

Description

Features

- SGT LV MOSFET technology
- Excellent $Q_g \cdot R_{on}$ product(FOM)
- Extremely low on-resistance(R_{on})

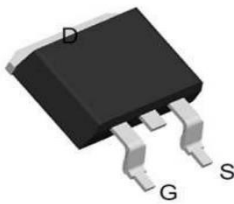
Application

- Motor drive and control
- High current switching
- UPS

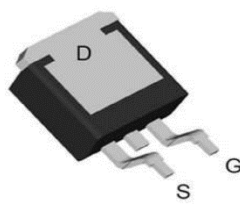
V_{DS}	95	V
$R_{ds(on),typ}@V_{gs}=10V$	4.8	m Ω
I_D	130	A



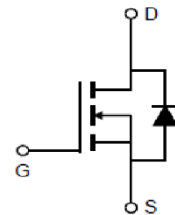
Top View



Bottom View



Pin Configuration



Package Marking and Ordering Information

Part	Marking	Package	Packing	Reel Size	Tape Width	Qty
CMS050H09U	S050H09U	TO252	Reel	NA	NA	2500pcs

Key Performance Parameters

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	95	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@T_c=25^\circ C}$	Continuous Drain Current, $V_{GS}=10V$	130	A
$I_{D@T_c=100^\circ C}$	Continuous Drain Current, $V_{GS}=10V$	85	A
IDM	Pulsed Drain Current	420	A
EAS	Single Pulse Avalanche Energy	456	mJ
$PD@T_c=25^\circ C$	Total Power Dissipation	138	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_j	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ	Max	Units
R _{θJA}	Thermal Resistance Junction-Ambient	62	70	°C/W
R _{θJC}	Thermal Resistance Junction-Case	0.75	0.9	°C/W

Electrical Characteristics (T_J=25 °C, Unless otherwise noted)

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
BVDSS	Drain-Source Breakdown Voltage	95	--	--	V	V _{GS} =0V, I _D =250uA
R _{DS(ON)}	Static Drain-Source On-Resistance	--	4.8	5.3	mΩ	V _{GS} =10V, I _D =50A
V _{GS(th)}	Gate Threshold Voltage	2	3	4	V	V _{GS} =V _{DS} , I _D =250uA
IDSS	Drain-Source Leakage Current	--	--	1	uA	V _{DS} =95V, V _{GS} =0V, T _J =25°C
		--	--	10	uA	V _{DS} =72V, V _{GS} =0V, T _J =125°C
IGSS	Gate-Source Leakage Current	--	--	±100	nA	V _{GS} =±20V, V _{DS} =0V
g _{fs}	Forward Transconductance	--	120	--	S	V _{DS} =10V, I _D =50A
R _g	Gate Resistance	--	1.8	--	Ω	V _{DS} =0V, V _{GS} =0V, f=1MHz
Q _g	Total Gate Charge	--	68.3	--	nC	V _{DS} =50V, V _{GS} =10V, I _D =50A
Q _{gs}	Gate-Source Charge	--	19.6	--		
Q _{gd}	Gate-Drain Charge	--	20.7	--		
T _{d(on)}	Turn-On Delay Time	--	21	--	ns	V _{DD} =50V, V _{GS} =10V, R _G =3Ω I _D =50A
T _r	Rise Time	--	57	--		
T _{d(off)}	Turn-Off Delay Time	--	44	--		
T _f	Fall Time	--	27	--		
C _{iss}	Input Capacitance	--	4051	--	pF	V _{DS} =50V, V _{GS} =0V, f=1MHz
C _{oss}	Output Capacitance	--	597	--		
C _{rss}	Reverse Transfer Capacitance	--	19	--		

Diode Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	--	--	130	A
I _{sm}	Pulsed Source Current		--	--	420	A
T _{rr}	Body Diode Reverse Recovery Time	I _F =50A, di/dt=100A/us	--	70	--	ns
Q _{rr}	Body Diode Reverse Recovery Charge		--	135	--	nC
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =50A, T _J =25°C	--	--	1.4	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.
4. The EAS data shows Max. rating. The test condition is V_{DD}=50V, V_{GS}=10V, L=0.5mH.

