

## Features

- Uses CRM advanced Trench technology
- Extremely low on-resistance  $R_{DS(on)}$
- Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- Qualified according to JEDEC criteria

## Applications

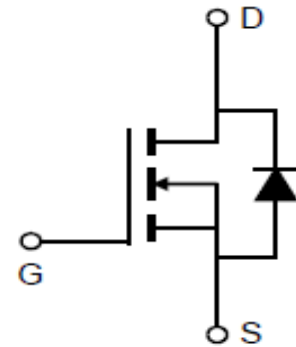
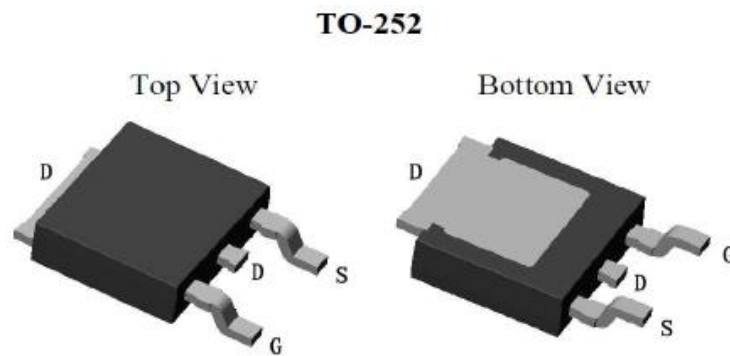
- Motor control and drive
- Electrical tools
- Lithium battery protection

## Product Summary

$V_{DS}$	60V
$R_{DS(on)}$ typ.	6.5mΩ
$I_D$ (Silicon limit)	85A

**100% DVDS Tested**

**100% Avalanche Tested**



## Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTD085N06N2-G	T085N06N2	TO-252	Reel	N/A	N/A	2500pcs

## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	60	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) <sup>a1</sup> $T_C = 25^\circ\text{C}$ (Package limit) <sup>a1</sup> $T_C = 100^\circ\text{C}$ (Silicon limit)	$I_D$	85 60 56	A
Pulsed drain current ( $T_C = 25^\circ\text{C}$ , $t_p$ limited by $T_{jmax}$ )	$I_{D\ pulse}$	240	A
Avalanche energy, single pulse (L=0.5mH)	$E_{AS}$	272	mJ
Gate-Source voltage	$V_{GS}$	±20	V
Power dissipation ( $T_C = 25^\circ\text{C}$ )	$P_{tot}$	104	W
Operating junction and storage temperature	$T_j, T_{stg}$	-55...+150	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	$T_{sold}$	260	°C

**Thermal Resistance**

Parameter	Symbol	Typ	Max	Unit
Thermal resistance, junction – case.	$R_{thJC}$	-	1.2	°C/W
Thermal resistance, junction – ambient(min. footprint)	$R_{thJA}^{a2}$	-	62.5	

**Electrical Characteristic (at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified)**

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

**Static Characteristic**

Drain-source breakdown voltage	$BV_{DSS}$	60	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.5	3	3.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	$I_{DSS}$	-	-	1 100	$\mu A$	$V_{DS}=60V, V_{GS}=0V$ $T_j=25^\circ C$ $T_j=150^\circ C$
Gate-source leakage current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	6.5	8.3	$m\Omega$	$T_j=25^\circ C$ $V_{GS}=10V, I_D=19A$
Transconductance	$g_{fs}$		22		S	$V_{DS}=5V, I_D=19A$

