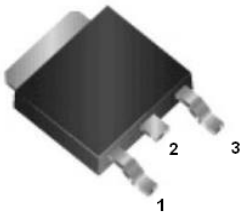
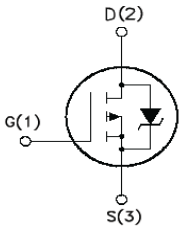
SURFACE MOUNT PNP POWER MOSFET

CDD10P06



Pin Confugration
1. Gate
2. Drain
3. Source



TO-252 (DPAK)

Surface Mount Plastic Package

Features

1. TYPICAL $R_{DS(on)}$ = 0.18Ω
2. EXCEPTIONAL dv/dt CAPABILITY
3. 100% AVALANCHE TESTED
4. LOW GATE CHARGE
5. APPLICATION ORIENTED CHARCTERIZATION

Description

This Power MOSFET shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment.

Applications

MOTOR CONTROL
DC-DC & DC-AC CONVERTERS

Maximum Ratings (T_a=25°C unless otherwise specified)

DESCRIPTION	SYMBOL	VALUE	UNIT
Drain-Source Voltage (V_{GS} = 0)	V_{DS}	60	V
Drain-Gate Voltage (R_{GS} = 20 kΩ)	V_{DGR}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current (continuous) at T_C = 25°C	I_D	10	A
Drain Current (continuous) at T_C = 100°C		7	
Drain Current (pulsed)	I_{DM} (*)	40	A
Total Dissipation at T_C = 25°C	P_{tot}	40	W
Derating Factor		0.27	W/°C
Peak Diode Recovery Voltage slope	dv/dt (1)	6	V/ns
Storage Temperature	T_{stg}	-65 to 175	°C
Max. Operating Junction Temperature	T_J	175	°C

Notes:

1. (*) Pulse width limited by safe operating area.
2. P-CHANNEL MOSFET actual polarity of voltages and current has to be reversed.
3. (1) I_{SD} ≤ 10A, di/dt ≤ 300A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_j ≤ T_JMAX

Thermal Characteristics

DESCRIPTION	SYMBOL	VALUE	UNIT
Thermal Resistance Junction-case	$R_{thj\text{-}case}$	3.75 Max	°C/W
Thermal Resistance Junction-ambient	$R_{thj\text{-}amb}$	100 Max	°C/W
Maximum Lead Temperature For Soldering Purpose	T_l	275	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max)	10	A
E_{AS}	Single Pulse Avalanche Energy (starting T_j = 25 °C, I_D = I_{AR}, V_{DD} = 25 V)	125	mJ

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	60			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating T_C = 125°C			1 10	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20V			±1	µA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 5 A		0.18	0.20	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 25 V I_D=5 A	2	5		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25 V f = 1 MHz V_{GS} = 0		850 230 75		pF pF pF

Electrical Characteristics (Continued)……

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 30 V I_D = 5 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		20 40		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 48 V I_D= 10 A V_{GS}= 10 V		16 4 6	21	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 30 V I_D = 5 A R_G = 4.7Ω, V_{GS} = 10 V (Resistive Load, Figure 3)		40 10		ns ns
$t_{r(Voff)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	V_{clamp} = 48 V I_D = 10 A R_G = 4.7Ω, V_{GS} = 10 V (Inductive Load, Figure 5)		10 17 30		ns ns ns

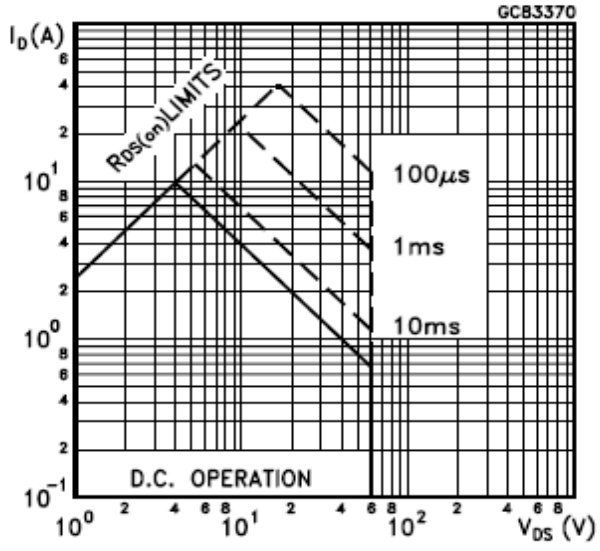
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				10 40	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 10 A V_{GS} = 0			2.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 10 A di/dt = 100A/µs V_{DD} = 30 V T_j = 150°C (see test circuit, Figure 5)		100 260 5.2		ns µC A

