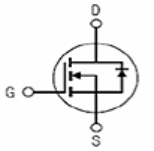
SILICON N-CHANNEL POWER MOSFET

60Volt,60Amp.,94 Watts

CDZ44

TO-220



TO-220
Leaded Plastic Package
RoHS compliant

GENERAL DESCRIPTION:

The CDZ44 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is TO-220, which accords with the RoHS standard.

FEATURES:

1. Fast Switching.
2. Low Gate Charge and Rdson.
3. Low Reverse transfer capacitances.
4. 100% Single Pulse avalanche energy.

APPLICATION:

1. Power switching application .
2. Hard switched and high frequency circuits .
3. Uninterruptible power supply .

ABSOLUTE MAXIMUM RATINGS (Ta = 25 ℃ Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Drain-to-Source Voltage	V_{DSS}	60	V
Continuous Drain Current	ID	60	A
Continuous Drain Current T_C = 100 °C		46	A
Pulsed Drain Current	I_{DM}	240	A
Gate-to-Source Voltage	V_{GS}	±20	V
Single Pulse Avalanche Energy	E_{AS} [a2]	150	mJ
Avalanche Energy ,Repetitive	E_{AR} [a1]	10	mJ
Avalanche Current	I_{AR} [a1]	25	A
Peak Diode Recovery dv/dt	dv/dt [a3]	5.0	V/ns
Power Dissipation	P_D	94	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	175, -55 to 175	°C
Maximum Temperature for Soldering	T_L	300	°C

ELECTRICAL CHARACTERISTICS at (Ta = 25 ℃ Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
OFF Characteristics						
Drain to Source Breakdown Voltage	V_{DSS}	V_{GS}=0V, I_D=250μA	60	--	--	V
Bvdss Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	D=250uA,Reference 25℃	--	0.06	--	V/°C
Drain to Source Leakage Current	I_{DSS}	V_{DS} = 60V, V_{GS}= 0V, Ta = 25℃	--	--	1	μA
		V_{DS} =48V, V_{GS}= 0V, Ta = 125℃	--	--	250	
Gate to Source Forward Leakage	$I_{GSS(F)}$	V_{GS} =+20V	--	--	1	μA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	V_{GS} =-20V	--	--	-1	μA
On Characteristics						
Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=30A	--	13.0	17.0	mΩ
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 250μA	1.5	--	4.0	V
Pulse width tp≤380μs,δ≤2%						
Dynamic Characteristics						
Forward Transconductance	g_{fs}	V_{DS}=5V, I_D =30A	19	--	--	S
input Capacitance	c_{iss}	V_{GS} = 0V V_{DS} = 30V f = 1.0MHz	--	2080	--	pF
Output Capacitance	c_{oss}		--	160	--	
Reverse Transfer Capacitance	c_{rss}		--	120	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(ON)}$	I_D =30A V_{DD} = 30V V_{GS} = 10V R_G = 3.0Ω	--	7.6	--	ns
Rise Time	t_r		--	5.2	--	
Turn-Off Delay Time	$t_{d(OFF)}$		--	28.2	--	
Fall Time	t_f		--	5.8	--	
Total Gate Charge	Q_g	I_D =30A V_{DD} =30V V_{GS} = 10V	--	52	--	nC
Gate to Source Charge	Q_{gs}		--	6.5	--	
Gate to Drain (“Miller”) Charge	Q_{gd}		--	17	--	
Drain- Source Diode Characteristics						
Continuous Source Current (Body Diode)	I_S		--	--	60	A
Maximum Pulsed Current (Body Diode)	I_{SM}		--	--	240	A
Diode Forward Voltage	V_{SD}	I_S=60A,V_{GS}=0V	--	--	1.5	V
Reverse Recovery Time	t_{rr}	I_S=25A,T_j = 25°C dIF/dt=100A/us, V_{GS}=0V	--	50	--	ns
Reverse Recovery Charge	Q_{rr}		--	120	--	nC
Pulse width tp≤380μs,δ≤2%						

Thermal Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Junction-to-Ambient	$R_{\theta JA}$	62 (Max)	°C/W
Junction-to-Case	$R_{\theta JC}$	1.5 (Max)	°C/W