**Dynamic Characteristic**

Input Capacitance	$C_{iss}$	-	3582	-	$\mu F$	$V_{GS}=0V, V_{DS}=30V$ $f=1MHz$
Output Capacitance	$C_{oss}$	-	228	-		
Reverse Transfer Capacitance	$C_{rss}$	-	210	-		
Gate Total Charge	$Q_g$	-	68.95	-	nC	$V_{GS}=10V, V_{DS}=30V$ $I_D=20A, f=1MHz$
Gate-Source charge	$Q_{gs}$	-	16.2	-		
Gate-Drain charge	$Q_{gd}$	-	21.5	-		
Turn-on delay time	$t_{d(on)}$	-	20.8	-	ns	$V_{GS}=10V,$ $V_{DS}=30V$ $RG=3.0\Omega,$ $ID=20A$
Rise time	$t_r$	-	22.6	-		
Turn-off delay time	$t_{d(off)}$	-	73.5	-		
Fall time	$t_f$	-	23.5	-		
Gate resistance	$R_G$	-	5	-	$\Omega$	$V_{GS}=0V, V_{DS}=0V, f=1MHz$

## Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	$V_{SD}$	-	-	1.2	V	$V_{GS}=0V, I_{SD}=20A$
Body Diode Continuous Forward Current	$I_S$	-	-	60	A	$T_C = 25^{\circ}C$
Body Diode Reverse Recovery Time	$t_{rr}$	-	34.05	-	ns	$I_F=20A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	$Q_{rr}$	-	37.77	-	nC	

a1: Calculated continuous current based on maximum allowable junction temperature. Note that current limitations arising from heating of the device leads may occur with some lead mounting arrangements.

a2: The value of  $R_{thJA}$  is measured by placing the device in a still air box which is one cubic foot.

