

General Description

The 13N45 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 efficient switched mode power supplies and active power factor correction.

Features

- Fast switching
- 100% avalanche tested
- RoHS Compliant

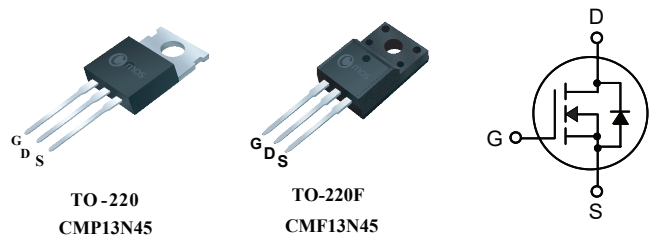
Product Summary

BVDSS	RDSON	ID
450V	0.46Ω	13A

Applications

- Switch Mode Power Supplies(SMPS)
- Inverter

TO-220/220F Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	220	220F	Units
V_{DS}	Drain-Source Voltage	450		V
V_{GS}	Gate-Source Voltage	±30		V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current	13	13*	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	7	7*	A
I_{DM}	Pulsed Drain Current ¹	52	52*	A
EAS	Single Pulse Avalanche Energy ²	600		mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	195	40	W
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	-55 to 150		°C

* Drain current limited by maximum junction temperature

Thermal Data

Symbol	Parameter	220	220F	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	62.5	62.5	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-case	0.65	3.15	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	450	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=6.5A$	---	0.42	0.46	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=360V$, $V_{GS}=0V$	---	---	1	μA
		$V_{DS}=360V$, $V_{GS}=0V$, $T_C=125^{\circ}\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=15V$, $I_D=6.5A$	---	12	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1	---	Ω
Q_g	Total Gate Charge	$I_D=13A$	---	16	---	nC
Q_{gs}	Gate-Source Charge	$V_{DD}=360V$	---	4.8	---	
Q_{gd}	Gate-Drain Charge	$V_{GS}=10V$	---	4.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=200V$ $I_D=13A$ $R_G=20\Omega$	---	34	---	ns
T_r	Rise Time		---	32	---	
$T_{d(off)}$	Turn-Off Delay Time		---	83	---	
T_f	Fall Time		---	56	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1600	---	pF
C_{oss}	Output Capacitance		---	130	---	
C_{rss}	Reverse Transfer Capacitance		---	10	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	13	A
I_{SM}	Pulsed Source Current		---	---	52	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=13A$, $T_J=25^{\circ}\text{C}$	---	0.93	1.4	V

Note :

1.Repetitive rating; pulse width limited by maximum junction temperature.

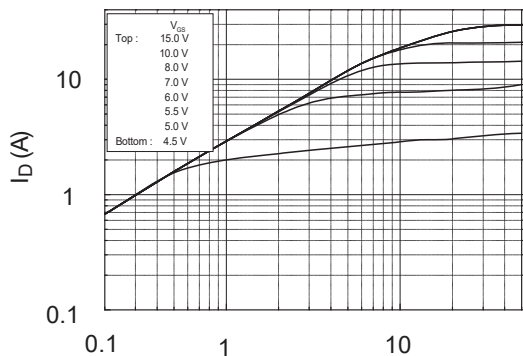
2.The test condition is $V_{DD}=80V$, $L=5\text{mH}$, $I_D=15.5A$, $V_{GS}=10V$, Starting $T_J=25^{\circ}\text{C}$.

