250V N-Channel MOSFET

General Description

The 40N25P uses advanced planar stripe DMOS technology and design to provide excellent RDS(ON). These devices are wellsuited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
250V	90mΩ	40A

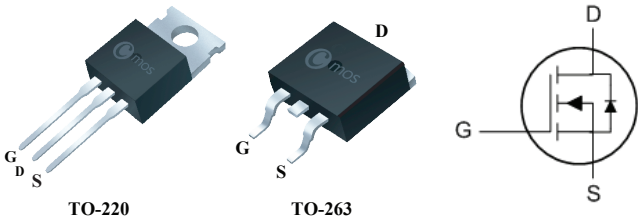
Applications

- Uninterruptible power supplies
- DC/DC converter
- DC/AC inverter

Features

- Fast switching
- 100% avalanche tested
- Improve dv/dt capability
- RoHS compliant

TO-220/263 Pin Configuration



Type	Package	Marking
CMP40N25P	TO-220	CMP40N25P
CMB40N25P	TO-263	CMB40N25P

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	250	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current	40	A
I_D@T_C=100℃	Continuous Drain Current	32	A
I_{DM}	Pulsed Drain Current[1]	160	A
EAS	Single Pulse Avalanche Energy[2]	1000	mJ
P_D@T_C=25℃	Total Power Dissipation	160	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.78	℃/W

Electrical Characteristics (T_J=25℃ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	250	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A	---	---	90	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=200V , V_{GS} =0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} =±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=25A	---	23	---	S
Q_g	Total Gate Charge	I_D=20 A V_{DS} =125V V_{GS} =10 V	---	63	---	nC
Q_{gs}	Gate-Source Charge		---	17	---	
Q_{gd}	Gate-Drain Charge		---	19	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS} =125V I_D=20A R_G=25Ω	---	43	---	ns
T_r	Rise Time		---	27	---	
$T_{d(off)}$	Turn-Off Delay Time		---	156	---	
T_f	Fall Time		---	33	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	2700	---	pF
C_{oss}	Output Capacitance		---	325	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	40	A
I_{SM}	Pulsed Source Current		---	---	160	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=20A ,T_J=25℃	---	0.85	1.4	V
t_{rr}	Reverse Recovery Time	di/dt = 100A/μs V_{GS}=0V , I_{SD}=20A	---	167	---	ns
Q_{rr}	Reverse Recovery Charge		---	1.25	---	μC

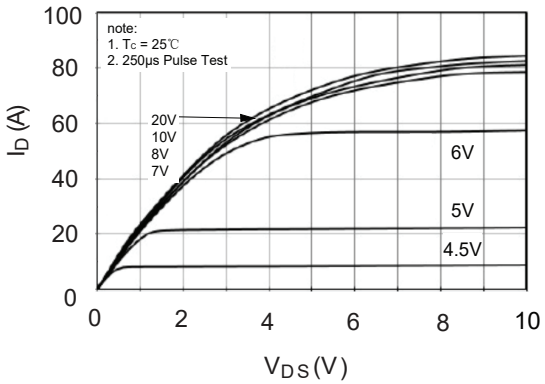
Note :

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

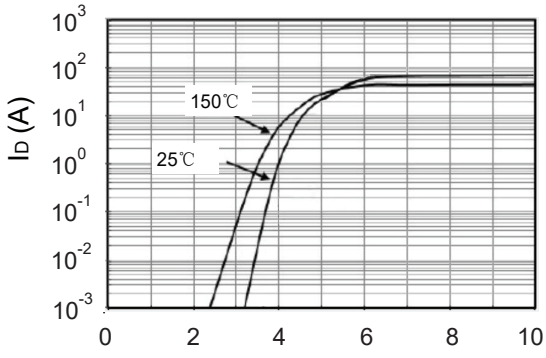
2.The test condition is V_{DD}=50V,V_{GS}=10V,L=1mH,I_{AS}=40A.

