

Description

Features

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

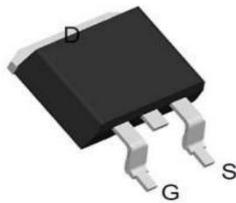
Application

- Battery management
- High current switching application
- Power management

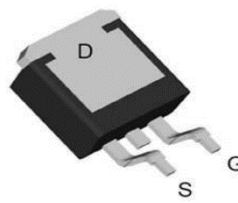
V_{DS}	100	V
$R_{ds(on),typ}@V_{gs}=10V$	3.3	m Ω
I_D	180	A



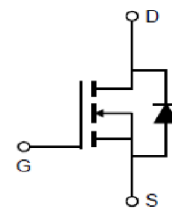
Top View



Bottom View



Pin Configuration



Package Marking and Ordering Information

Part	Marking	Package	Packing	Reel Size	Tape Width	Qty
CMS038H10G	S038H10G	TO-263-2L	Reel	NA	NA	800pcs

Key Performance Parameters

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	$\pm 20V$	V
$I_{D@Tc=25^{\circ}C}$	Continuous Drain Current, $V_{GS}=10V$	180	A
$I_{D@Tc=100^{\circ}C}$	Continuous Drain Current, $V_{GS}=10V$	100	A
IDM	Pulsed Drain Current ¹	480	A
EAS	Single Pulse Avalanche Energy ⁴	552	mJ
$PD@Tc=25^{\circ}C$	Total Power Dissipation	208	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	56	62.5	°C/W
R _{θJC}	Thermal Resistance Junction-Case	0.54	0.6	°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	100	--	--	V	V _{GS} =0V, I _D =250uA
R _{DS(ON)}	Static Drain-Source On-Resistance	--	3.3	3.8	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} =100V, V _{GS} =0V, T _J =25°C
		--	--	10	uA	V _{DS} =80V, V _{GS} =0V, T _J =125°C
IGSS	Gate-Source Leakage Current	--	--	±100	nA	V _{GS} =±20V, V _{DS} =0V
g _{fs}	Forward Transconductance	--	103	--	S	V _{DS} =10V, I _D =50A
R _g	Gate Resistance	--	1.6	--	Ω	V _{DS} =0V, V _{GS} =0V, f=1MHz
Q _g	Total Gate Charge ^{2,3}	--	112	--	nC	V _{DS} =50V, V _{GS} =10V, I _D =50A
Q _{gs}	Gate-Source Charge ^{2,3}	--	35.2	--		
Q _{gd}	Gate-Drain Charge ^{2,3}	--	31.5	--		
T _{d(on)}	Turn-On Delay Time ^{2,3}	--	28	--	ns	V _{DD} =50V, V _{GS} =10V, R _G =3Ω I _D =50A
T _r	Rise Time ^{2,3}	--	27	--		
T _{d(off)}	Turn-Off Delay Time ^{2,3}	--	59	--		
T _f	Fall Time ^{2,3}	--	30	--	pF	V _{DS} =50V, V _{GS} =0V, f=1MHz
C _{iss}	Input Capacitance	--	6792	--		
C _{oss}	Output Capacitance	--	1502	--		
C _{rss}	Reverse Transfer Capacitance	--	56	--		

Diode Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
T _{rr}	Body Diode Reverse Recovery Time	IF=65A, di/dt=150A/us	--	70	--	ns
Q _{rr}	Body Diode Reverse Recovery Charge		--	237	--	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