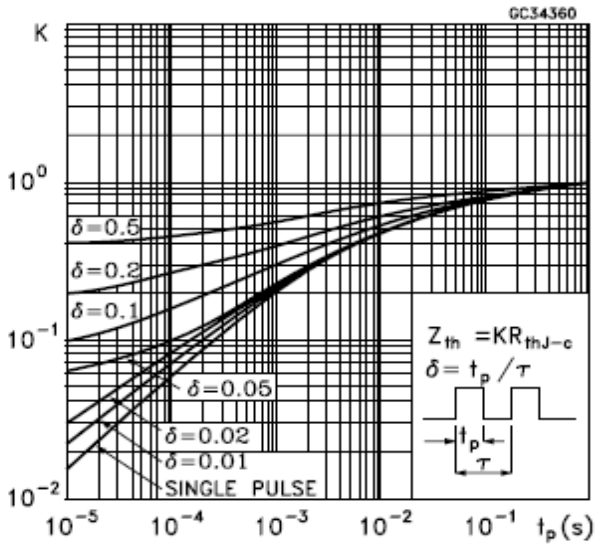
(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

Typical Electrical And Thermal Characteristics

Safe Operating Area

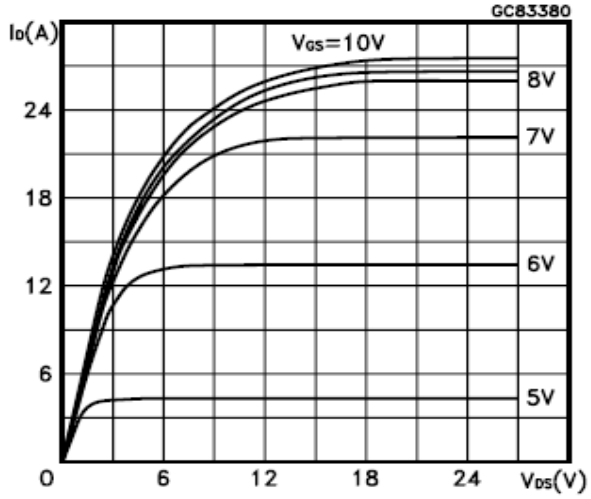


Thermal Impedance

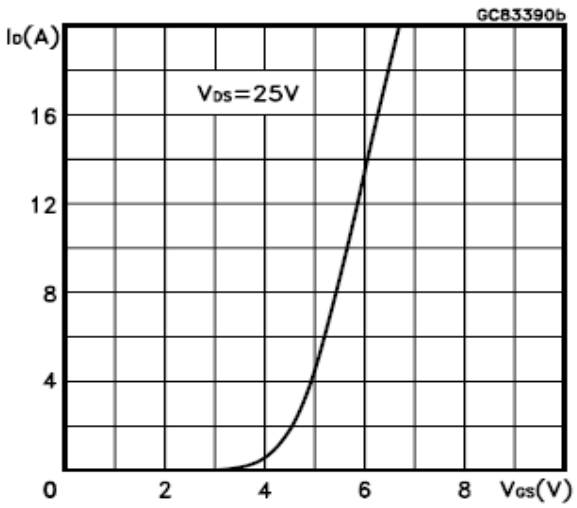


Typical Electrical And Thermal Characteristics (Cont.)