## Typical Performance Characteristics

Fig 1: Output Characteristics

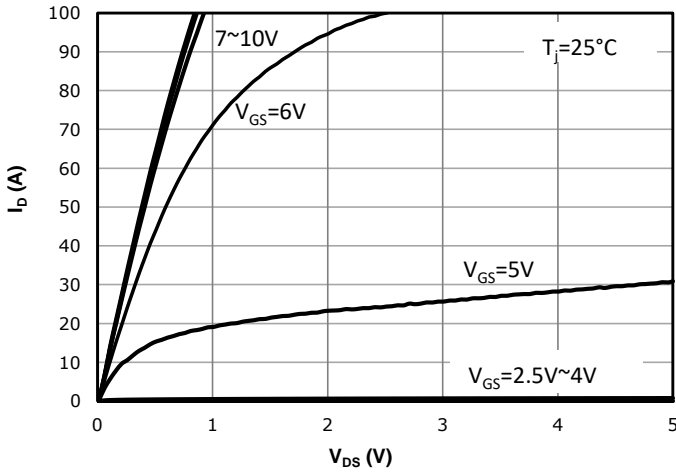


Fig 2: Transfer Characteristics

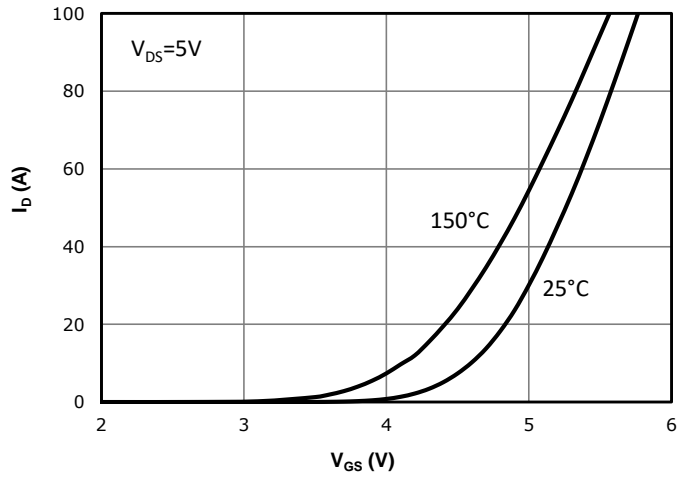


Fig 3:  $R_{DS(on)}$  vs Drain Current and Gate Voltage

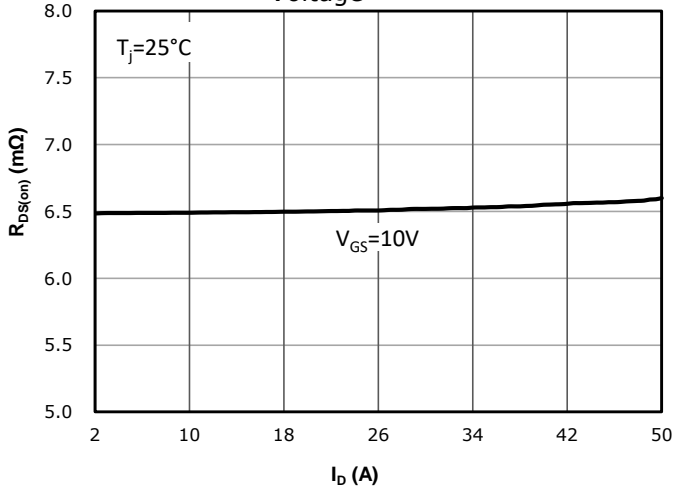