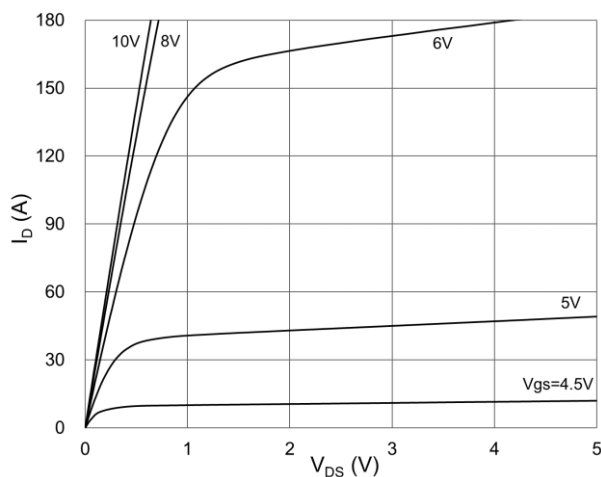
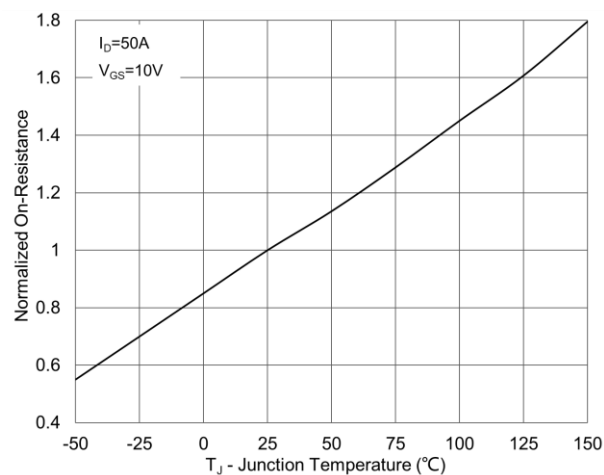
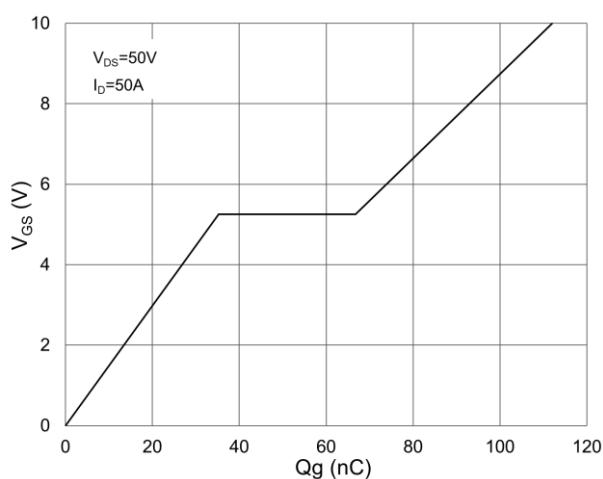
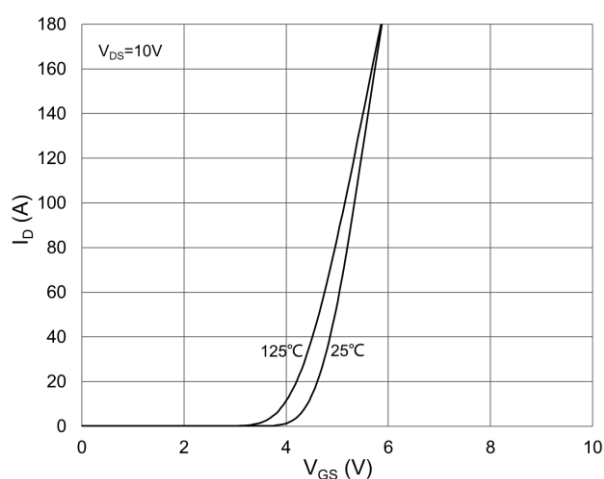
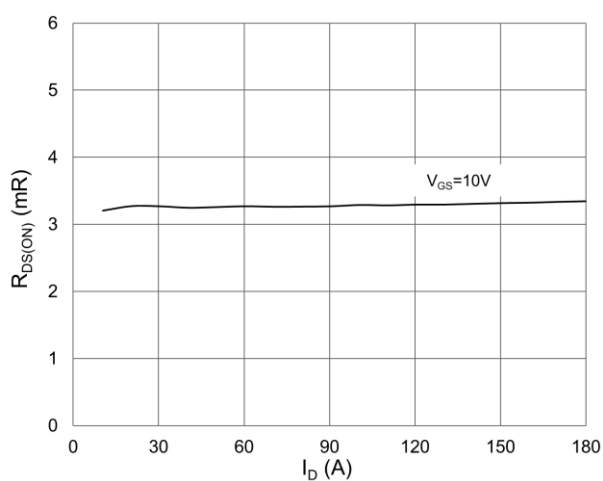
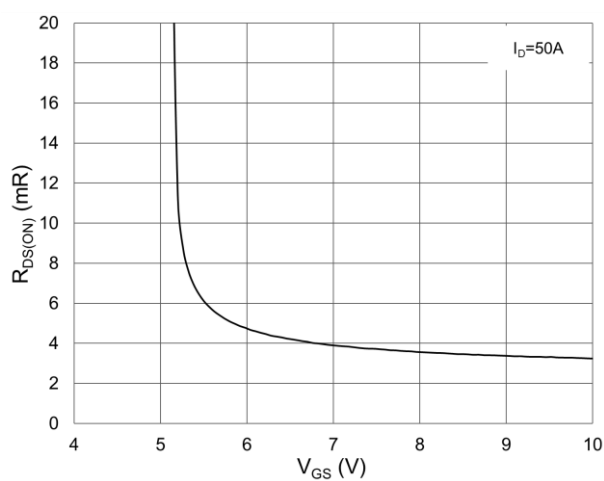
Fig1 Output Characteristics

