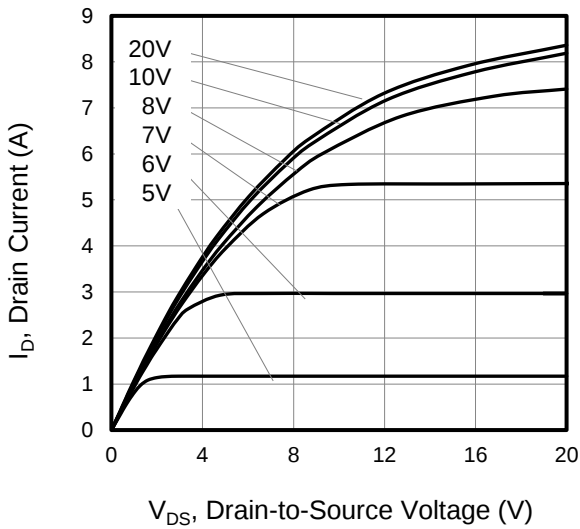


Figure 2. Body Diode Forward Voltage

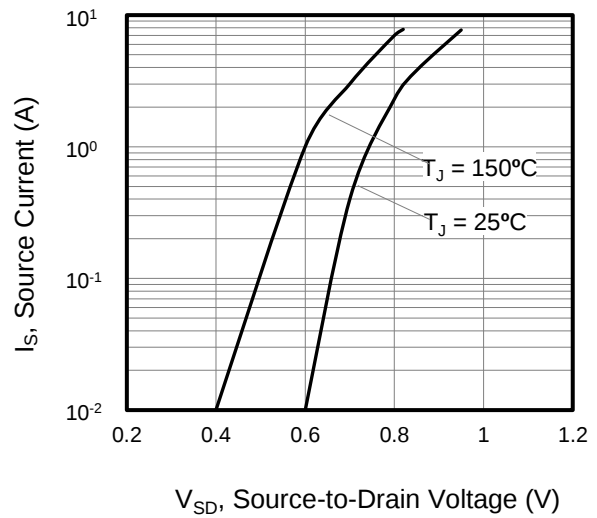


Figure 3. Drain Current vs. Temperature

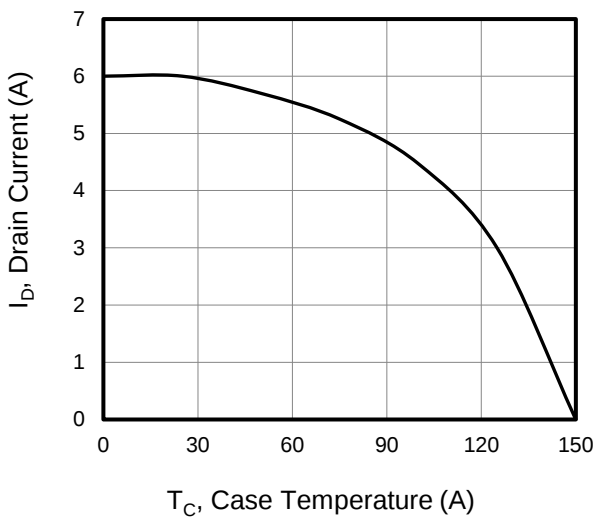


Figure 4. BV_{DSS} Variation vs. Temperature

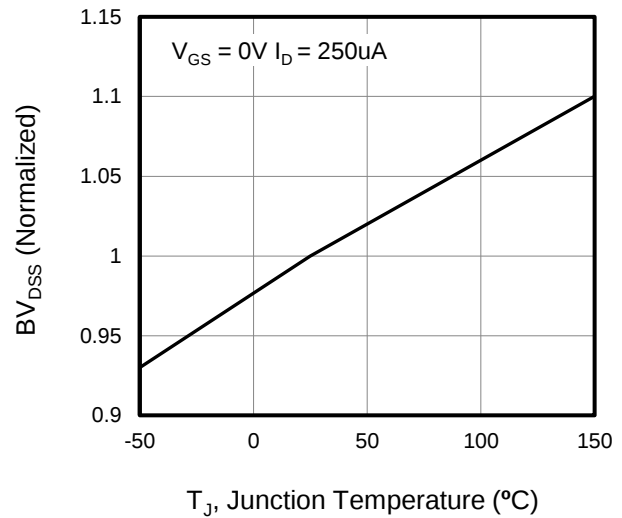


Figure 5. Transfer Characteristics

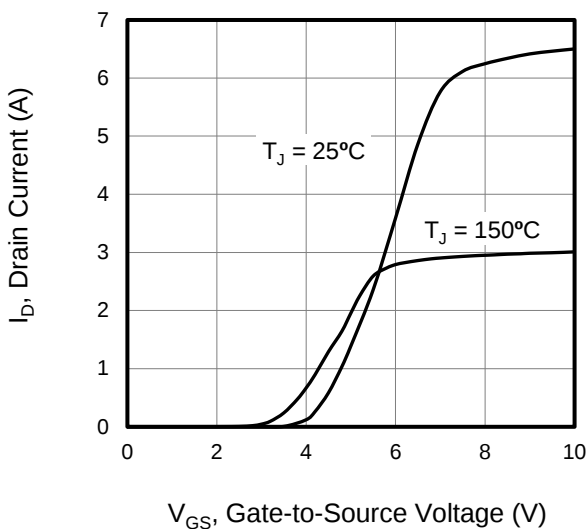
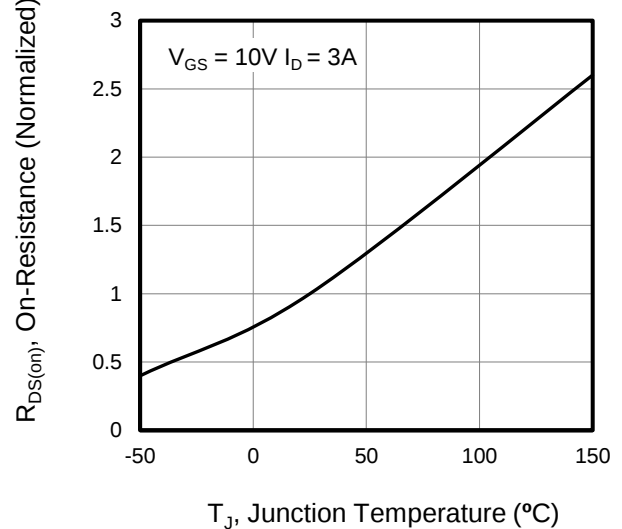


Figure 6. On-Resistance vs. Temperature



Typical Characteristics $T_j = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Capacitance