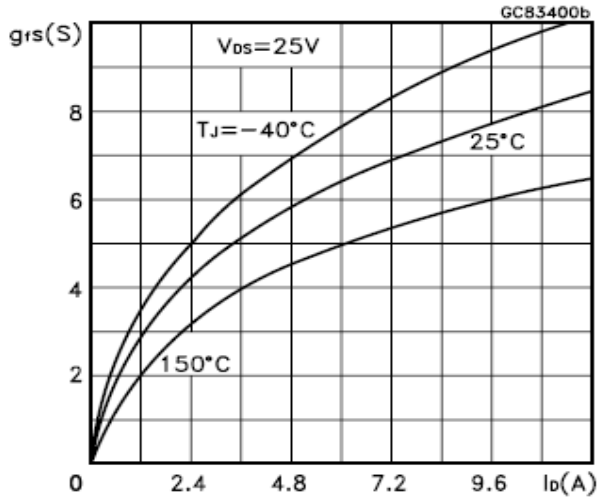
Output Characteristics



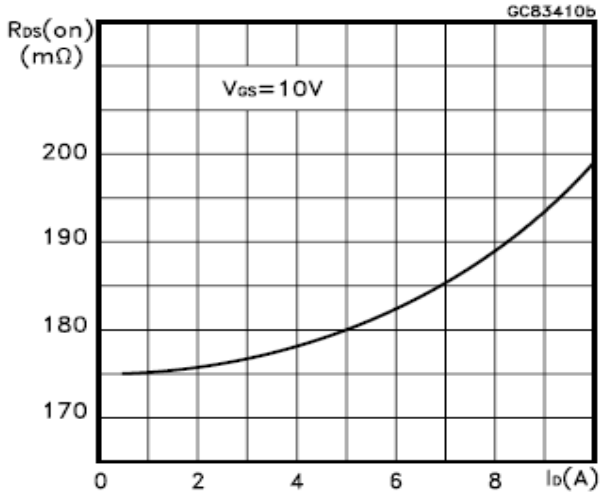
Transfer Characteristics



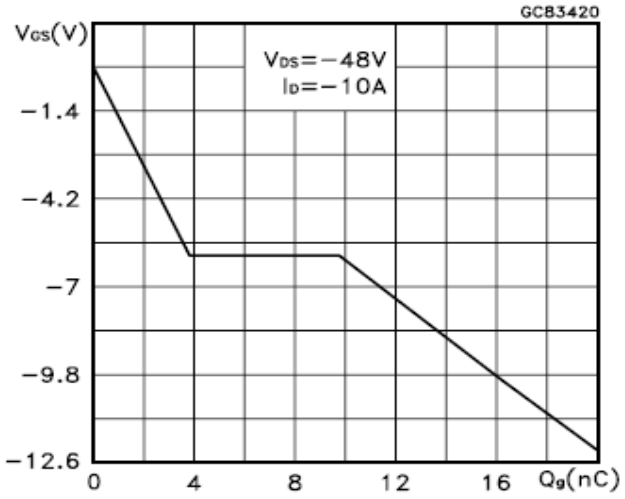
Transconductance



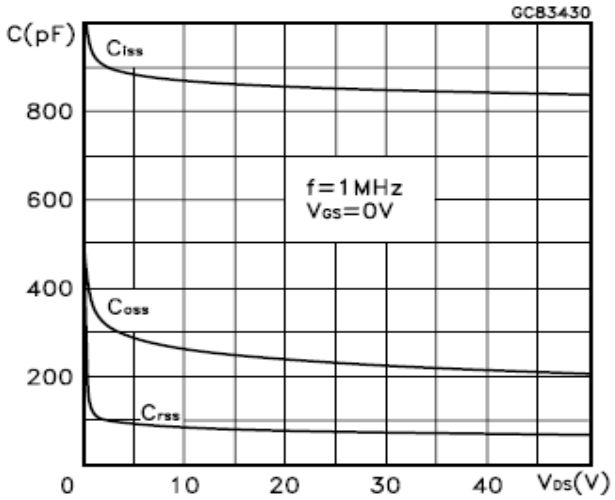
Static Drain-source On Resistance



Gate Charge vs Gate-source Voltage

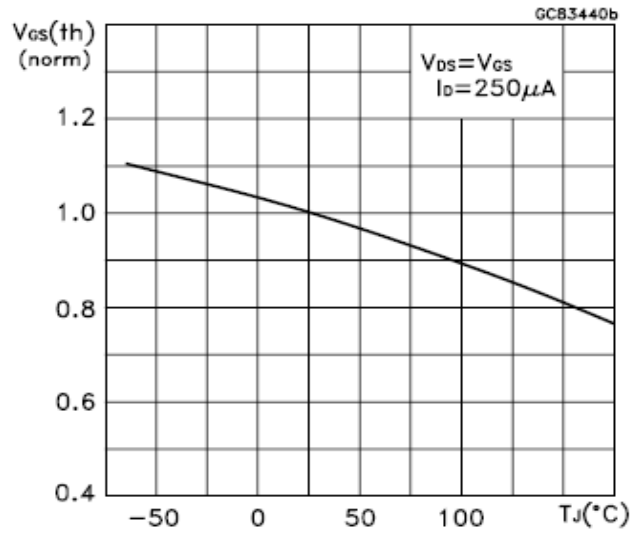