Typical Performance Characteristics

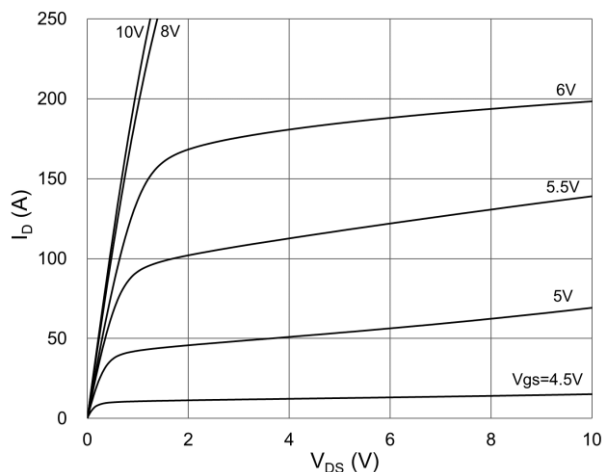
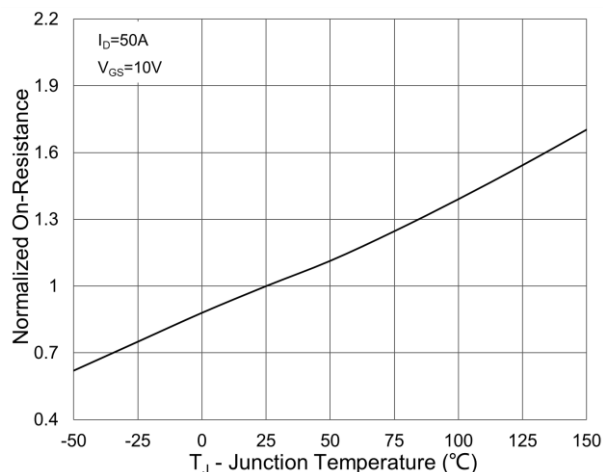
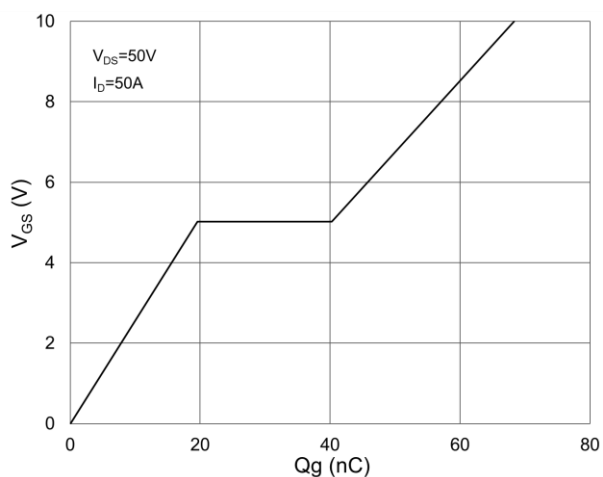
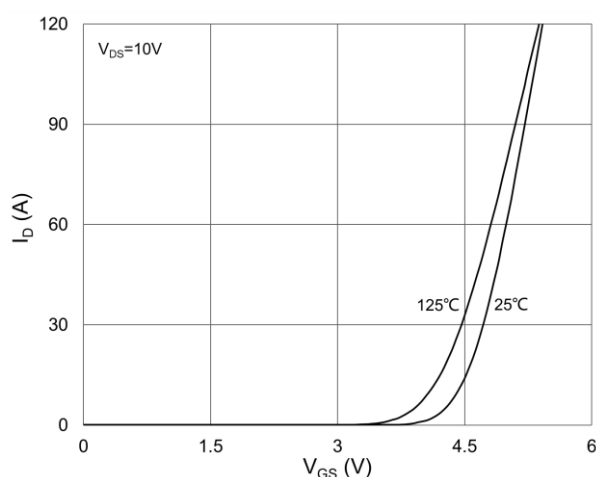
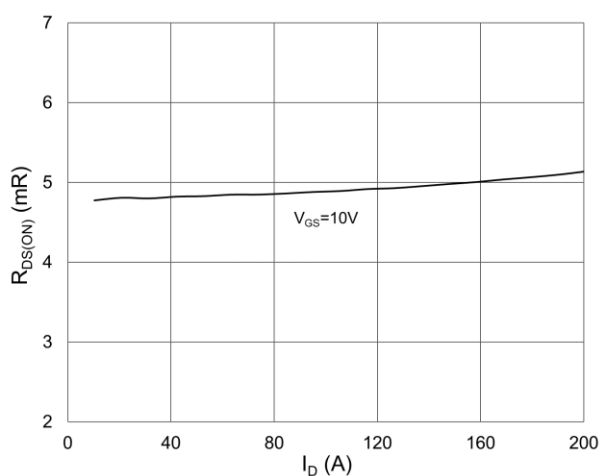
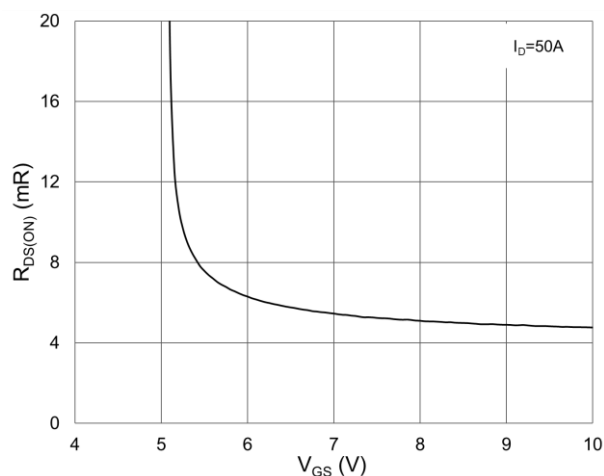
Fig1 Output Characteristics