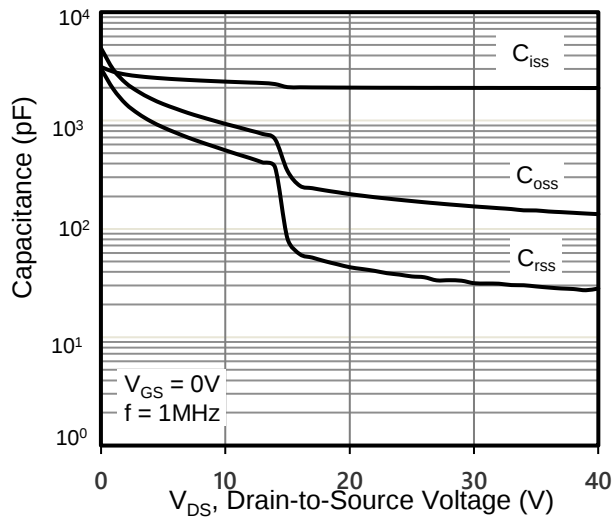


Figure 8. Gate Charge

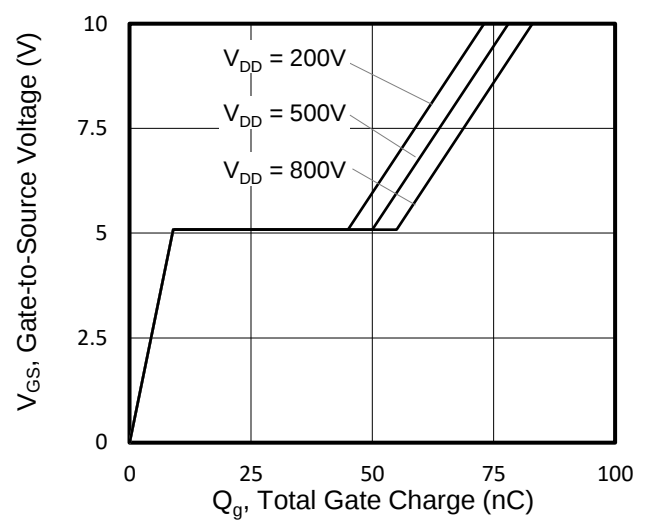


Figure 9. Transient Thermal Impedance TO-220F

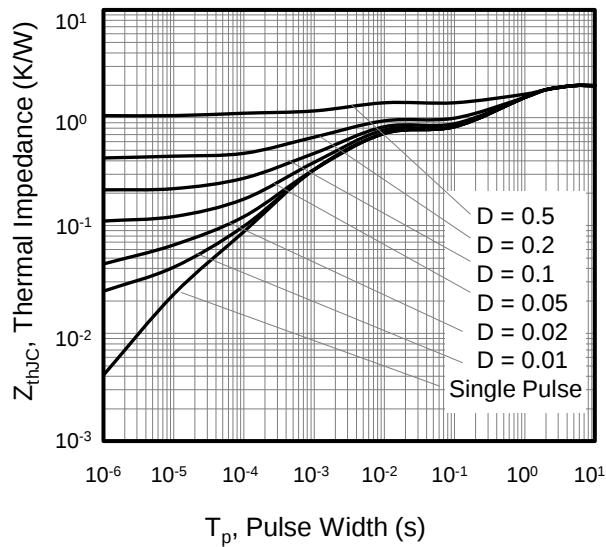


Figure 10. Transient Thermal Impedance TO-220,TO-247

