

General Description

The 16N50 uses advanced planar stripe DMOS technology to provide excellent $R_{DS(ON)}$ and superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

Features

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

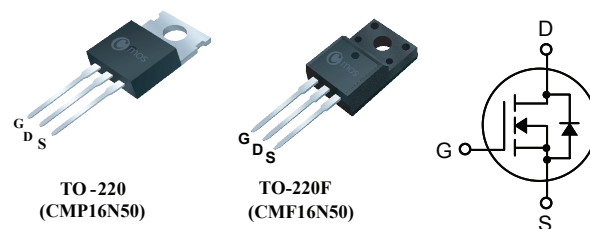
Product Summary

BVDSS	$R_{DS(ON)}$	ID
500V	0.4 Ω	16A

Applications

- Charger
- Adaptor
- Power Supply

TO-220/220F Pin Configuration



Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Symbol	Parameter	220	220F	Units
V_{DSS}	Drain-Source Voltage	500		V
I_D	Drain Current - Continuous (T _C = 25°C) - Continuous (T _C = 100°C)	16	16*	A
		9.6	9.6*	A
I_{DM}	Drain Current - Pulsed ¹	64	64*	A
V_{GSS}	Gate-Source Voltage	± 30		V
E_{AS}	Single Pulsed Avalanche Energy ²	780		mJ
E_{AR}	Repetitive Avalanche Energy ¹	20		mJ
dv/dt	Peak Diode Recovery dv/dt ³	4.5		V/ns
P_D	Power Dissipation (T _C = 25°C)	200	38	W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150		°C
T _L	Maximum lead temperature for soldering purposes, 1/8 from case for 5 seconds	300		°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	220	220F	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.63	3.3	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	---	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

Electrical Characteristic (T_C=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	500	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C	--	0.5	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 500 V, V _{GS} = 0 V	--	--	1	μA
		V _{DS} = 400 V, T _C = 125°C	--	--	10	
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	--	4	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 8A	--	0.32	0.4	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	3000	--	pF
C _{oss}	Output Capacitance		--	200	--	pF
C _{rss}	Reverse Transfer Capacitance		--	30	--	pF
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 250 V, I _D = 16A R _G = 25Ω	--	45	--	ns
t _r	Turn-On Rise Time		--	140	--	ns
t _{d(off)}	Turn-Off Delay Time		--	75	--	ns
t _f	Turn-Off Fall Time		--	70	--	ns
Q _g	Total Gate Charge	V _{DS} = 400 V, I _D = 16A V _{GS} = 10 V	--	38	--	nC
Q _{gs}	Gate-Source Charge		--	10	--	nC
Q _{gd}	Gate-Drain Charge		--	17	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	16	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	64	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 16A	--	--	1.4	V
t _{rr}	Reverse Recovery Time ⁴	V _{GS} = 0 V, I _S = 16A	--	490	--	ns
Q _{rr}	Reverse Recovery Charge	dl _F / dt = 100 A/μA	--	5	--	μC

note:

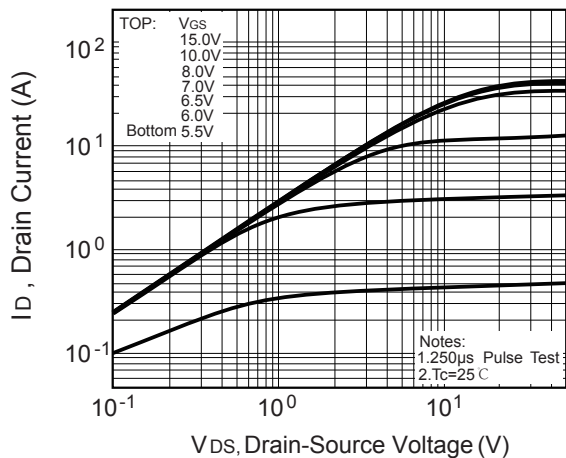
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. L=5.5mH, I_{AS}=16A, V_{DD}=50V, R_G=25Ω, Starting T_J=25 °C.
3. I_{SD}≤16A, di/dt ≤ 200A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.
4. Essentially Independent of Operating Temperature Typical Characteristics.

This product has been designed and qualified for the consumer market.

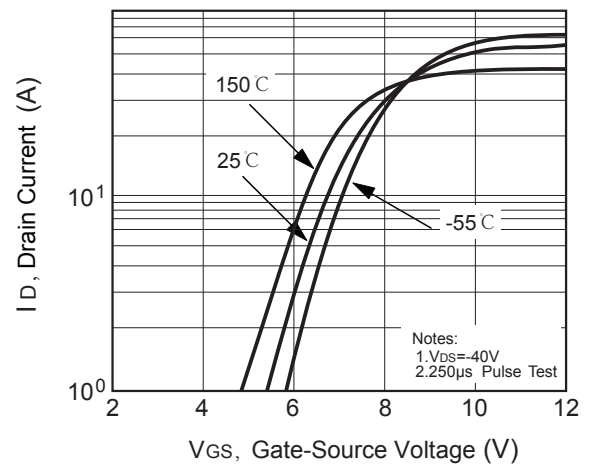
Cmos assumes no liability for customers' product design or applications.