Fig 4:  $R_{DS(on)}$  vs Gate Voltage

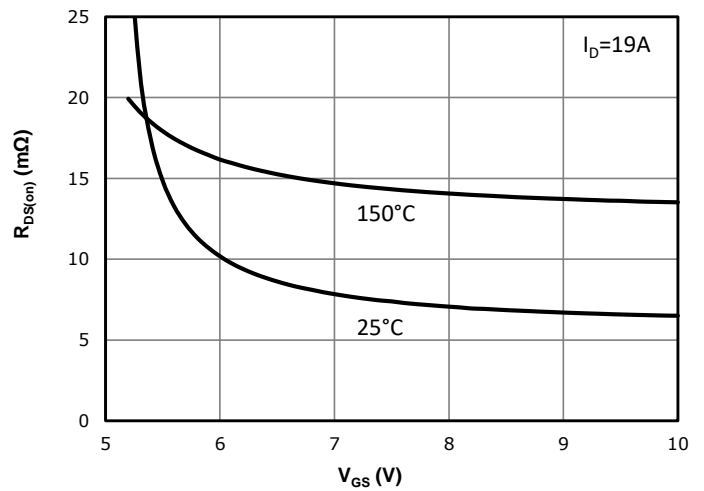


Fig 5:  $R_{DS(on)}$  vs. Temperature

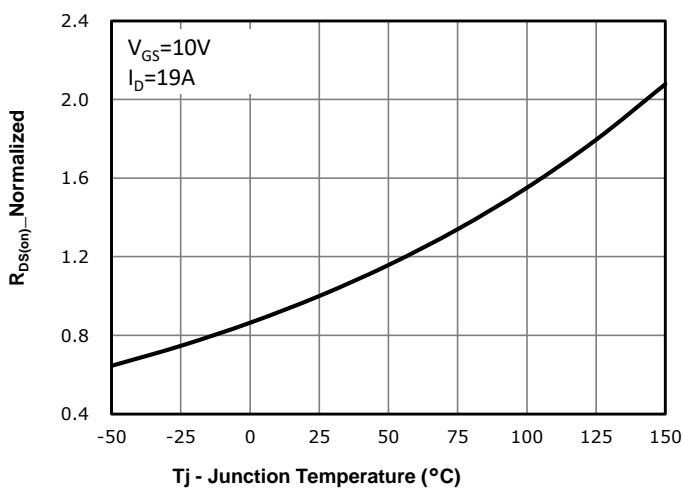


Fig 6:  $V_{GS(th)}$  vs. Temperature

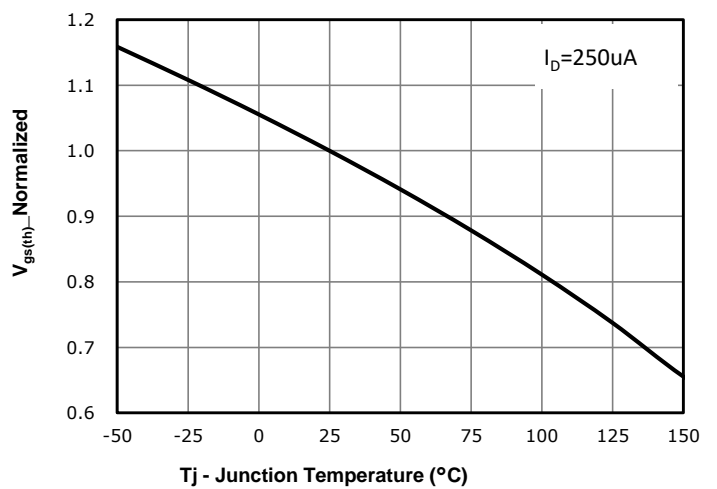


Fig 7: BVdss vs. Temperature

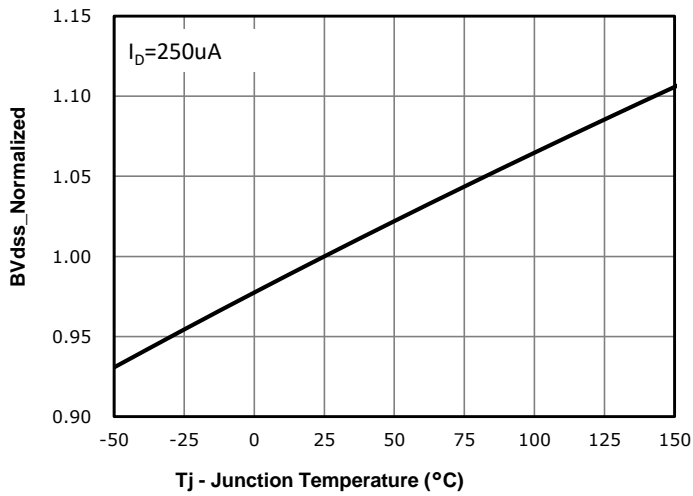