Fig2 Normalized $R_{DS(on)}$ vs. T_J

Fig3 Gate Charge Waveform

Fig4 Transfer Characteristics

Fig5 $R_{DS(on)}$ vs. Drain Current and Gate Voltage

Fig6 $R_{DS(on)}$ vs. Gate Voltage


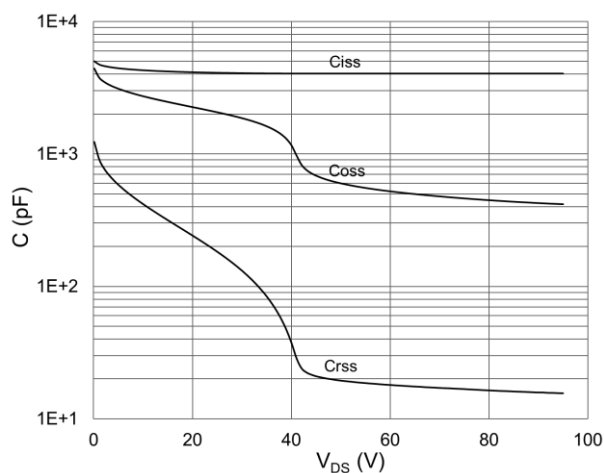
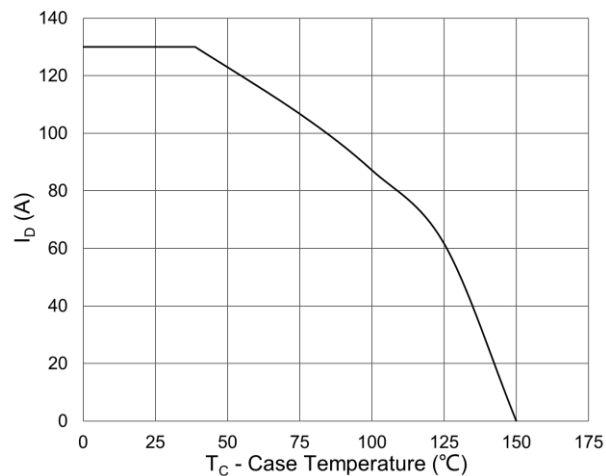
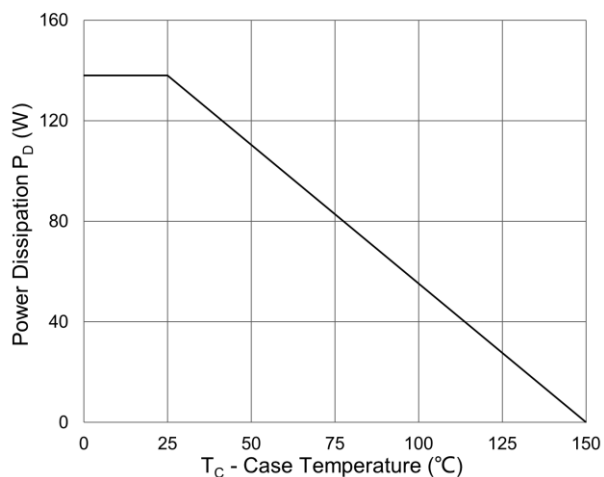
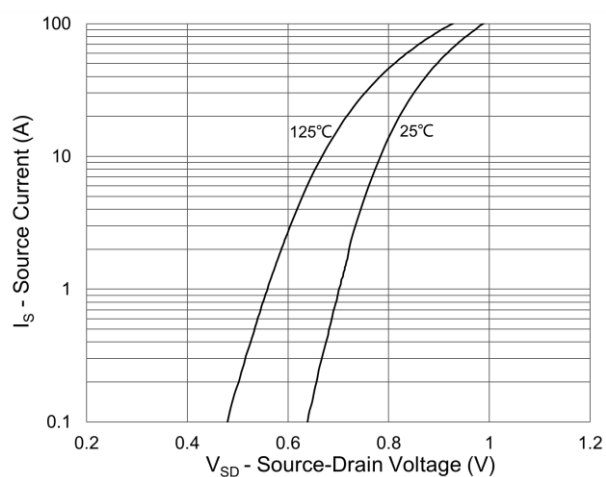
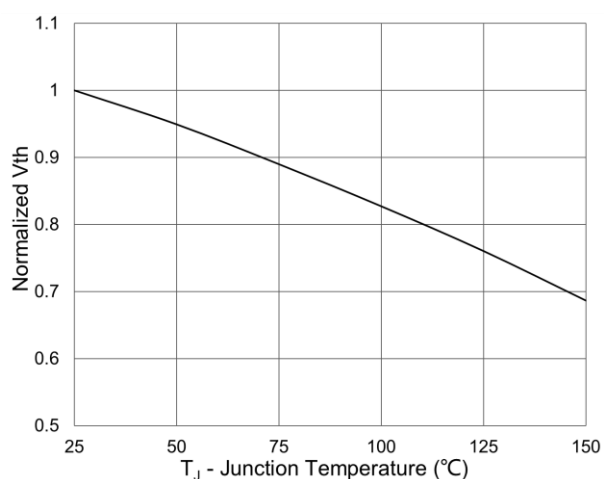
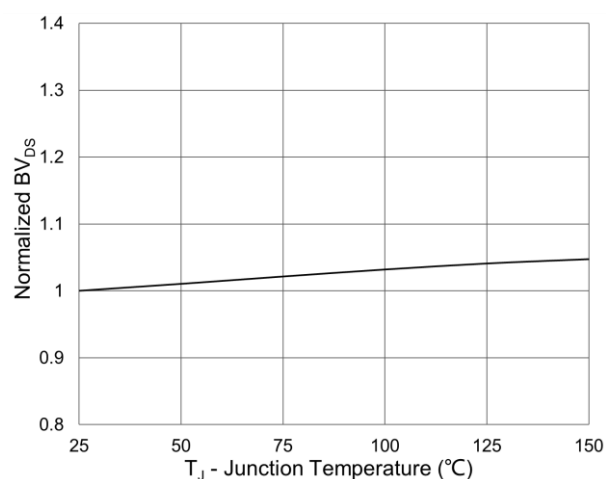