Notes[a1]: Repetitive rating; pulse width limited by maximum junction temperature

[a2]: EAS condition : Tj =25, VDDD= ℃ 30V,VG=10V,L=0.5mH,Rg=25Ω

[a3]: I_{SD}=25A, di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

CDZ44
Rev1 21062021EFC

Test Circuits and Waveforms

Fig 1. Gate Charge Test circuit

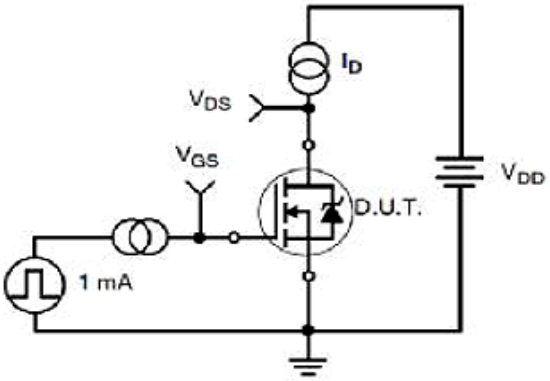


Fig 2. Gate Charge Waveform

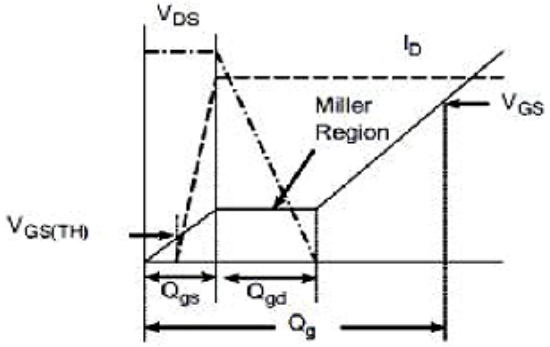


Fig 3 .Resistive Switching Circuit

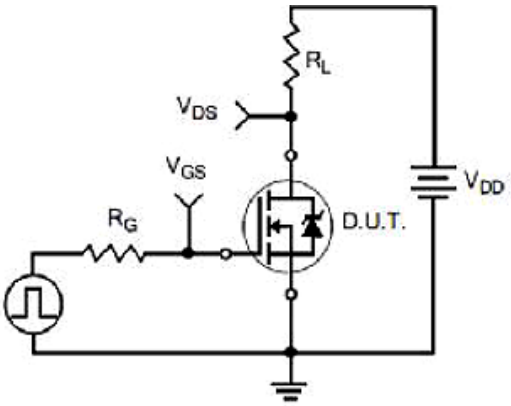
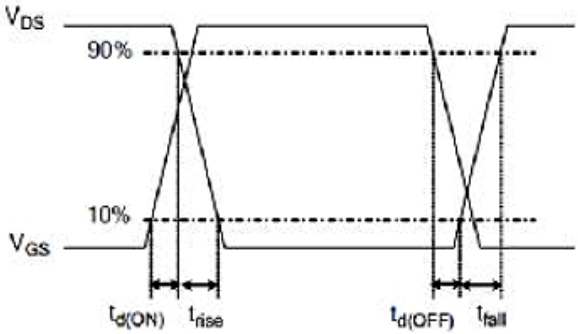