Fig 8: Body-diode Forward Characteristics

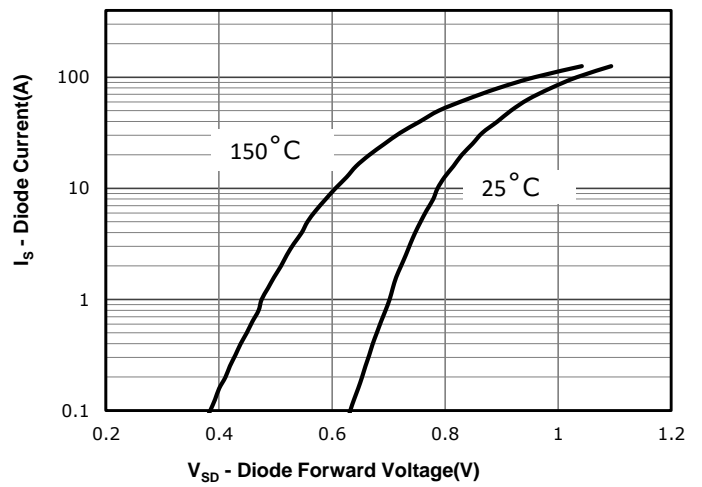


Fig 9: Gate Charge Characteristics

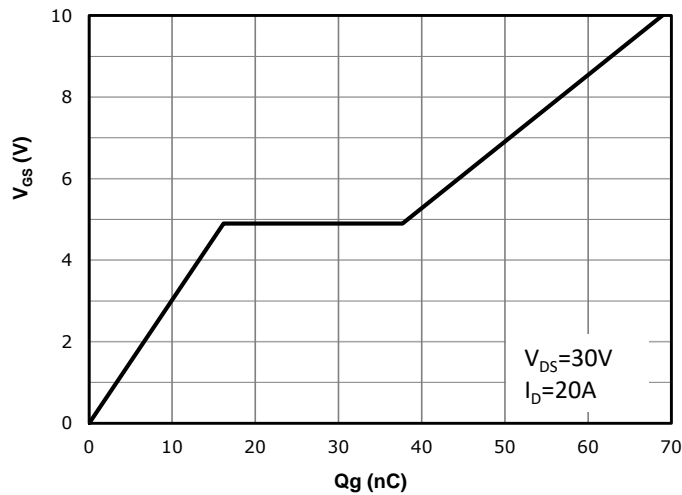


Fig 10: Capacitance Characteristics

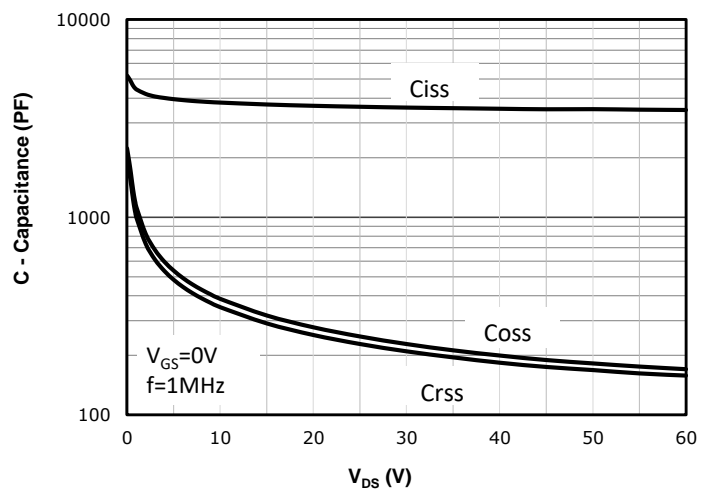


Fig 11: Drain Current Derating

