



CSLLDM22011-225F

**N-CHANNEL
LR POWER SPACECELLITE™ MOSFET
11 AMP, 225 VOLT**



TO-220FP CASE



www.centrasemi.com

DESCRIPTION:

The CENTRAL SEMICONDUCTOR CSLLDM22011-225F is an N-Channel MOSFET designed for high voltage, fast switching, low earth orbit applications. This radiation hardened MOSFET combines high voltage capability with ultra low $r_{DS(ON)}$, low threshold voltage, and low gate charge for optimal efficiency.

MARKING CODE:

**CSLL11225
TO-220FP
D/C**

RADIATION TESTING



APPLICATIONS:

- Satellite power supplies
- Solar panel inverters

TEST FLOW:

- Based on PEM-INST-001

FEATURES:

- High voltage capability
- Low gate charge ($Q_{GS} = 4.45nC$ TYP)
- Ultra low $r_{DS(ON)}$ (0.3Ω TYP)
- TID = 10kRad

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

	SYMBOL		UNITS
Drain-Source Voltage	V_{DS}	225	V
Gate-Source Voltage	V_{GS}	30	V
Continuous Drain Current (Steady State)	I_D	11	A
Maximum Pulsed Drain Current, $t_p=10\mu s$	I_{DM}	44	A
Continuous Source Current (Body Diode)	I_S	11	A
Maximum Pulsed Source Current (Body Diode)	I_{SM}	44	A
Single Pulse Avalanche Energy (Note 1)	E_{AS}	280	mJ
Power Dissipation	P_D	25	W
Operating and Storage Junction Temperature	T_J, T_{stg}	-55 to +150	$^\circ C$
Thermal Resistance	Θ_{JC}	5.0	$^\circ C/W$
Thermal Resistance	Θ_{JA}	120	$^\circ C/W$

Note 1: $L=30mH, I_{AS}=4.0A, V_{DD}=100V, R_G=25\Omega, \text{Initial } T_J=25^\circ C$

ELECTRICAL CHARACTERISTICS PRE-TOTAL DOSE IRRADIATION: ($T_C=25^\circ C$ unless otherwise noted)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{GSSF}, I_{GSSR}	$V_{GS}=30V, V_{DS}=0$			100	nA
I_{DSS}	$V_{DS}=600V, V_{GS}=0$		0.047	1.0	μA
BV_{DSS}	$V_{GS}=0, I_D=250\mu A$	600			V
$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.09	4.0	V
V_{SD}	$V_{GS}=0, I_S=11A$		0.92	1.4	V
$r_{DS(ON)}$	$V_{GS}=10V, I_D=5.5A$		0.30	0.36	Ω
C_{rss}	$V_{DS}=100V, V_{GS}=0, f=1.0MHz$		2.76		pF
C_{iss}	$V_{DS}=100V, V_{GS}=0, f=1.0MHz$		763		pF
C_{oss}	$V_{DS}=100V, V_{GS}=0, f=1.0MHz$		52		pF

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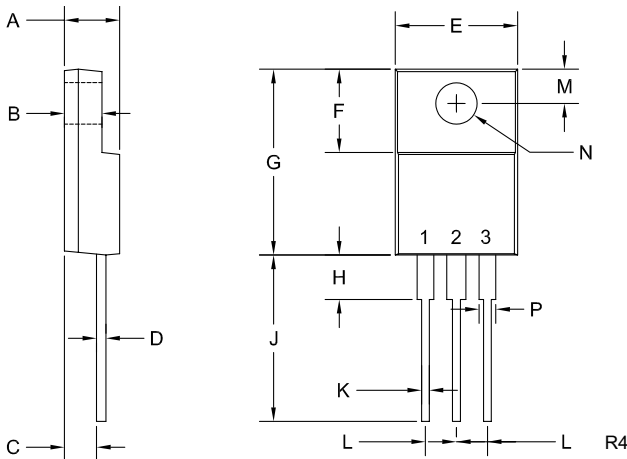


ELECTRICAL CHARACTERISTICS PRE-TOTAL DOSE IRRADIATION: ($T_C=25^\circ\text{C}$ unless otherwise noted)

SYMBOL	TEST CONDITIONS	TYP	UNITS
$Q_{g(\text{tot})}$	$V_{DS}=480\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}$ (Note 2)	23.05	nC
Q_{gs}	$V_{DS}=480\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}$ (Note 2)	4.45	nC
Q_{gd}	$V_{DS}=480\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}$ (Note 2)	11.31	nC
$t_{d(\text{on})}$	$V_{DD}=300\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}, R_G=25\Omega$ (Note 2)	11	ns
t_r	$V_{DD}=300\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}, R_G=25\Omega$ (Note 2)	27	ns
$t_{d(\text{off})}$	$V_{DD}=300\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}, R_G=25\Omega$ (Note 2)	37	ns
t_f	$V_{DD}=300\text{V}, V_{GS}=10\text{V}, I_D=11\text{A}, R_G=25\Omega$ (Note 2)	23	ns
t_{rr}	$V_{GS}=0, I_S=11\text{A}, di/dt=100\text{A}/\mu\text{s}$ (Note 2)	315	ns
Q_{rr}	$V_{GS}=0, I_S=11\text{A}, di/dt=100\text{A}/\mu\text{s}$ (Note 2)	4.0	μC

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

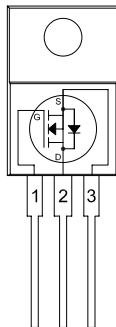
TO-220FP CASE - MECHANICAL OUTLINE



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	-	0.161	-	4.10
J	0.506	0.543	12.85	13.80
K	0.020	0.031	0.50	0.79
L	0.100		2.54	
M	0.120	0.140	3.05	3.55
N (DIA)	0.116	0.134	2.95	3.40
P	0.039	0.058	1.00	1.47