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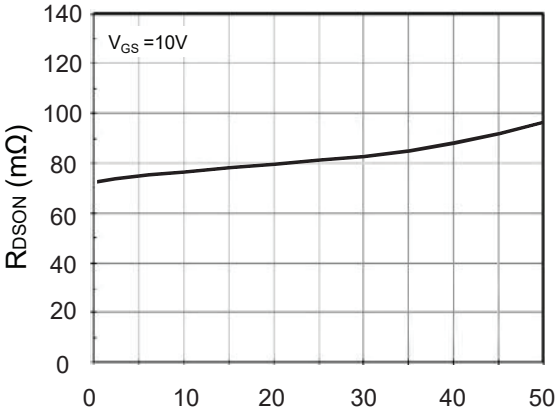
Typical Characteristics



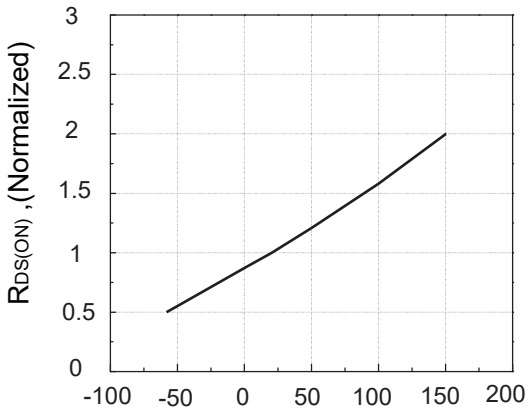
Output Characteristics



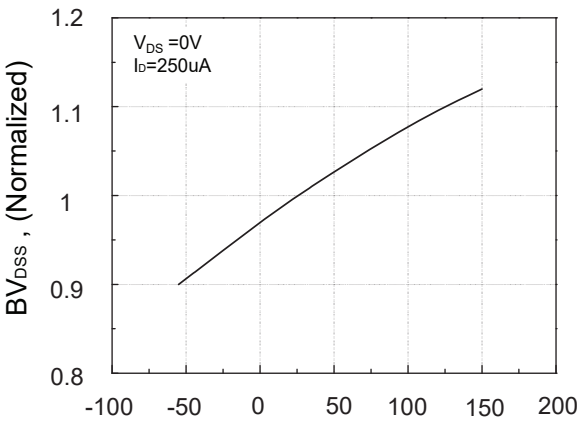
transfer characteristics



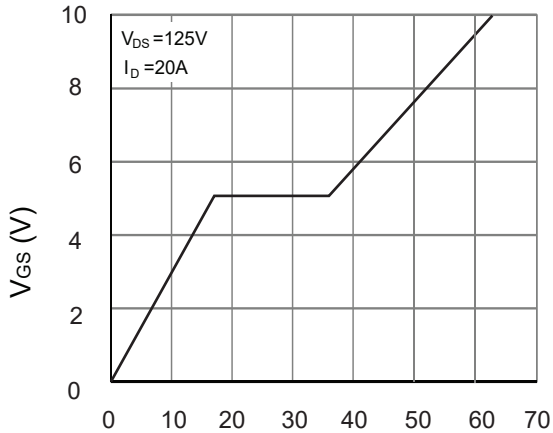
drain-source VS on-resistance



On-Resistance Variation vs Temperature

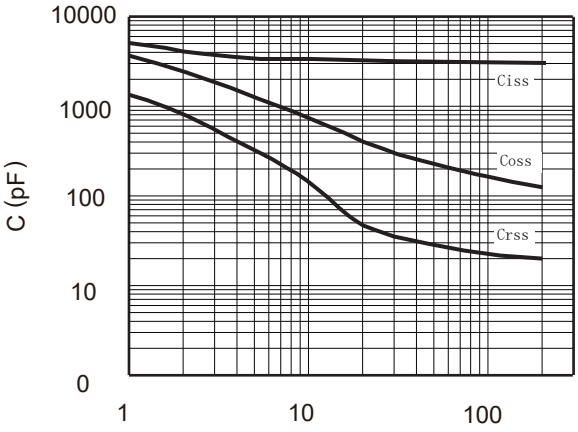


Breakdown Voltage Variation vs. Temperature

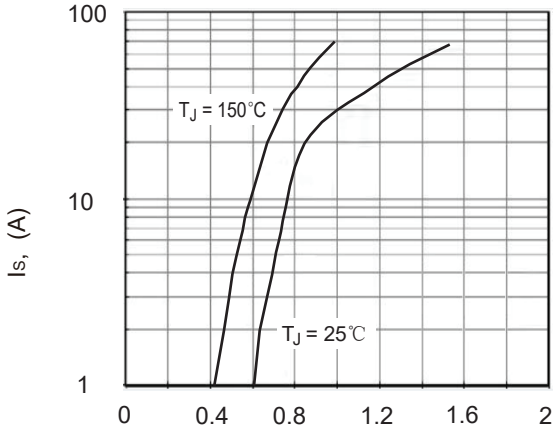


