

CDM22010-650

SILICON  
N-CHANNEL POWER MOSFET  
10 AMP, 650 VOLT



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TO-220 CASE

**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR CDM22010-650 is a high current, 650 Volt N-Channel power MOSFET designed for high voltage, fast switching applications such as Power Factor Correction (PFC), lighting and power inverters. This MOSFET combines high voltage capability with low  $r_{DS(ON)}$ , low threshold voltage and low gate charge.

**MARKING CODE: CDM10-650**

**APPLICATIONS:**

- Power Factor Correction
- Motor drives
- Alternative energy inverters
- Solid state lighting

**FEATURES:**

- High voltage capability ( $V_{DS}=650V$ )
- Low gate charge ( $Q_{gs}=8.0nC$ )
- Low  $r_{DS(ON)}$  ( $0.88\Omega$ )

**MAXIMUM RATINGS:** ( $T_A=25^\circ C$  unless otherwise noted)

	SYMBOL		UNITS
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	30	V
Continuous Drain Current (Steady State)	$I_D$	10	A
Maximum Pulsed Drain Current, $t_p=10\mu s$	$I_{DM}$	40	A
Continuous Source Current (Body Diode)	$I_S$	10	A
Maximum Pulsed Source Current (Body Diode)	$I_{SM}$	40	A
Single Pulse Avalanche Energy (Note 1)	$E_{AS}$	608	mJ
Power Dissipation	$P_D$	2.0	W
Power Dissipation ( $T_C=25^\circ C$ )	$P_D$	156	W
Operating and Storage Junction Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ C$
Thermal Resistance	$\theta_{JC}$	0.8	$^\circ C/W$
Thermal Resistance	$\theta_{JA}$	62.5	$^\circ C/W$

Note 1:  $L=30mH, I_{AS}=6.2A, V_{DD}=50V, R_G=25\Omega, \text{Initial } T_J=25^\circ C$

**ELECTRICAL CHARACTERISTICS:** ( $T_A=25^\circ C$  unless otherwise noted)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$I_{GSSF}, I_{GSSR}$	$V_{GS}=30V, V_{DS}=0$		10	100	nA
$I_{DSS}$	$V_{DS}=650V, V_{GS}=0$		0.03	1.0	$\mu A$
$BV_{DSS}$	$V_{GS}=0, I_D=250\mu A$	650			V
$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	2.8	4.0	V
$V_{SD}$	$V_{GS}=0, I_S=10A$		0.9	1.4	V
$r_{DS(ON)}$	$V_{GS}=10V, I_D=5.0A$		0.88	1.0	$\Omega$
$C_{rSS}$	$V_{DS}=25V, V_{GS}=0, f=1.0MHz$		1.2		pF
$C_{iSS}$	$V_{DS}=25V, V_{GS}=0, f=1.0MHz$		1168		pF
$C_{OSS}$	$V_{DS}=25V, V_{GS}=0, f=1.0MHz$		129		pF

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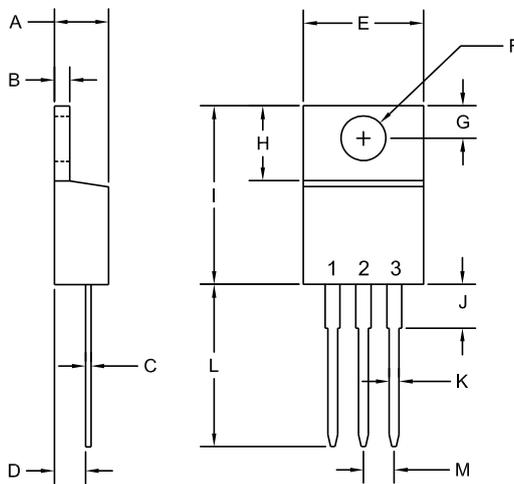


**ELECTRICAL CHARACTERISTICS - Continued:** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

SYMBOL	TEST CONDITIONS	TYP	UNITS
$Q_{g(\text{tot})}$	$V_{DS}=520\text{V}, V_{GS}=10\text{V}, I_D=10\text{A}$ (Note 2)	20	nC
$Q_{gs}$	$V_{DS}=520\text{V}, V_{GS}=10\text{V}, I_D=10\text{A}$ (Note 2)	8.0	nC
$Q_{gd}$	$V_{DS}=520\text{V}, V_{GS}=10\text{V}, I_D=10\text{A}$ (Note 2)	7.0	nC
$t_d$	$V_{DD}=325\text{V}, I_D=10\text{A}, R_G=25\Omega$ (Note 2)	20	ns
$t_r$	$V_{DD}=325\text{V}, I_D=10\text{A}, R_G=25\Omega$ (Note 2)	33	ns
$t_s$	$V_{DD}=325\text{V}, I_D=10\text{A}, R_G=25\Omega$ (Note 2)	57	ns
$t_f$	$V_{DD}=325\text{V}, I_D=10\text{A}, R_G=25\Omega$ (Note 2)	36	ns
$t_{rr}$	$V_{GS}=0, I_S=10\text{A}, di/dt=100\text{A}/\mu\text{s}$ (Note 2)	570	ns
$Q_{rr}$	$V_{GS}=0, I_S=10\text{A}, di/dt=100\text{A}/\mu\text{s}$ (Note 2)	4.7	$\mu\text{C}$