TO-220FP (REV: R4)

PIN CONFIGURATION



LEAD CODE:

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

MARKING CODE: CSLL11225 TO-220FP D/C

R0 (13-April 2023)

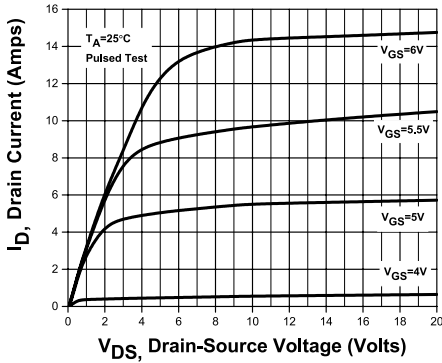
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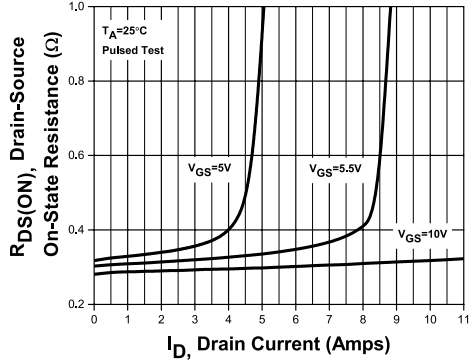


TYPICAL ELECTRICAL CHARACTERISTICS

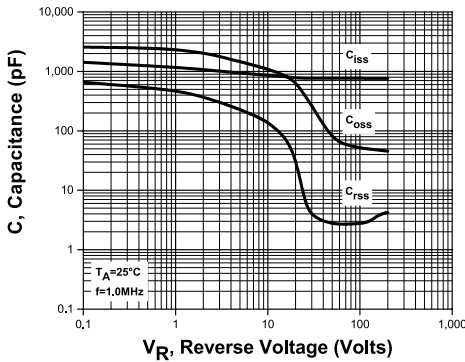
Output Characteristics



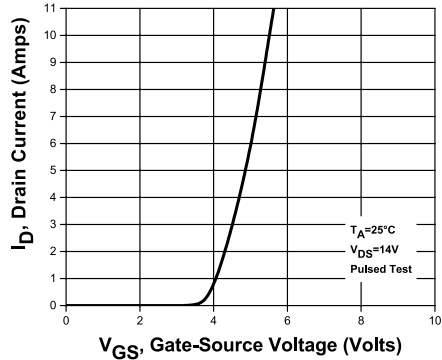
Drain Source On Resistance



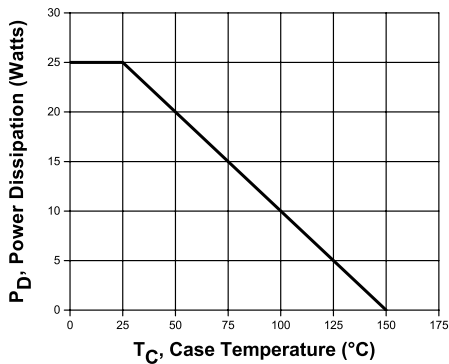
Capacitance



Transfer Characteristics



Power Derating



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RADIATION CHARACTERISTICS

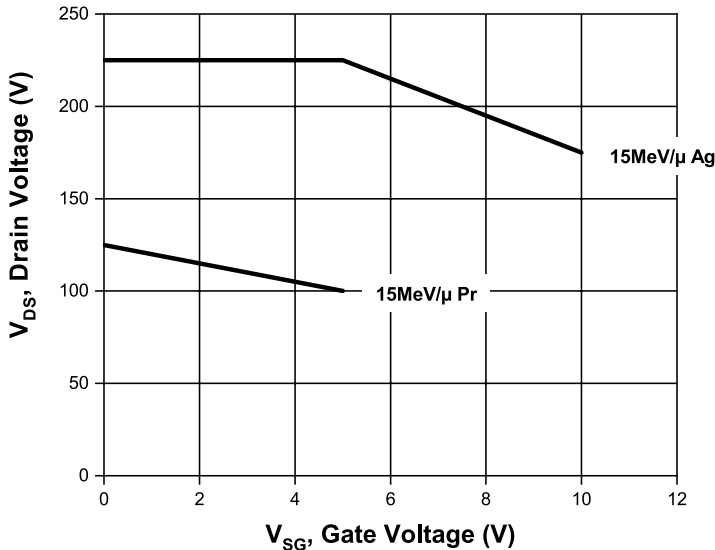
DOSE **TEST CONDITIONS**
10 kRad(Si) $V_{GS}=15V, V_{DS}=0$

ELECTRICAL CHARACTERISTICS POST-TOTAL DOSE IRRADIATION: ($T_A=25^\circ C$)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I_{GSSF}, I_{GSSR}	$V_{GS}=30V, V_{DS}=0$			100	nA
I_{DSS}	$V_{DS}=600V, V_{GS}=0$			200	μA
BV_{DSS}	$V_{GS}=0, I_D=250\mu A$	600			V
$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4		1.6	V
V_{SD}	$V_{GS}=0, I_S=11A$			1.4	V
$r_{DS(ON)}$	$V_{GS}=10V, I_D=5.5A$			0.36	Ω

SINGLE EVENT EFFECT SAFE OPERATING AREA:

ION	RANGE	LET
Ag	111.2 μm	44.9MeV-cm ² /mg
Pr	117.0 μm	61.3MeV-cm ² /mg



R0 (13-April 2023)

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).

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