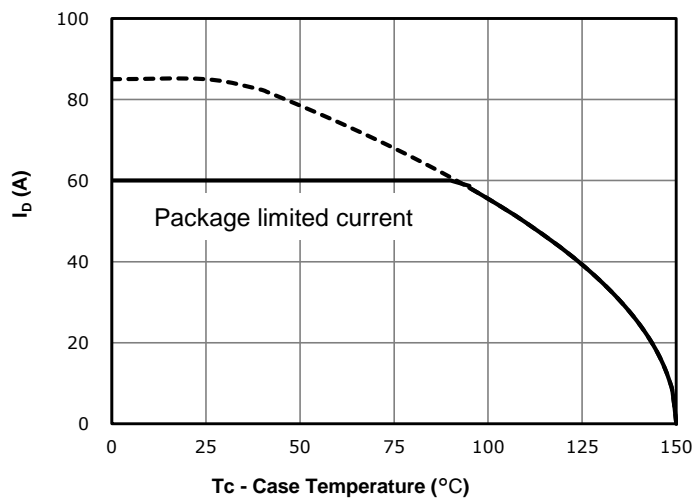


Fig 12: Power Dissipation

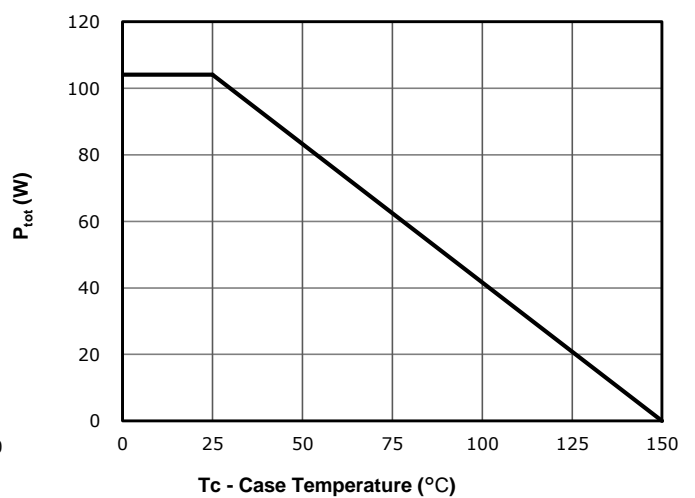


Fig 13: Safe Operating Area

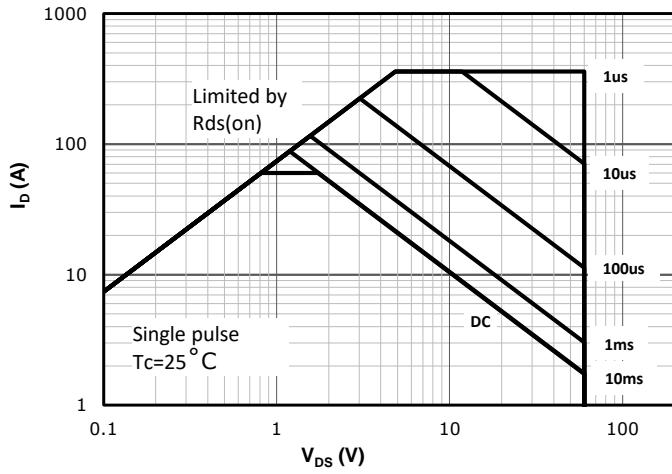
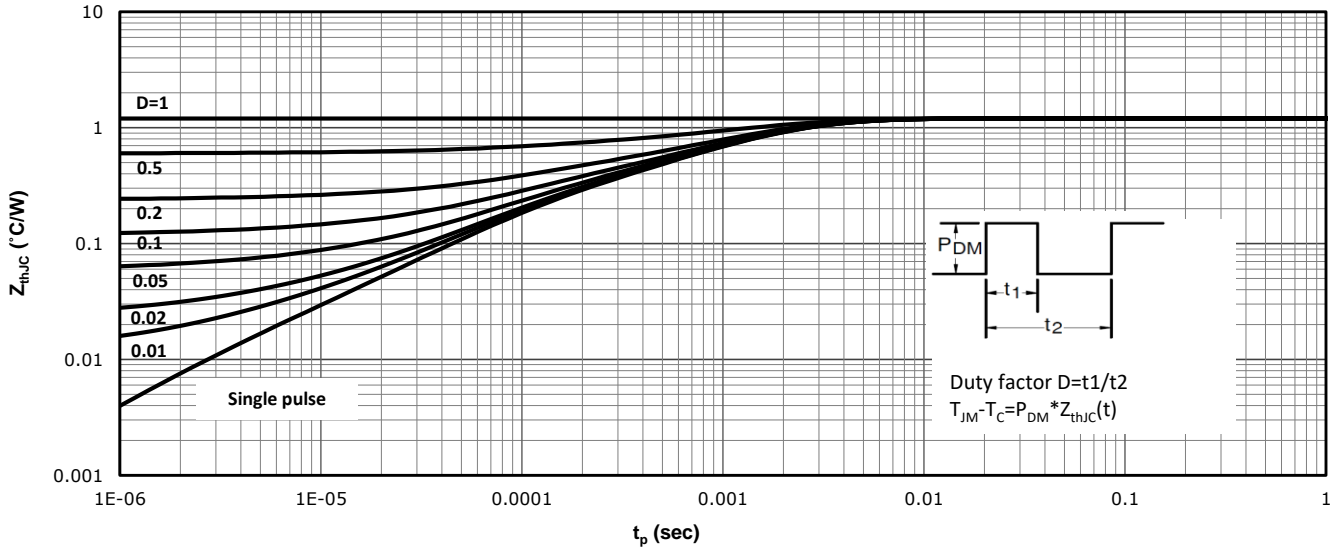
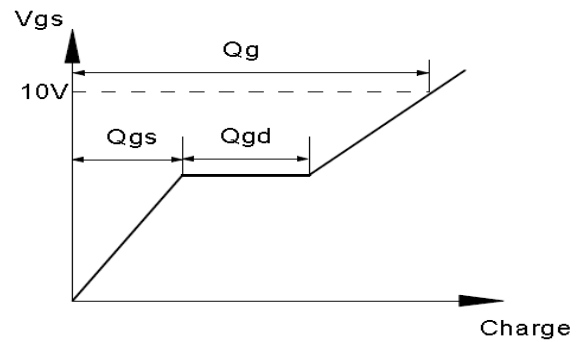
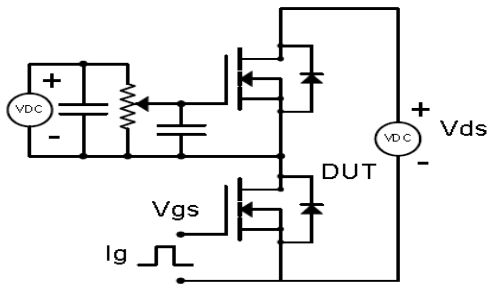


