

CDMSJ22013.8-650

**N-CHANNEL
SUPER JUNCTION MOSFET
13.8 AMP, 650 VOLT**



TO-220FP CASE



www.centrasemi.com

DESCRIPTION:

The CENTRAL SEMICONDUCTOR CDMSJ22013.8-650 is a high current, 650 Volt N-Channel power MOSFET designed for high voltage, fast switching applications such as Power Factor Correction (PFC), and power chargers. This MOSFET combines high voltage capability with low $r_{DS(ON)}$, low threshold voltage and low gate charge.

MARKING: CDMSJ

13.8-650

APPLICATIONS:

- Power Factor Correction
- TV Power
- UPS
- PD Charger
- Adapter

FEATURES:

- High voltage capability ($V_{DS}=650V$)
- Low gate charge ($Q_{gs}=6nC$)
- Low $r_{DS(ON)}$ (0.28 Ω)

MAXIMUM RATINGS: ($T_C=25^{\circ}C$)

Drain-Source Voltage
Gate-Source Voltage
Continuous Drain Current
Continuous Drain Current ($T_C=100^{\circ}C$)
Pulsed Drain Current
Forward Diode Current
Power Dissipation
Power Dissipation ($T_C=100^{\circ}C$)
Operating and Storage Junction Temperature

SYMBOL

V_{DS}	650
V_{GS}	30
I_D	13.8
I_D	8.7
I_{DM}	41.4
I_S	13.8
P_D	35.7
P_D	14.3
T_J, T_{stg}	-55 to +150

UNITS

V
V
A
A
A
A
W
W
$^{\circ}C$

ELECTRICAL CHARACTERISTICS: ($T_J=25^{\circ}C$ unless otherwise noted)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	710		V
$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3.2	4	V
$R_{DS(on)}$	$V_{GS}=10V, I_D=4.4A$ (Note 1)		248	280	m Ω
I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			1.0	μA
I_{GSS}	$V_{GS}=30V, V_{DS}=0V$			100	nA
I_{GSSR}	$V_{GS}=30V, V_{DS}=0V$			100	nA
gfs	$V_{DS}=20V, I_D=13.8A$		13		S
Q_g	$V_{DS}=520V, I_D=13.8A, V_{GS}=10V$		30		nC
Q_{gs}	$V_{DS}=520V, I_D=13.8A, V_{GS}=10V$		6		nC

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ELECTRICAL CHARACTERISTICS - Continued: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Q_{gd}	$V_{DS}=520\text{V}$, $I_D=13.8\text{A}$, $V_{GS}=10\text{V}$		13		nC
C_{iss}	$V_{DS}=400\text{V}$, $V_{GS}=0\text{V}$, $f=250\text{kHz}$		1040		pF
C_{oss}	$V_{DS}=400\text{V}$, $V_{GS}=0\text{V}$, $f=250\text{kHz}$		38		pF
C_{rss}	$V_{DS}=400\text{V}$, $V_{GS}=0\text{V}$, $f=250\text{kHz}$		11		pF
$C_{o(er)}$	$V_{DS}=0\text{V}$ to 520V , $V_{GS}=0\text{V}$, $f=250\text{kHz}$		48		pF
$t_{d(on)}$	$V_{DD}=325\text{V}$, $I_D=13.8\text{A}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$		43		ns
t_r	$V_{DD}=325\text{V}$, $I_D=13.8\text{A}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$		69		ns
$t_{d(off)}$	$V_{DD}=325\text{V}$, $I_D=13.8\text{A}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$		171		ns
t_f	$V_{DD}=325\text{V}$, $I_D=13.8\text{A}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$		66		ns
R_g	$f=1.0\text{MHz}$		21		Ω
V_{SD}	$I_S=13.8\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Q_{rr}	$I_S=13.8\text{A}$, $di/dt=100\text{A}/\mu\text{s}$		5.4		μC
t_{rr}	$I_S=13.8\text{A}$, $di/dt=100\text{A}/\mu\text{s}$		344		ns

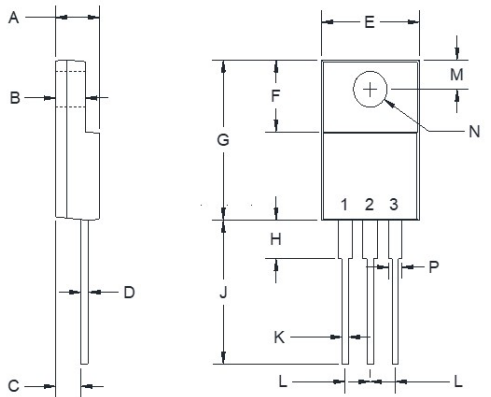
Note 1: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

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TO-220FP CASE - MECHANICAL OUTLINE



R5

SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.165	0.202	4.20	5.12
B	0.090	0.130	2.30	3.30
C	0.098	0.122	2.50	3.10
D	-	0.031	-	0.80
E	0.382	0.418	9.70	10.63
F	0.238	0.276	6.06	7.00
G	0.583	0.640	14.80	16.25
H	-	0.177	-	4.50
J	0.503	0.543	12.78	13.80
K	0.020	0.035	0.50	0.90
L	0.100		2.54	
M	0.100	0.140	2.55	3.55
N (DIA)	0.116	0.134	2.95	3.40
P	0.039	0.058	1.00	1.47