Cmos reserves the right to improve product design, functions and reliability without notice.

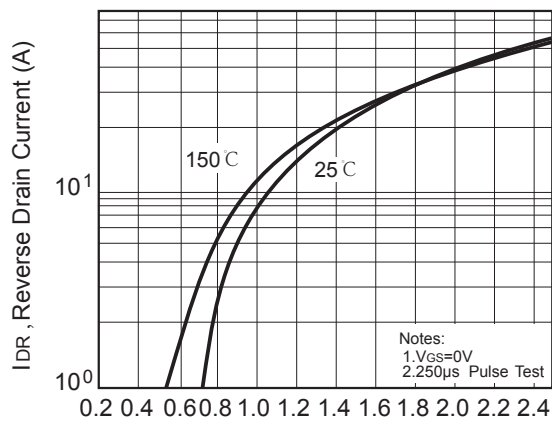
Typical Characteristics



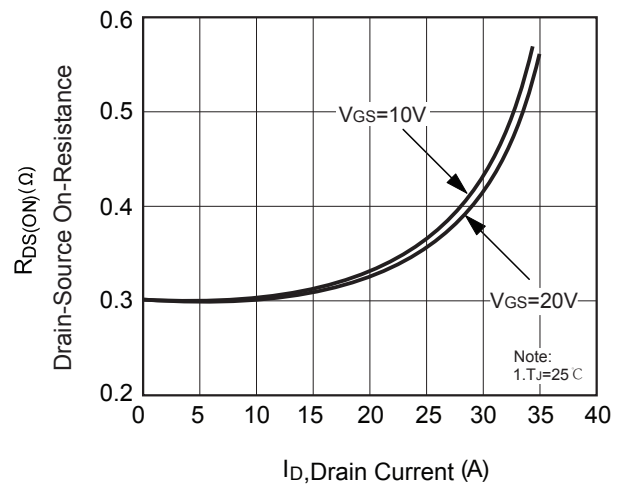
On-Region Characteristics



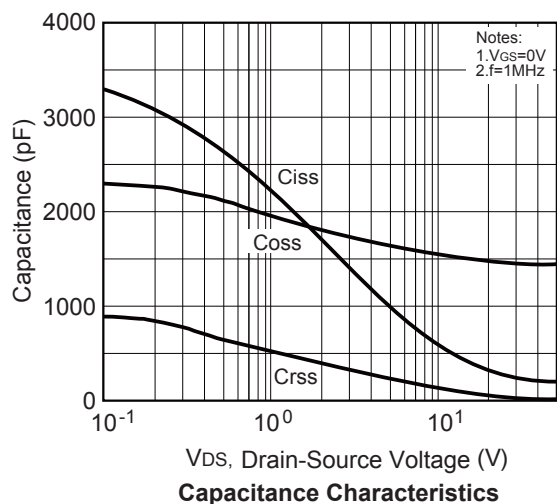
Transfer characteristics



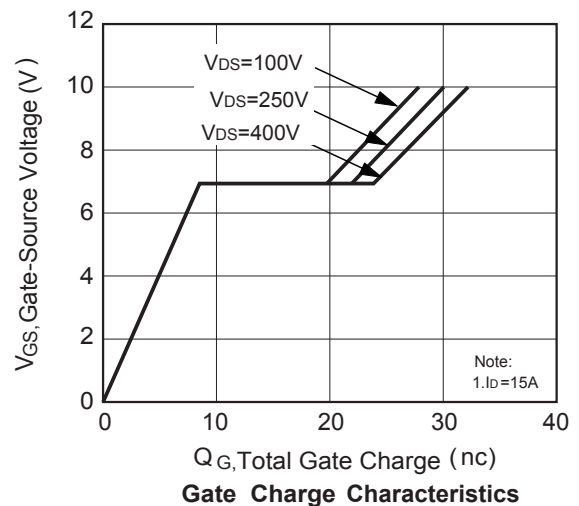
Body Diode Forward Voltage Variation vs. Source Current and Temperature