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


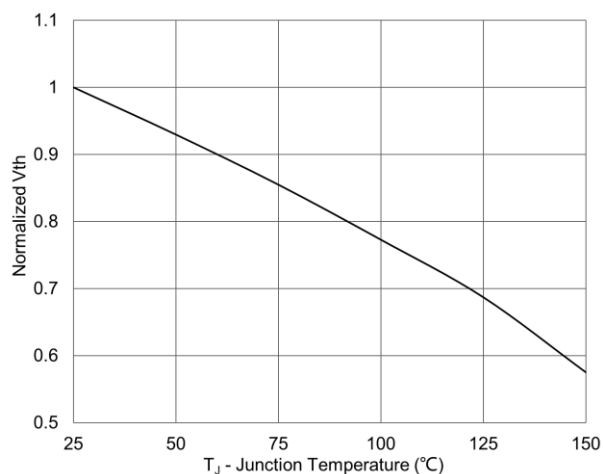
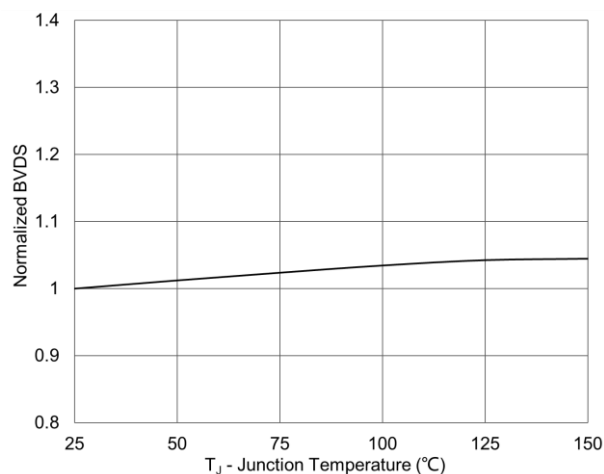
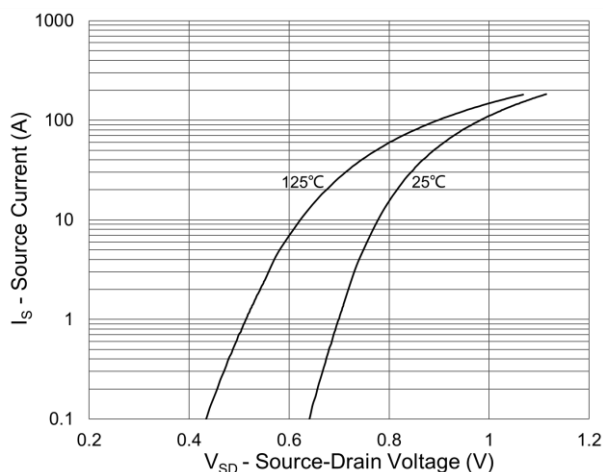