Fig 14: Max. Transient Thermal Impedance

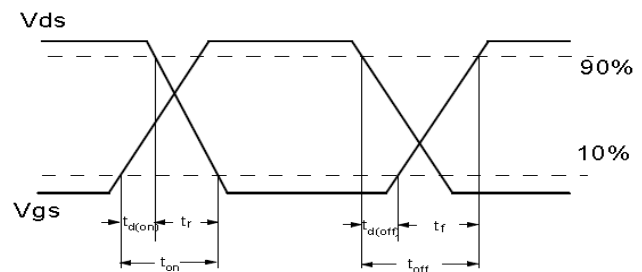
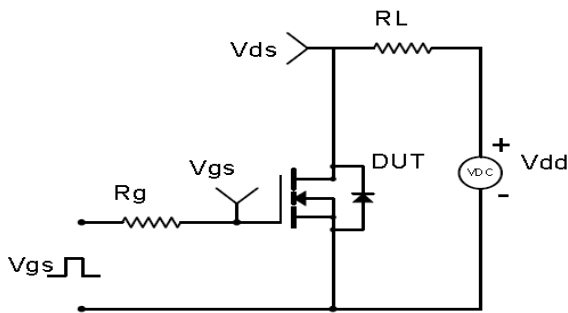


## Test Circuit & Waveform

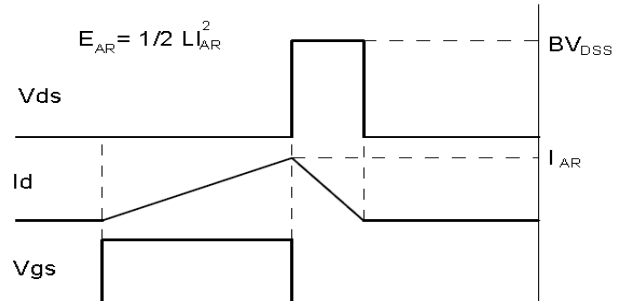
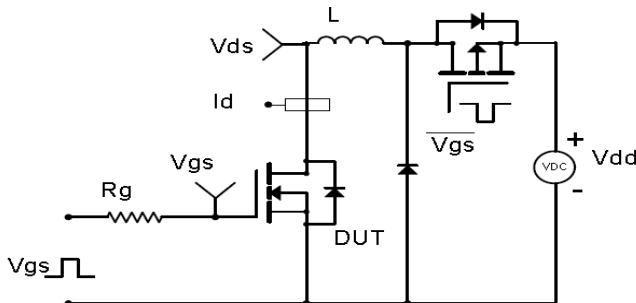
Gate Charge Test Circuit & Waveform



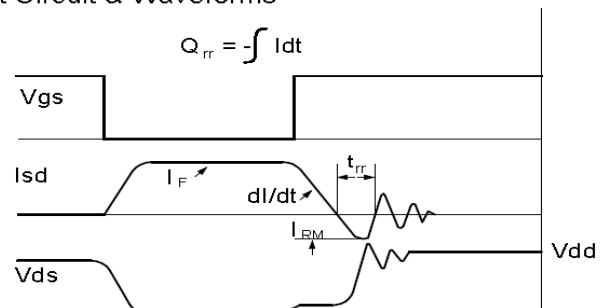
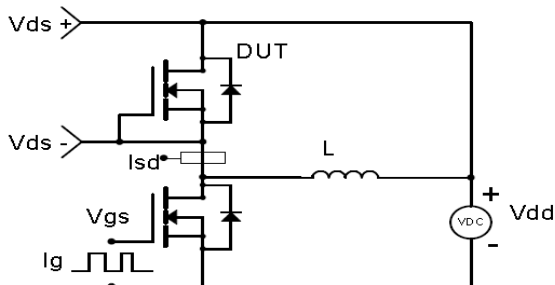
Resistive Switching Test Circuit & Waveforms