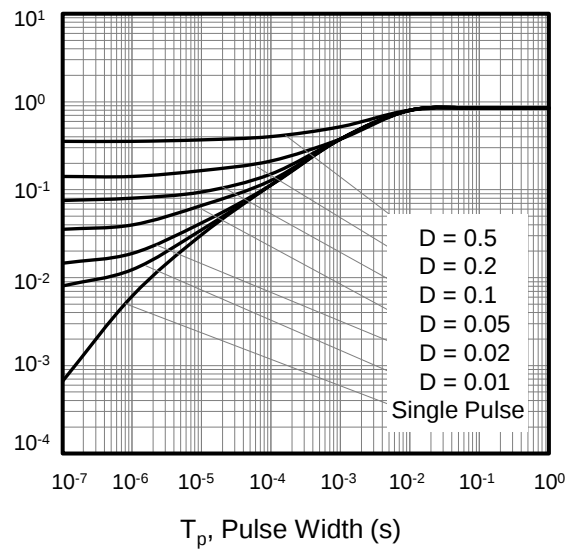


Figure A: Gate Charge Test Circuit and Waveform



Figure B: Resistive Switching Test Circuit and Waveform



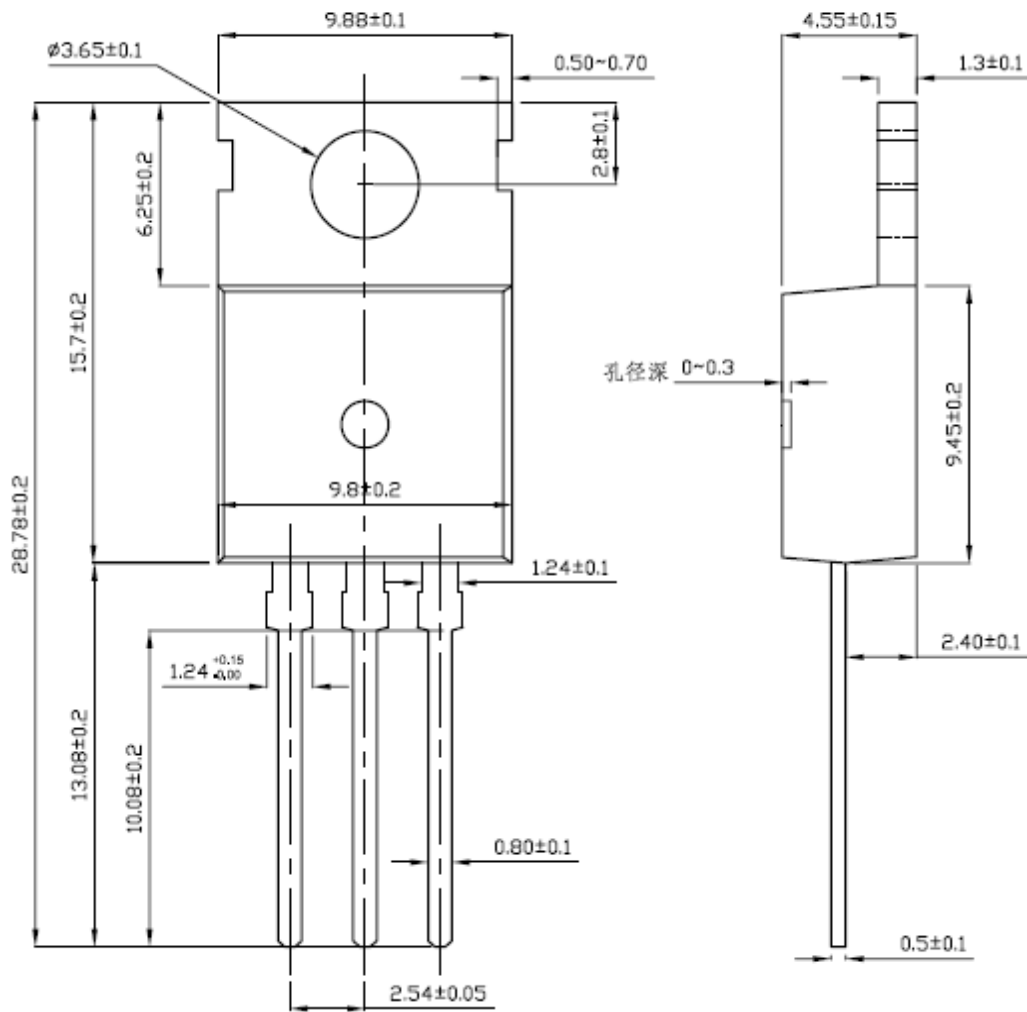
Figure C: Unclamped Inductive Switching Test Circuit and Waveform