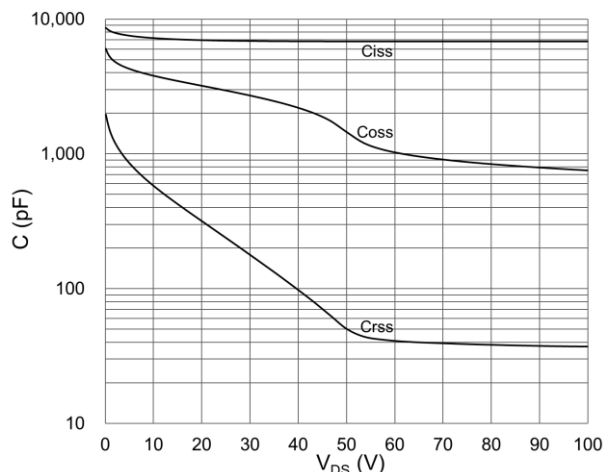
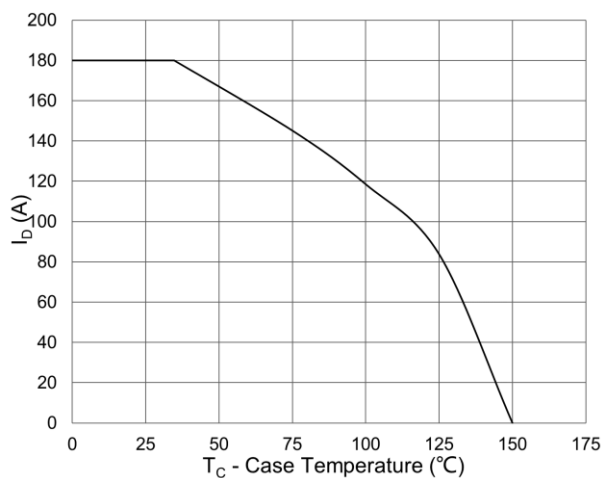
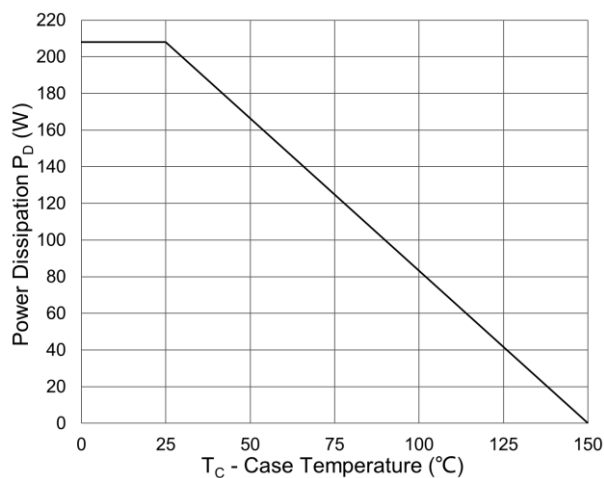
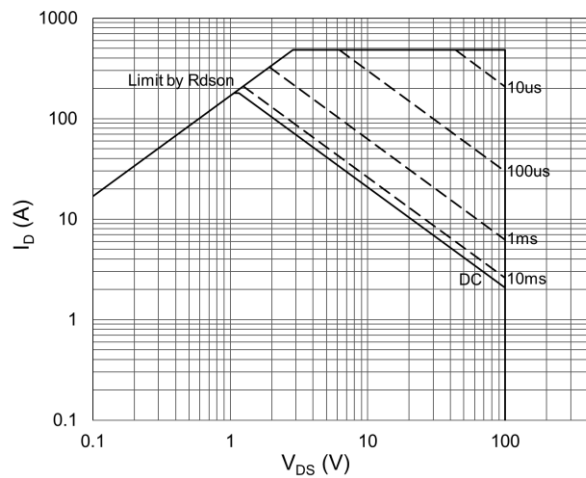