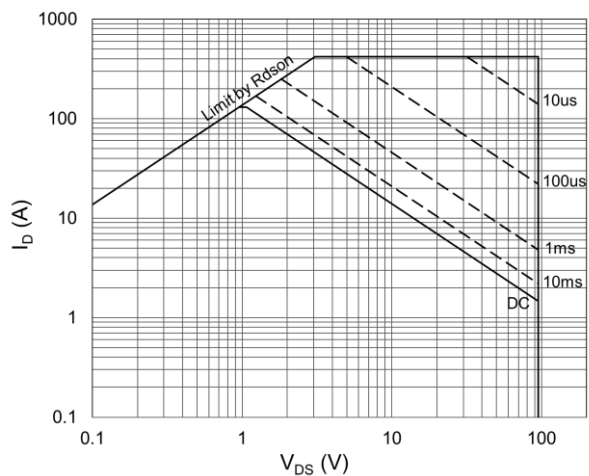
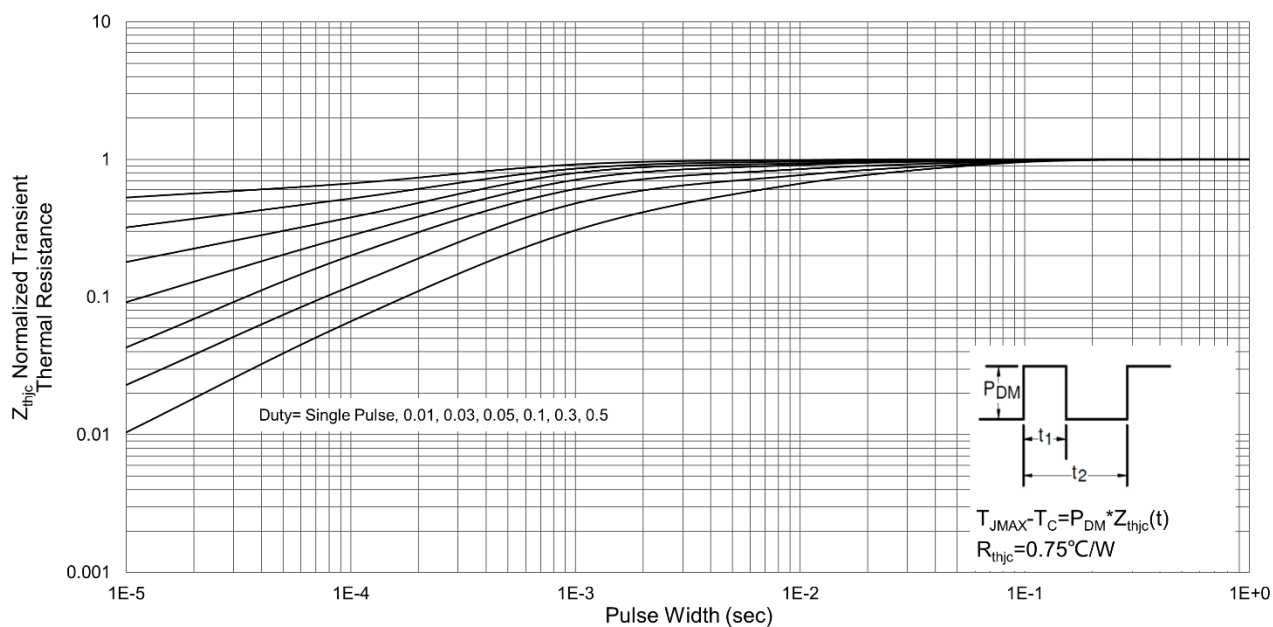
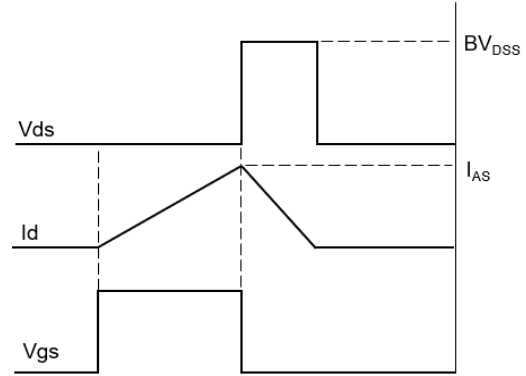
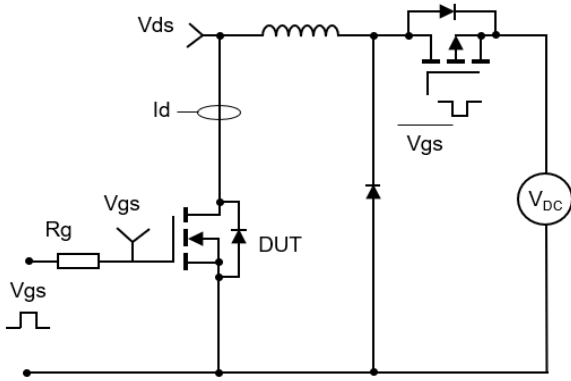
Fig7 Capacitance Characteristics