Gate charge vs gate-source voltage

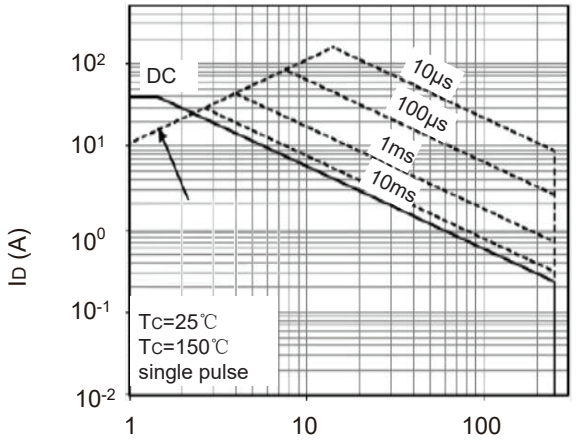
Characteristics



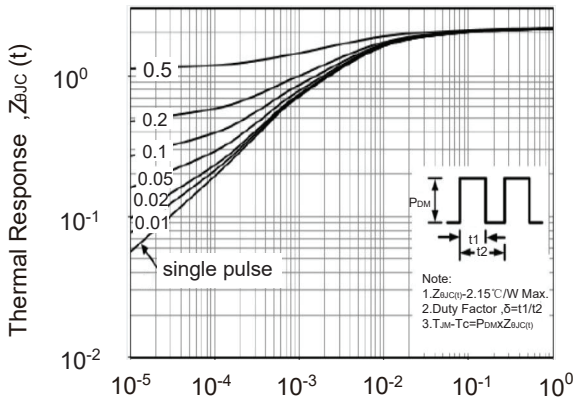
Capacitance Characteristics



Body-Diode Characteristics



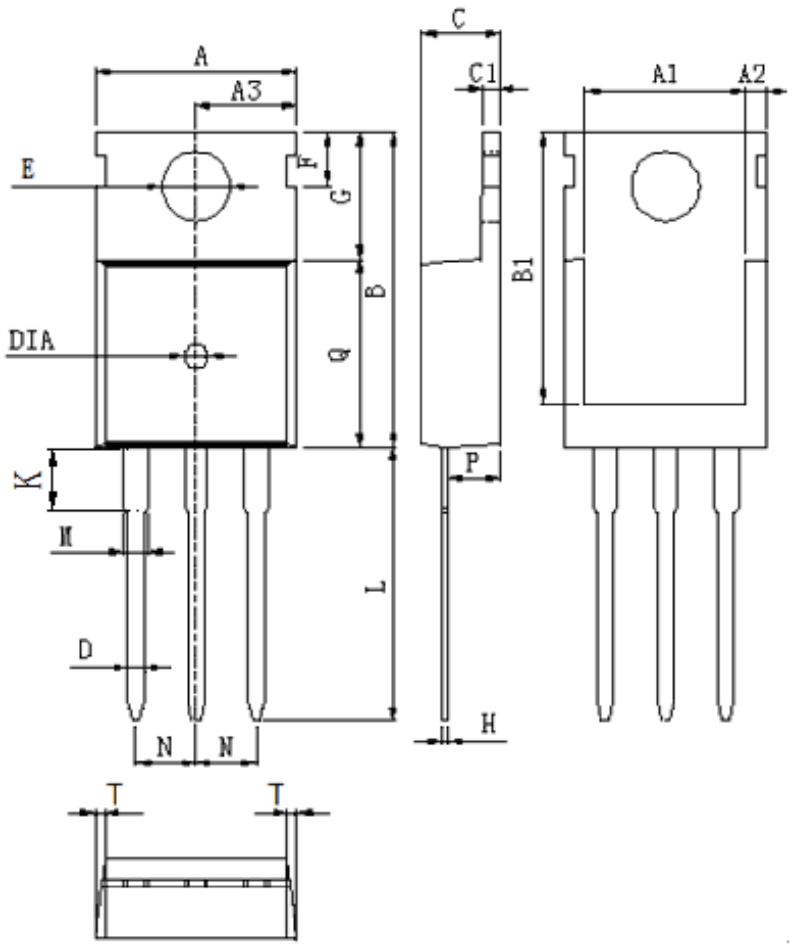
Safe operating area



Square Wave Pulse Duration (s)
Transient Impedance

Package Dimension

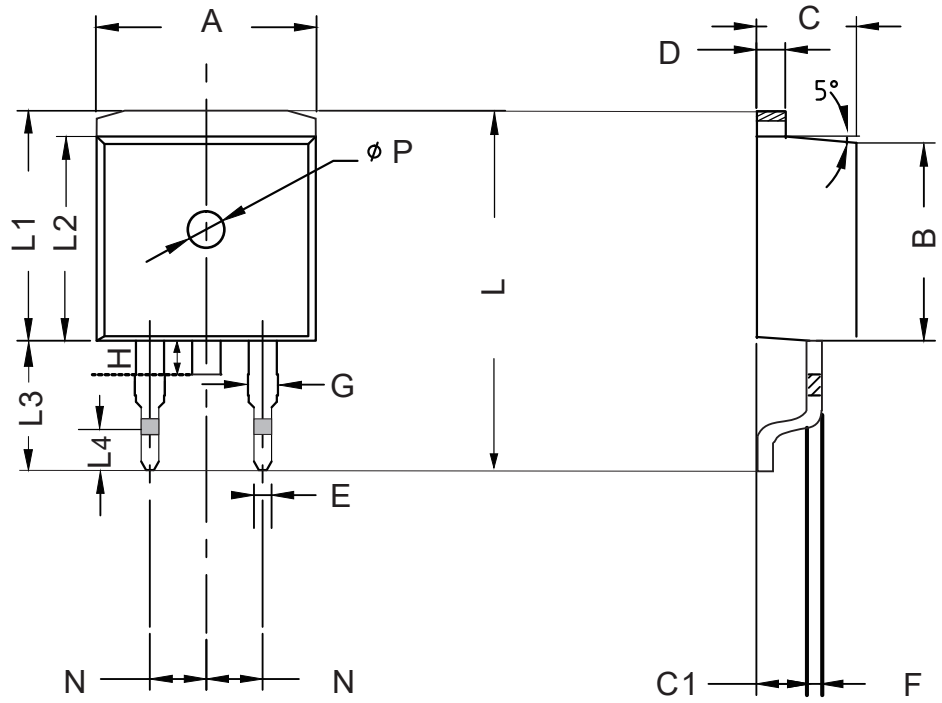
TO-220 Unit :mm



DIM	MILLIMETERS
A	10.0±0.3
A1	8.64±0.2
A2	1.15±0.1
A3	5.0±0.2
B	15.8±0.4
B1	13.2±0.3
C	4.56±0.1
C1	1.3±0.2
D	0.8±0.2
E	3.6±0.2
F	2.95±0.3
G	6.5±0.3
H	0.5±0.1
K	3.1±0.2
L	13.2±0.4
M	1.25±0.1
N	2.54±0.1
P	2.4±0.3
Q	9.0±0.3
T	W:0.35
DIA	⊙1.5(deep 0.2)

Package Dimension

TO-263 Unit :mm



Symbol	Millimeters		Symbol	Millimeters	
	Min.	Max.		Min.	Max.
A	9.60	10.30	H	1.45	1.75
B	8.40	9.00	L	14.60	15.00
C1	2.20	2.60	L1	10.00	11.00
C	4.30	4.70	L2	9.00	9.40
D	1.20	1.40	L3	4.10	4.50
E	0.70	0.90	L4	1.70	2.10
F	0.40	0.60	N	2.50	2.58
G	1.20	1.50	ØP	1.40	1.60