Fig 4 .Resistive Switching Waveform



Typical Characteristic Curves

Fig 5. Typical Output Characteristics

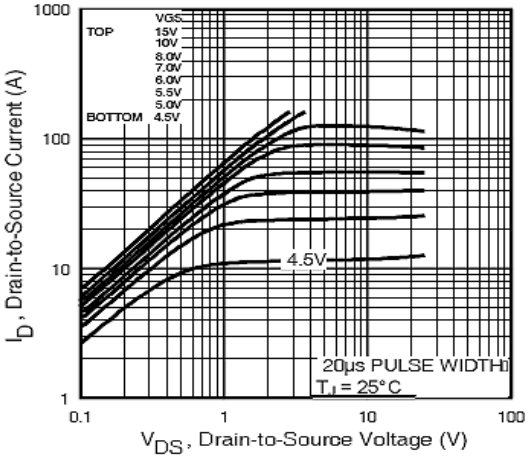


Fig 6. Typical Output Characteristics

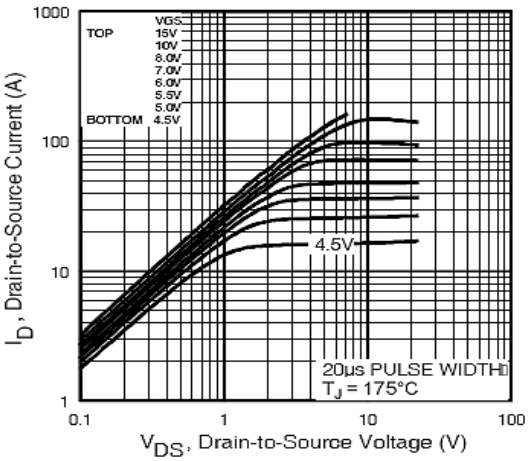


Fig 7. Typical Transfer Characteristics

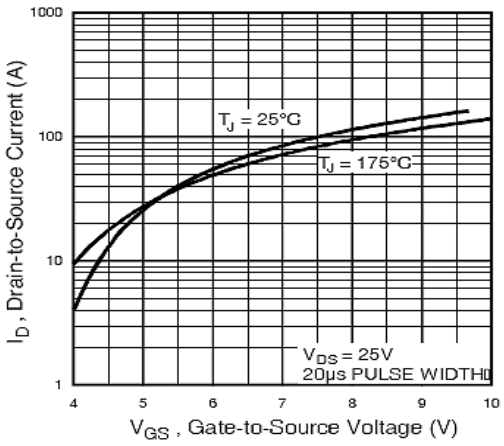
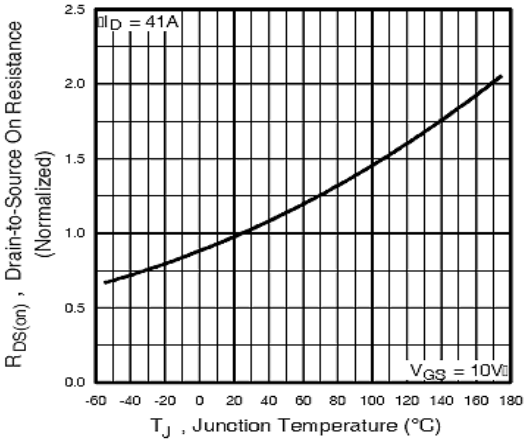