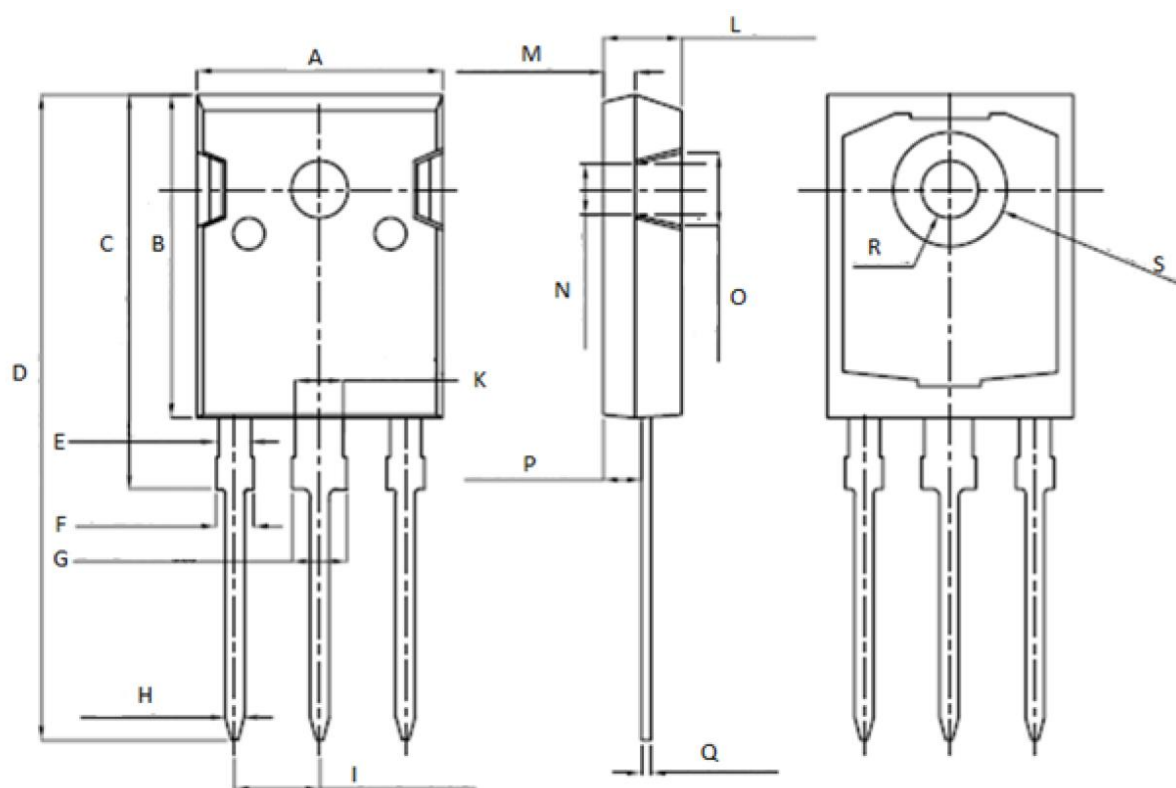


TO-220F



TO-220



TO-247


Unit: mm		
Symbol	Min.	Max.
A	15.95	16.25
B	20.85	21.25
C	20.95	21.35
D	40.5	40.9
E	1.9	2.1
F	2.1	2.25
G	3.1	3.25
H	1.1	1.3
I	5.40	5.50

Unit: mm		
Symbol	Min.	Max.
K	2.90	3.10
L	4.90	5.30
M	1.90	2.10
N	4.50	4.70
O	5.40	5.60
P	2.29	2.49
Q	0.51	0.71
R	φ 3.5	φ 3.7
S	φ 7.1	φ 7.3

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