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

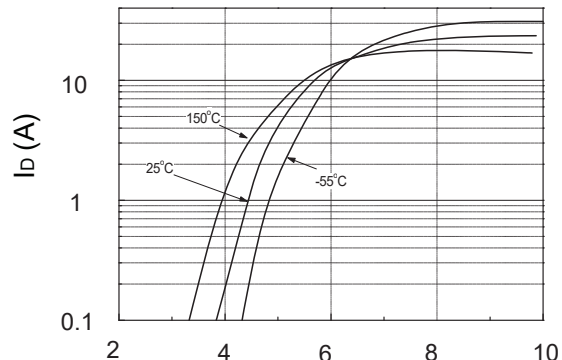
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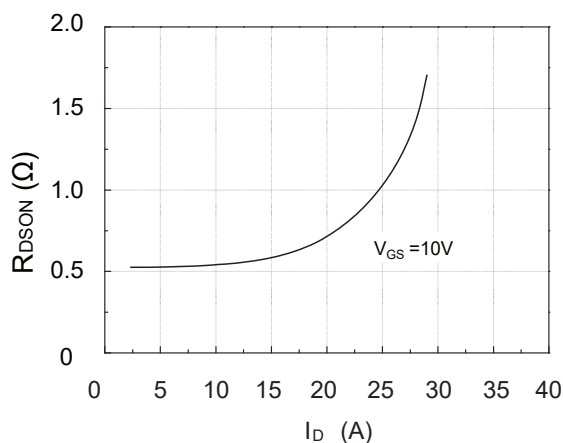
Typical Characteristics



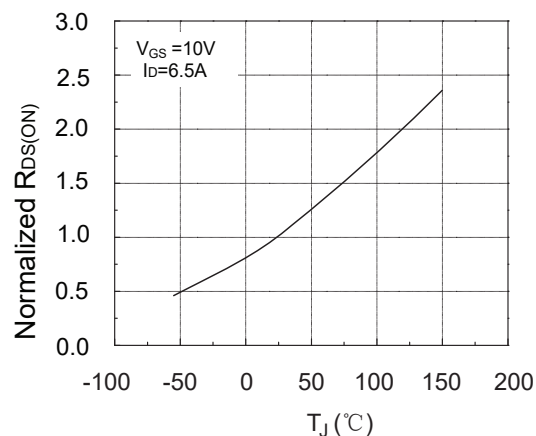
Output Characteristics



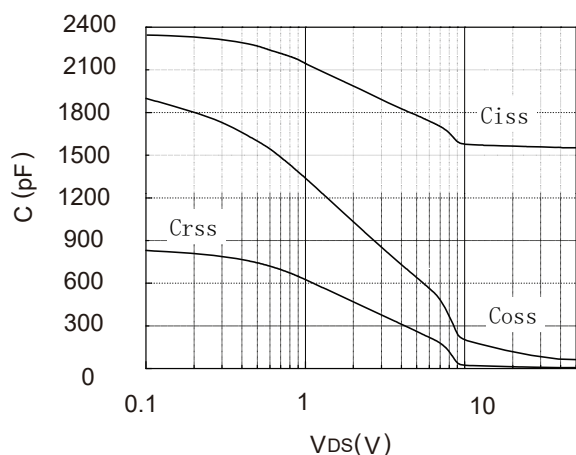
transfer characteristics



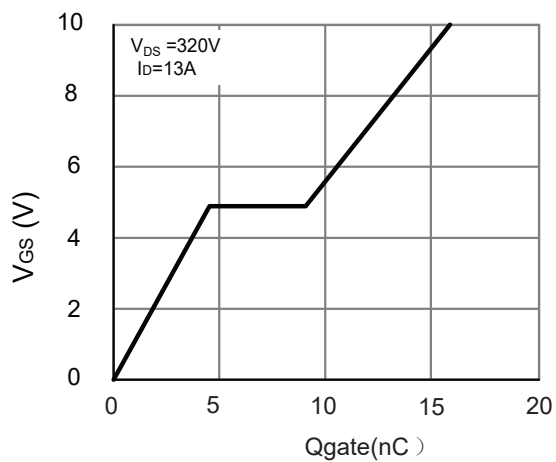
drain-source on-resistance



On-Resistance vs. Junction Temperature



Capacitance Characteristics



Gate charge vs gate-source voltage