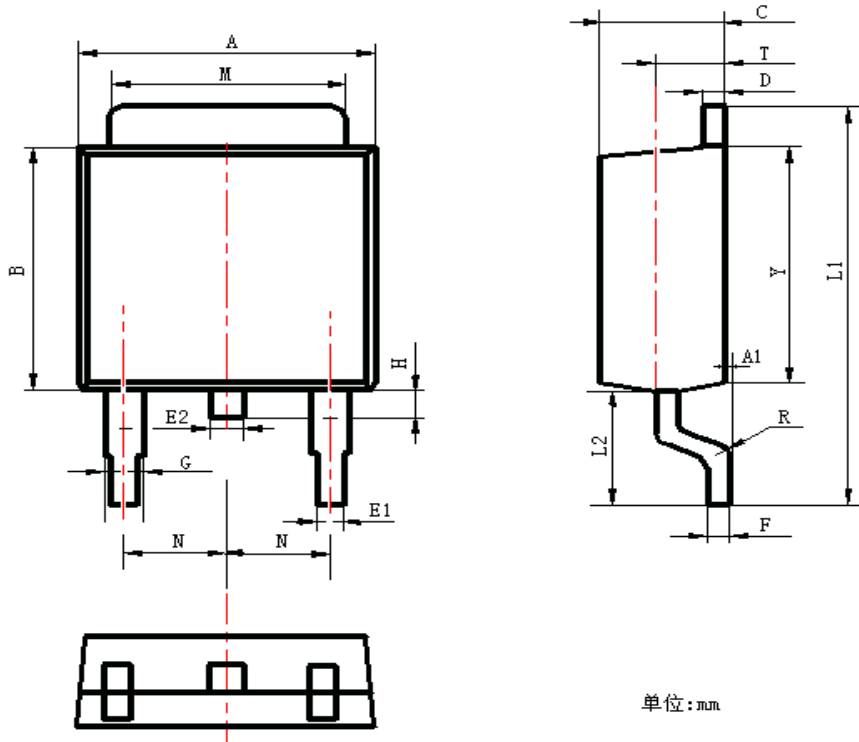
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



## Package Outline: TO-252

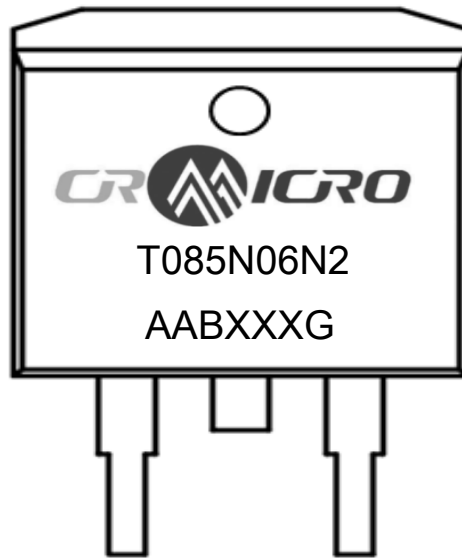


单位: mm

Symbol	Values(mm)	
	Min.	Max.
A	6.30	6.90
A1	0.00	0.16
B	5.70	6.30
C	2.10	2.50
D	0.30	0.70
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.40	1.00
M	5.10	5.50
N	2.09	2.49
R	0.30	
T	1.40	1.60
Y	5.10	6.30



## Marking



NOTE:  
AABXXXG  
AA —cycle code  
B —Fab code  
XXX —Assembly lot code

## Revision History

Revision	Date	Major changes
1.0	2022/9/9	Initial Release
2.0	2022/10/14	Modify the QG test condition
3.0		

## Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

CRM reserves the right to improve product design, function and reliability without notice.

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