TO-220FP (REV: R5)

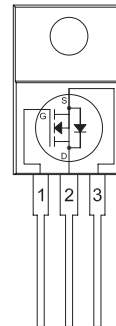
LEAD CODE:

- 1) Gate
- 2) Drain
- 3) Source

MARKING CODE: CDMSJ

13.8-650

PIN CONFIGURATION



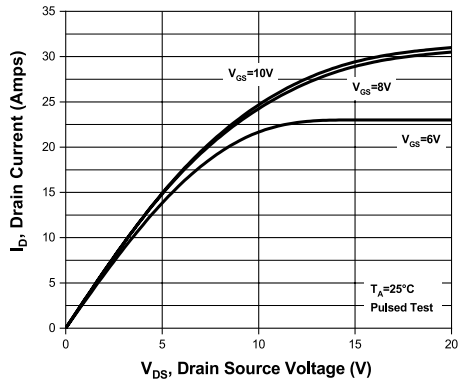
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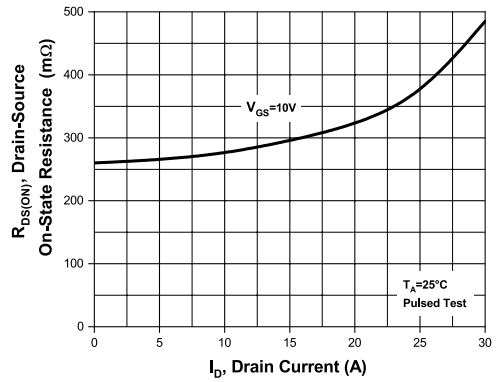


TYPICAL ELECTRICAL CHARACTERISTICS

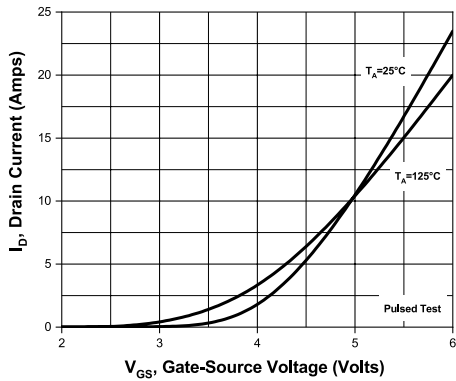
Typical Output Characteristics



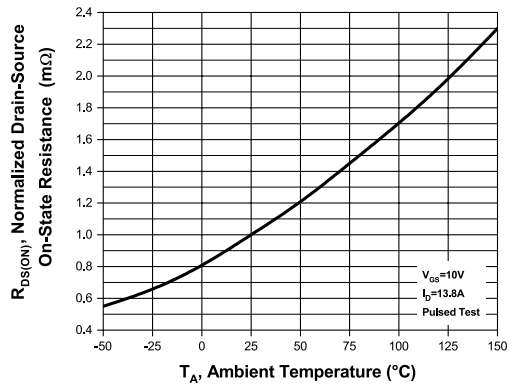
Drain Source On Resistance



Transfer Characteristics



Drain Source Temperature Coefficient

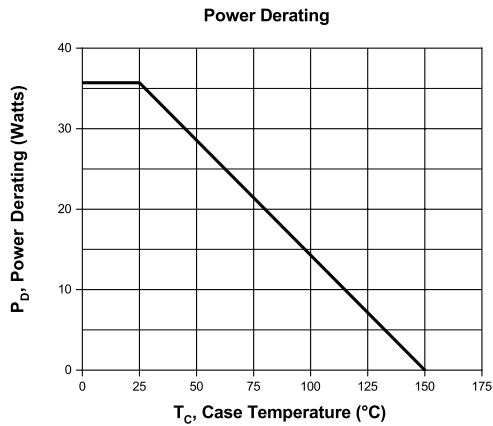
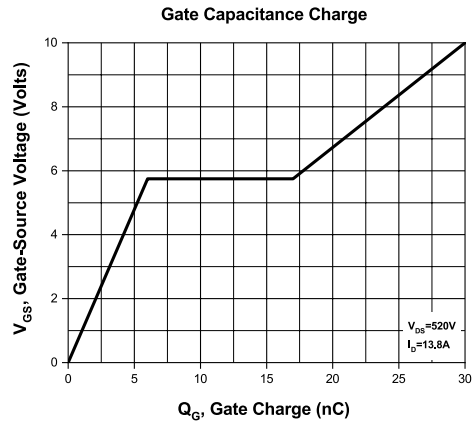
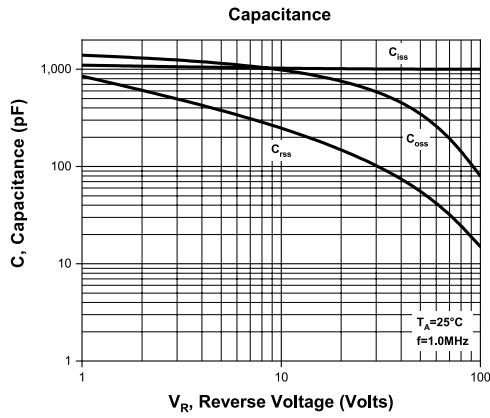


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TYPICAL ELECTRICAL CHARACTERISTICS



OUTSTANDING SUPPORT AND SUPERIOR SERVICES



PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2nd day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix "TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix "PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

CONTACT US

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