Fig 8. Normalized On-Resistance vs. Temperature



Typical Characteristic Curves

Fig 9.Typical Capacitance vs. Drain-to-Source Voltage

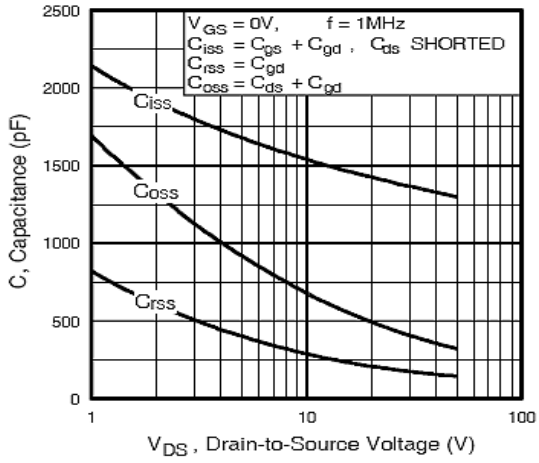


Fig 10.Typical Gate Charge vs. Gate-to-Source Voltage

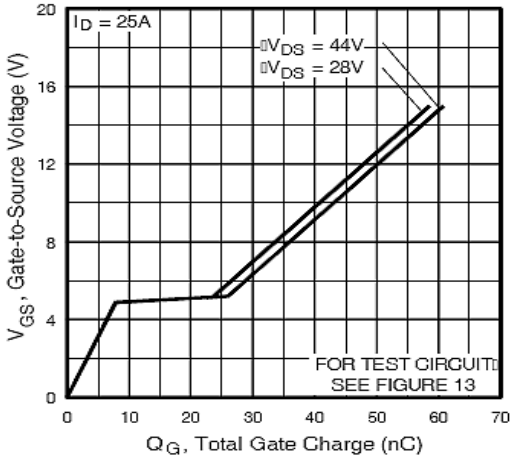


Fig 11.Typical Source-Drain Diode Forward Voltage

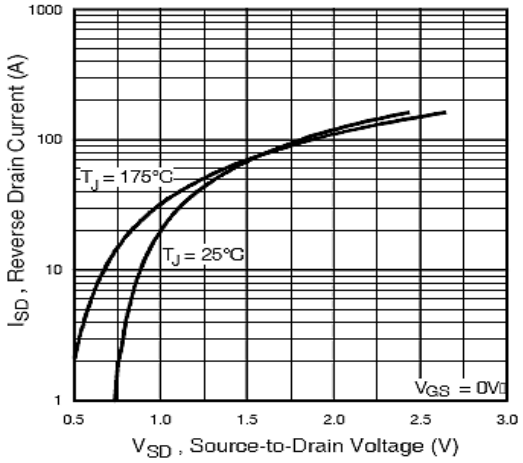
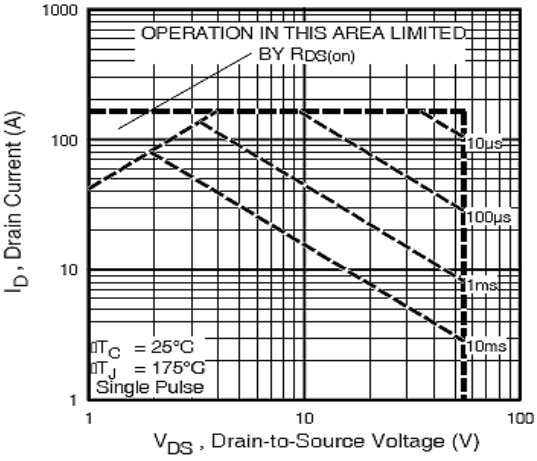
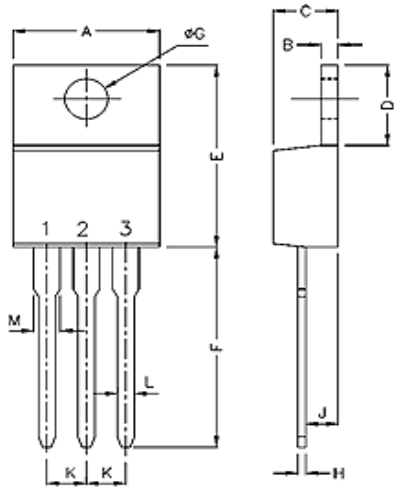


Fig 12. Maximum Safe Operating Area



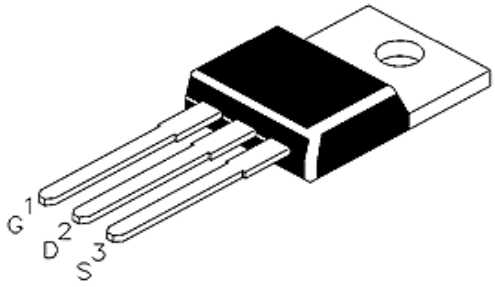
PACKAGE DETAILS

TO-220 Leaded Plastic Package



DIM	MIN	TYP.	MAX
A			10.7
B			1.4
C			4.8
D			6.9
E			16.5
F	12.5		
G		3.81	
H			0.4
J		2.67	
K		2.51	
L			1.2
M		1.27	

ALL DIMENSIONS ARE IN mm



PIN CONFIGURATION
1. GATE
2. DRAIN
3. SOURCE

Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.
For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	**Time**	**Condition**
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH

Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

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Continental Device India Pvt. Limited
C-120 Naraina Industrial Area, New Delhi 110 028, India.
Telephone +91-11-2579 6150, 4141 1112 Fax +91-11-2579 5290, 4141 1119
email@cdil.com www.cdil.com
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