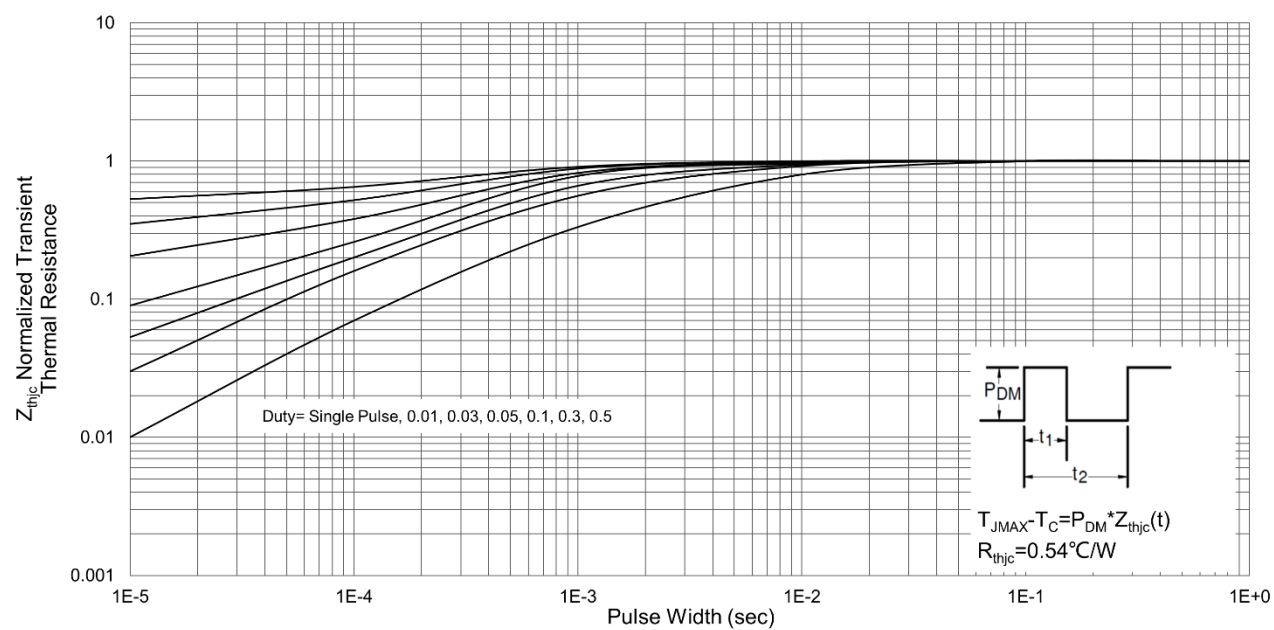
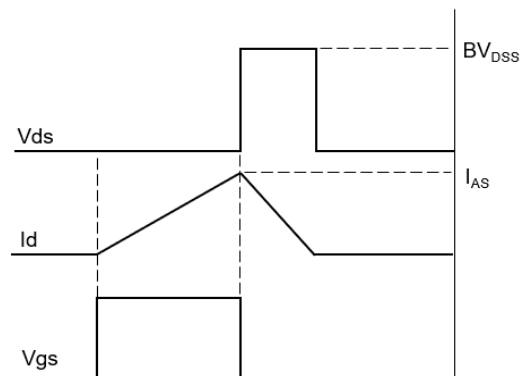
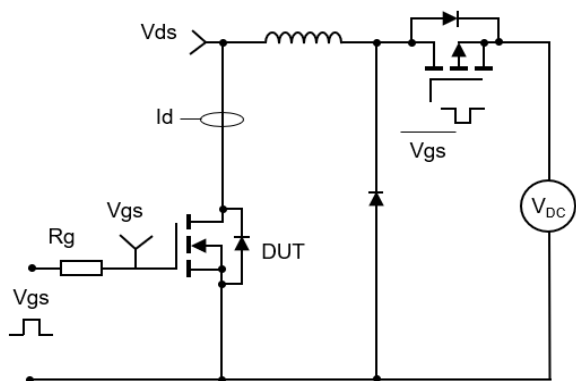
Fig7 Normalized Threshold Voltage vs. T_J