Capacitance Variations

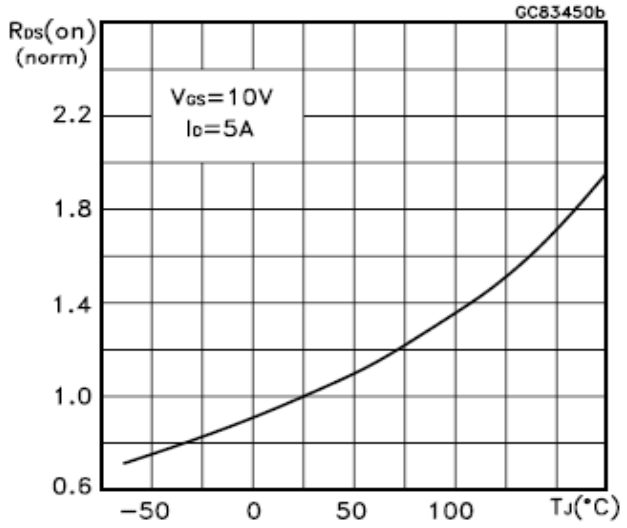


Typical Electrical And Thermal Characteristics (Cont.)

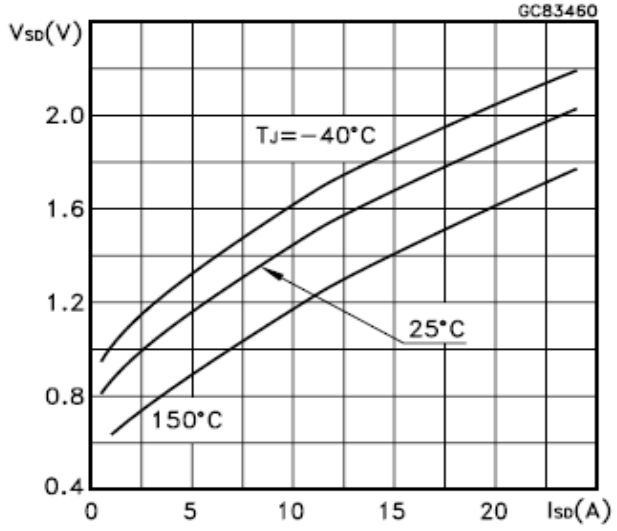
Normalized Gate Threshold Voltage vs Temperature



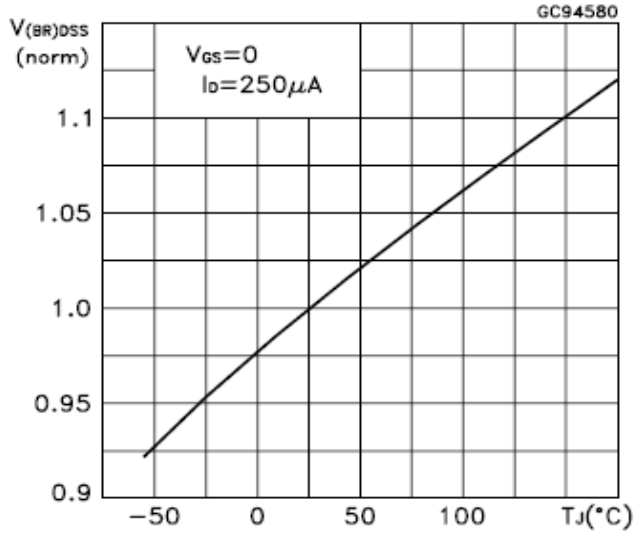
Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage Temperature