Fig8 Drain Current Derating

Fig9 Power Dissipation

Fig10 Source-Drain Diode Forward Characteristics

Fig11 Normalized Threshold Voltage vs. T_J

Fig12 Normalized Breakdown Voltage vs. T_J


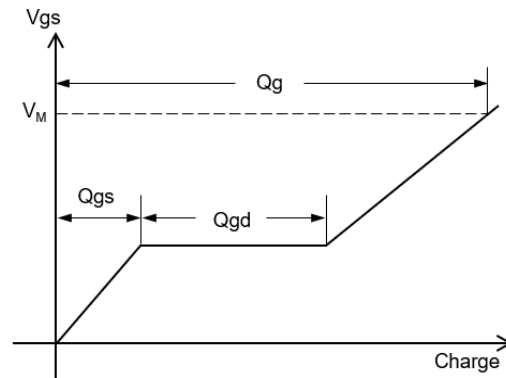
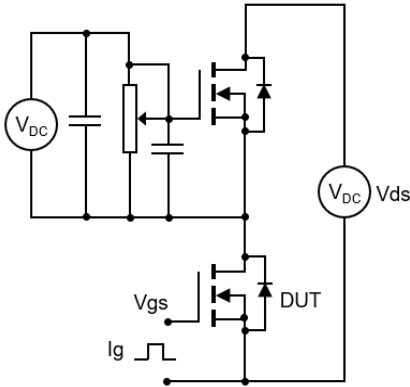
Fig13 Maximum Safe Operation Area

Fig14 Normalized Transient Impedance


Test Circuit & Waveform

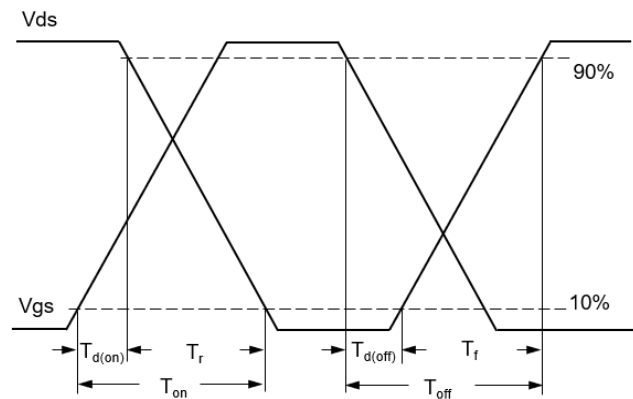
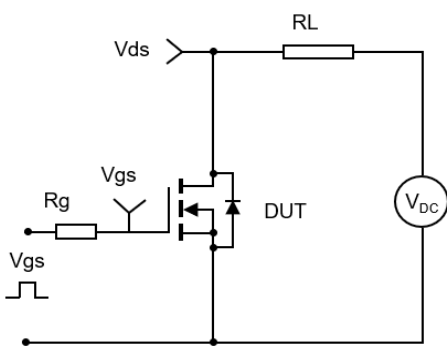
1. Unclamped Inductive Switching Test Circuit & Waveform