Fig8 Normalized Breakdown Voltage vs. T_J

Fig9 Source-Drain Diode Forward Characteristics

Fig10 Capacitance Characteristics

Fig11 Drain Current Derating

Fig12 Power Dissipation


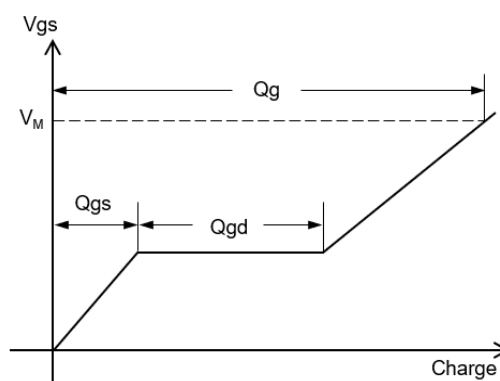
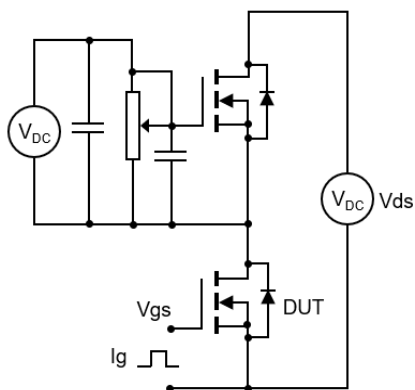
Fig13 Maximum Safe Operation Area

Fig14 Normalized Transient Impedance


Test Circuit & Waveform

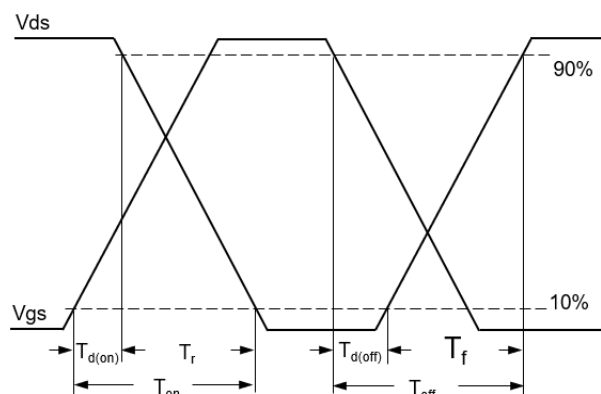
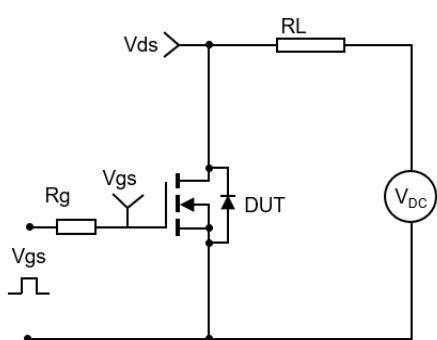
1. Unclamped Inductive Switching Test Circuit & Waveforms