TEST CIRCUITS

Fig. 1: Unclamped Inductive Load Test Circuit

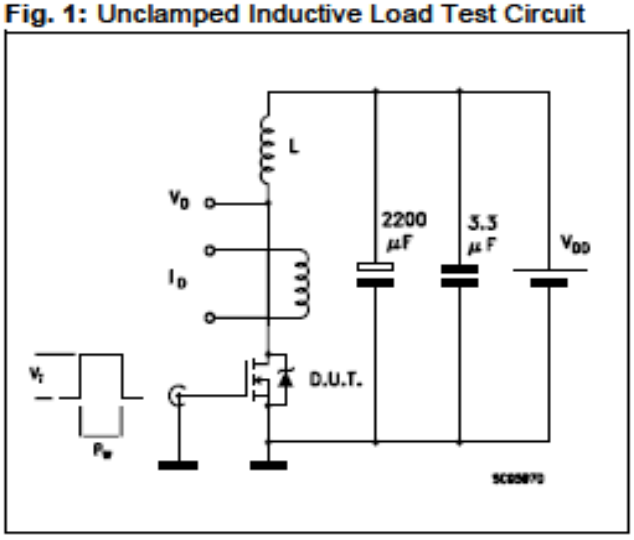


Fig. 2: Unclamped Inductive Waveform

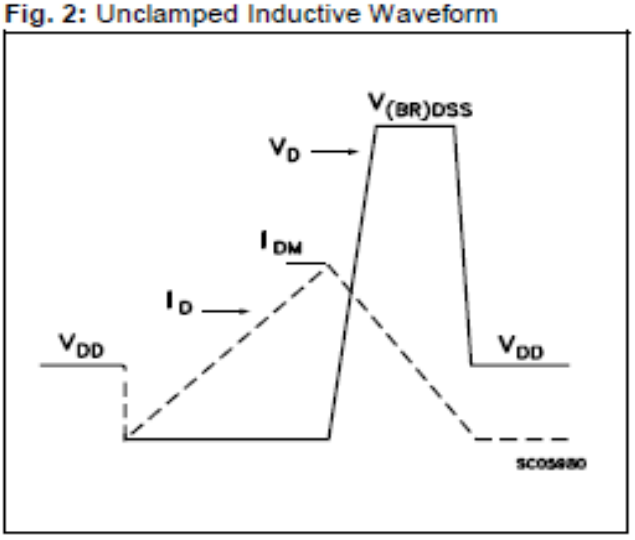


Fig. 3: Switching Times Test Circuits For Resistive Load

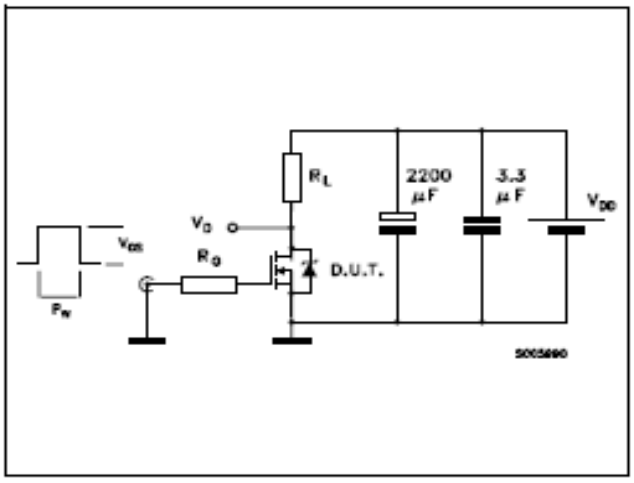


Fig. 4: Gate Charge test Circuit

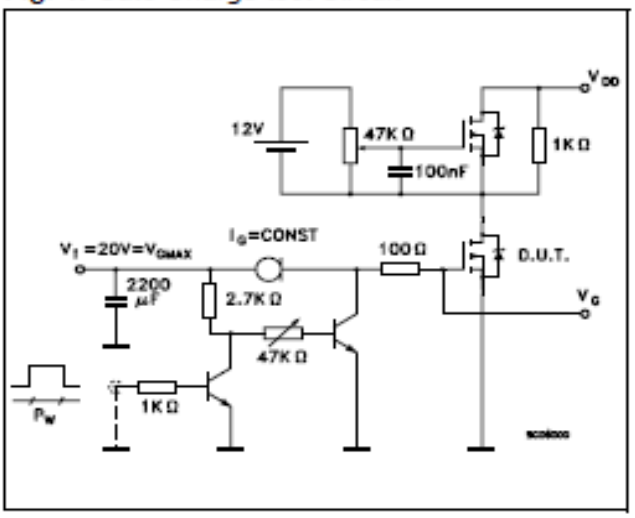
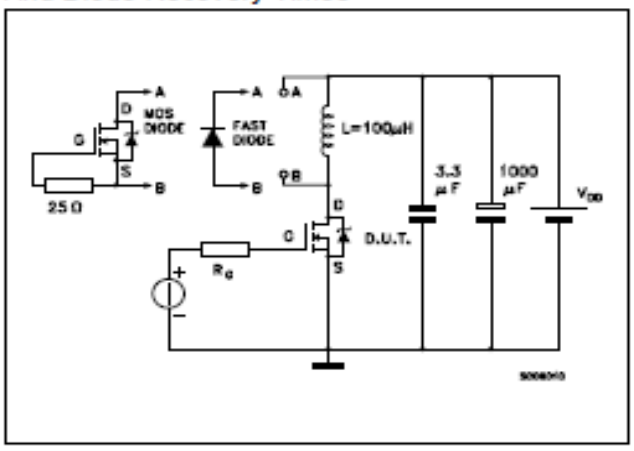
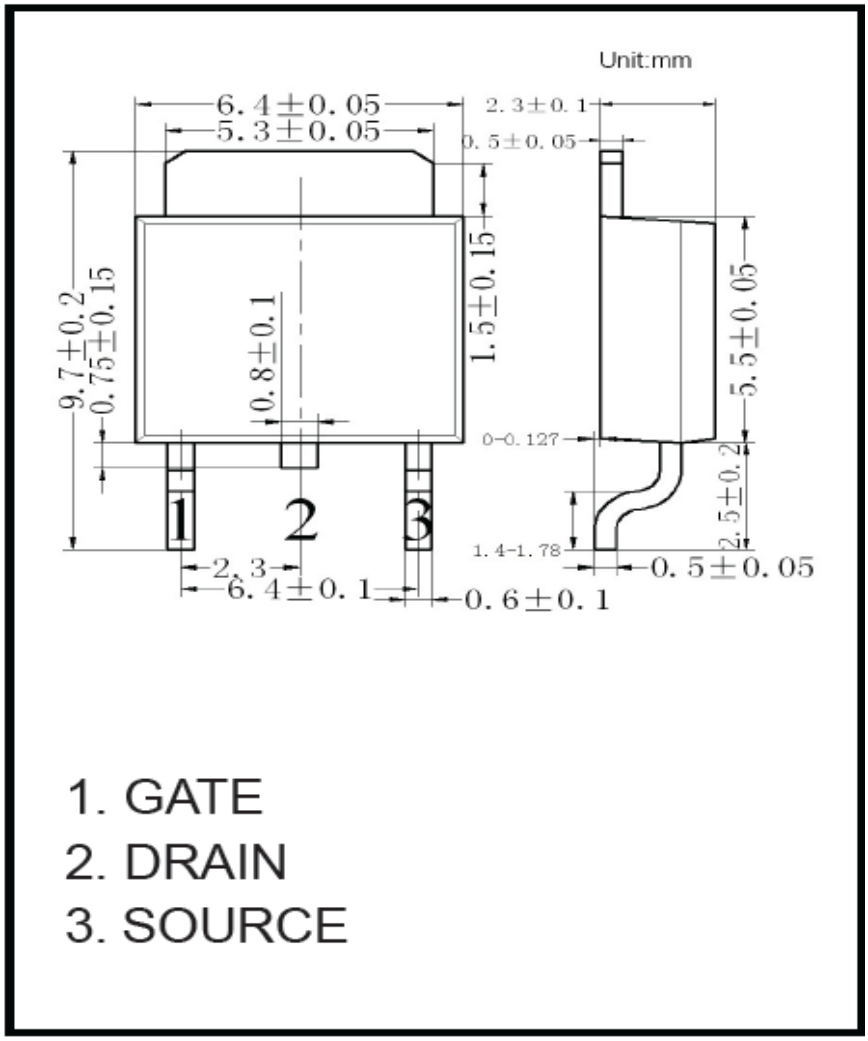


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



Package dimensions



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 you 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) mee functionality parameters for your application. The information furnished 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 individua Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their owr risk and CDIL will not be responsible for any damages resulting from such sale(s).

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