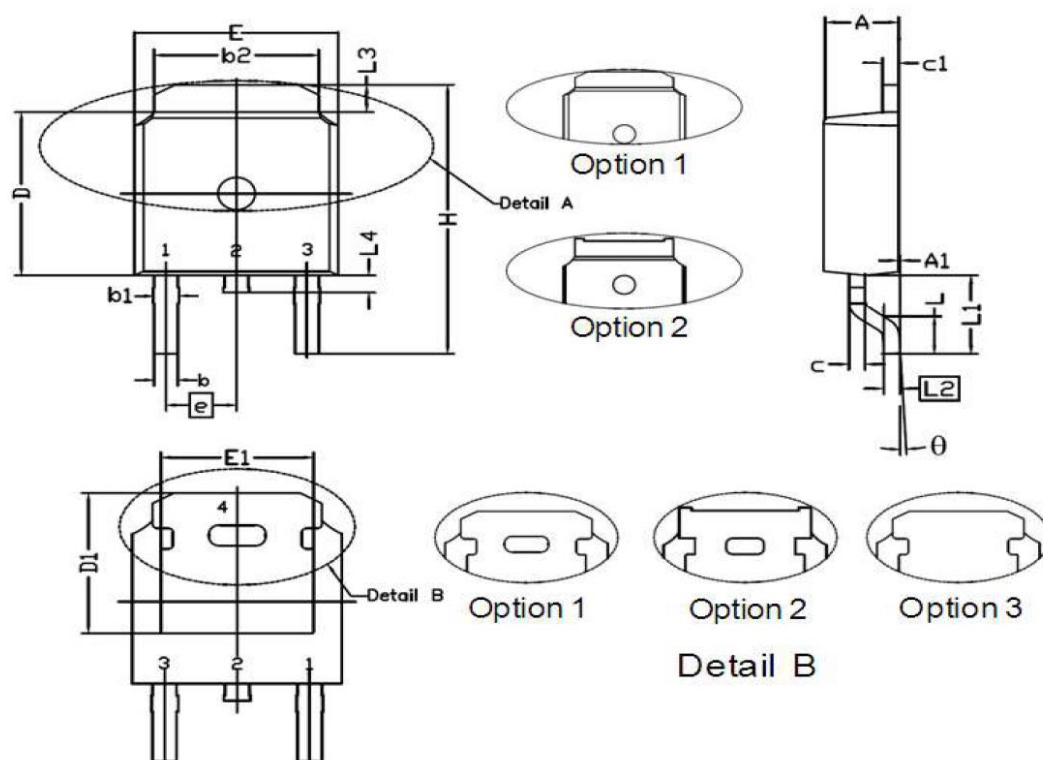
2. Gate Charge Test Circuit & Waveform



3. Resistive Switching Test Circuit & Waveform



TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
A1	0.00	0.15	0.000	0.006
b	0.60	0.91	0.024	0.036
b1	0.65	1.15	0.026	0.045
b2	5.00	5.64	0.197	0.222
c	0.45	0.61	0.018	0.024
c1	0.36	0.66	0.014	0.026
D	5.80	6.30	0.228	0.248
D1	5.21	--	0.205	--
e	2.29 BSC.		0.090 BSC.	
E	6.30	6.90	0.248	0.272
E1	4.40	--	0.173	--
H	9.40	10.48	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.92 REF		0.115 REF	
L2	0.508 BSC.		0.020 BSC.	
L3	0.72	1.35	0.028	0.053
L4	0.60	1.20	0.024	0.047
θ	0°	10°	0°	10°

Revision History

Version	Date	Major changes
1.0	2023/6/15	Release of formal version
1.1	2024/3/11	Marking Change: 050H09 change to S050H09U

Disclaimer

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

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

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