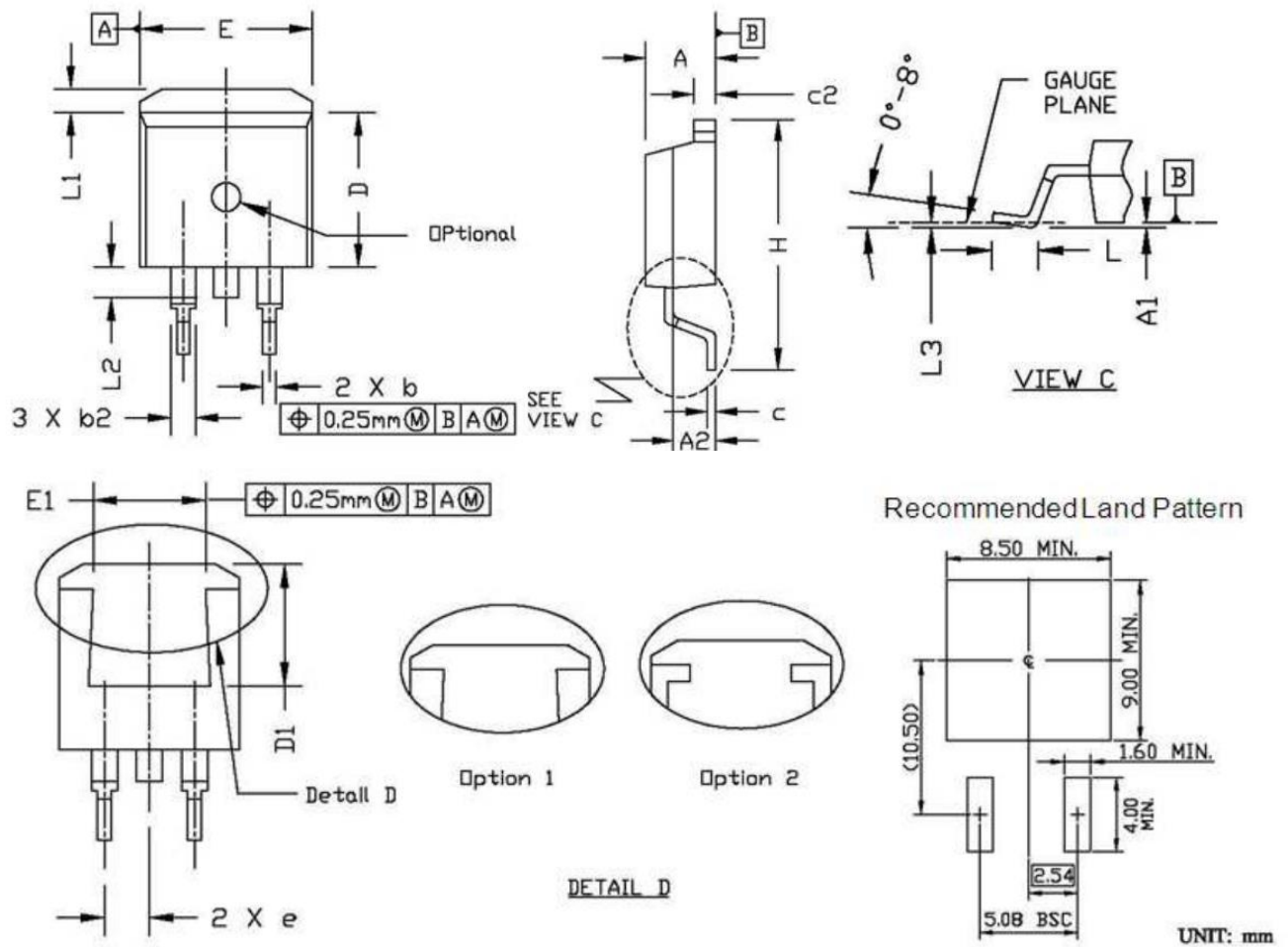
2. Gate Charge Test Circuit & Waveform



3. Resistive Switching Test Circuit & Waveform



TO263 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.86	0.169	0.191
A1	0.00	0.25	0.000	0.010
A2	2.34	2.79	0.092	0.110
b	0.68	0.94	0.027	0.037
b2	1.15	1.35	0.045	0.053
c	0.33	0.65	0.013	0.026
c2	1.17	1.40	0.046	0.055
D	8.38	9.45	0.330	0.372
D1	6.90	8.17	0.272	0.322
e	2.54 BSC.		0.100 BSC.	
E	9.78	10.50	0.385	0.413
E1	6.50	8.60	0.256	0.339
H	14.61	15.88	0.575	0.625
L	2.24	3.00	0.088	0.118
L1	0.70	1.60	0.028	0.063
L2	1.00	1.78	0.039	0.070
L3	0.00	0.25	0.000	0.010