On-Resistance Variation vs. Drain Current and Gate Voltage

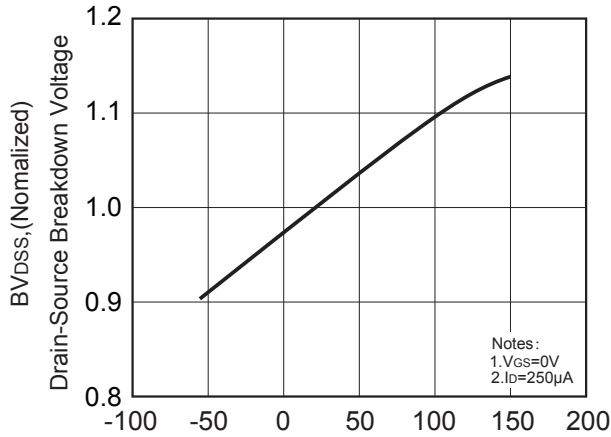


Capacitance Characteristics

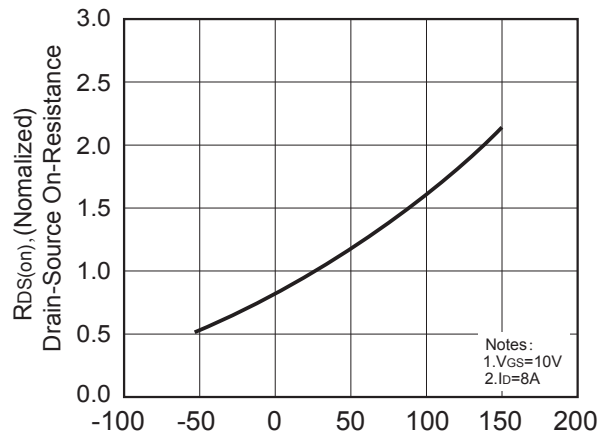


Gate Charge Characteristics

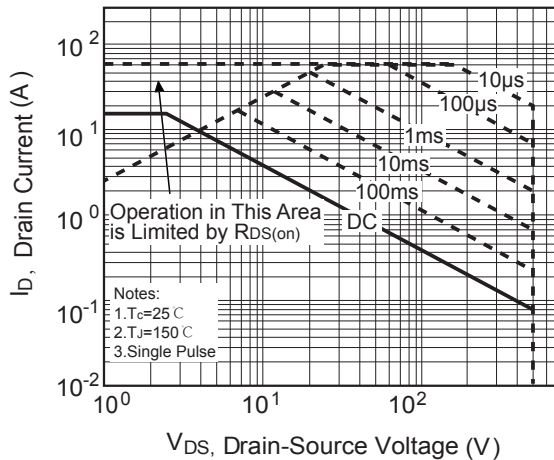
Typical Characteristics



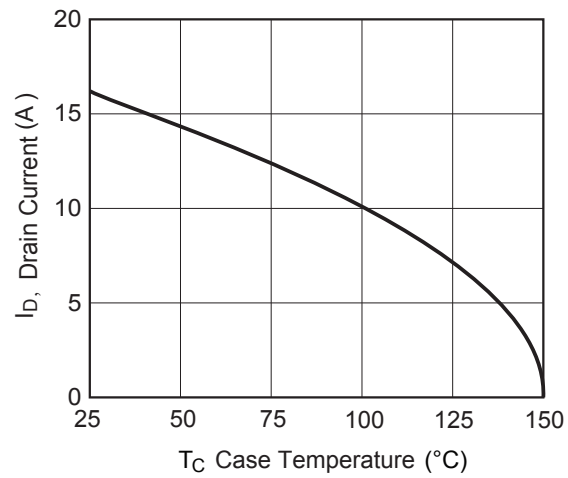
Breakdown Voltage Variation vs. Temperature



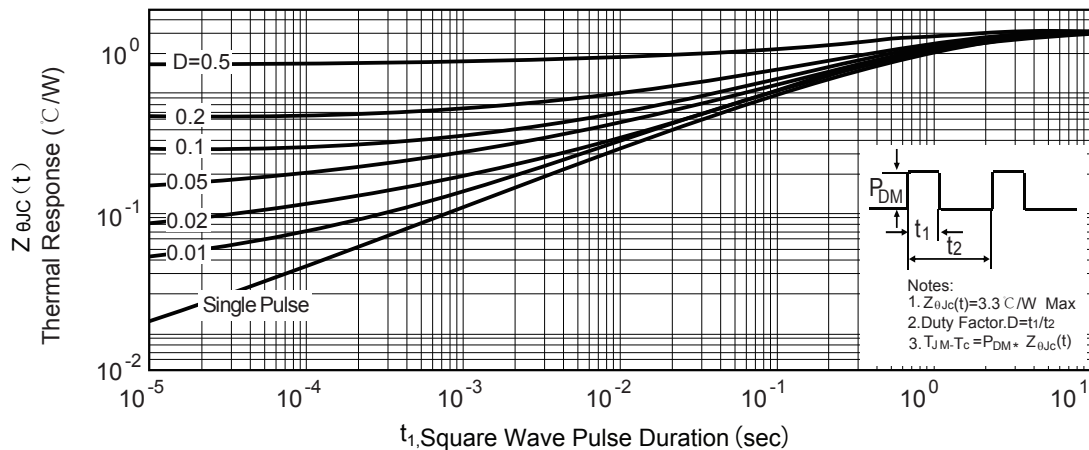
On-Resistance Variation vs. Temperature



Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



Transient Thermal Response Curve