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

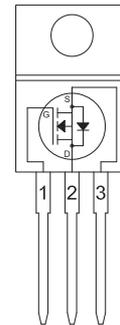
**TO-220 CASE - MECHANICAL OUTLINE**



SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.170	0.190	4.31	4.82
B	0.045	0.055	1.15	1.39
C	0.013	0.026	0.33	0.65
D	0.083	0.107	2.10	2.72
E	0.394	0.417	10.01	10.60
F (DIA)	0.140	0.157	3.55	4.00
G	0.100	0.118	2.54	3.00
H	0.230	0.270	5.85	6.85
I	0.560	0.625	14.23	15.87
J	-	0.250	-	6.35
K	0.025	0.038	0.64	0.96
L	0.500	0.579	12.70	14.70
M	0.090	0.110	2.29	2.79

TO-220 (REV: R2)

**PIN CONFIGURATION**



R2

**LEAD CODE:**

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

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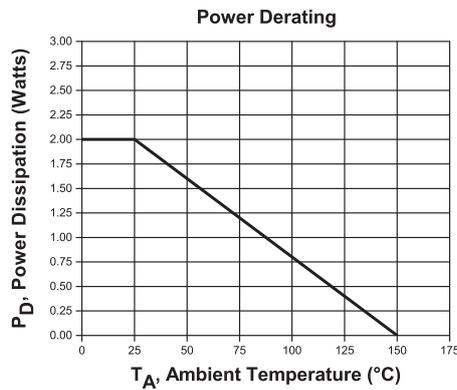
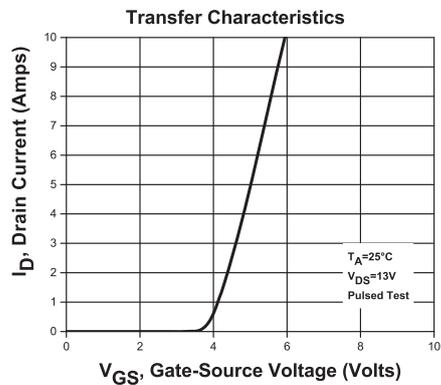
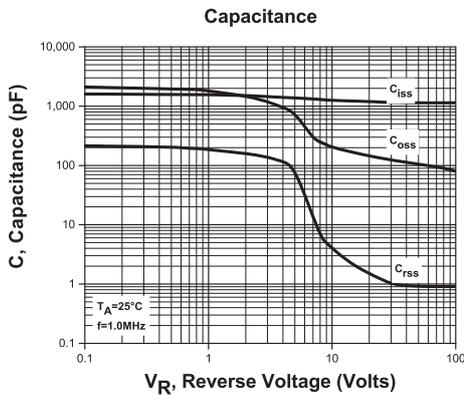
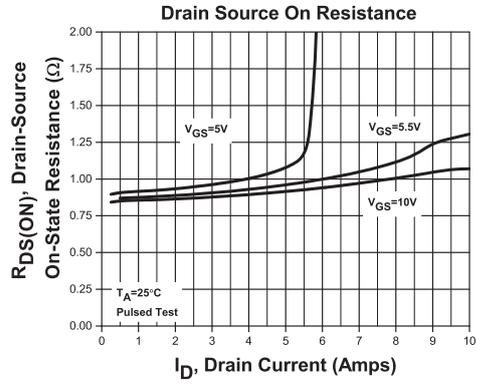
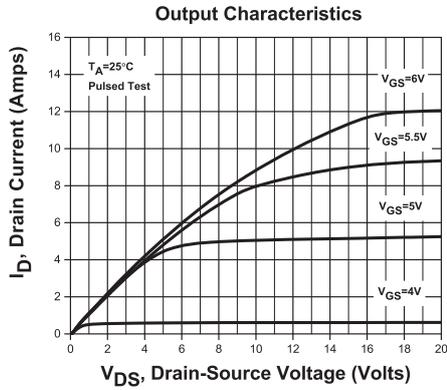
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TYPICAL ELECTRICAL CHARACTERISTICS



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### CONTACT US

#### Corporate Headquarters & Customer Support Team

Central Semiconductor Corp.  
145 Adams Avenue  
Hauppauge, NY 11788 USA  
Main Tel: (631) 435-1110  
Main Fax: (631) 435-1824  
Support Team Fax: (631) 435-3388  
[www.centrasemi.com](http://www.centrasemi.com)

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