

SDM035PU02S
-20V P-Channel MOSFETs

Rev 1.0

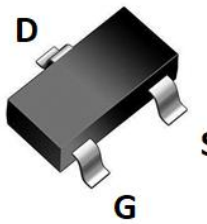
Feature

- ◇ Low $R_{DS(ON)}$
- ◇ Low Gate Charge
- ◇ High current Capability
- ◇ Green product RoHS compliant, lead free
- ◇ 100% UIS Tested, 100% Rg Tested

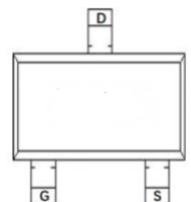
Product Summary

V_{DS}	-20	V
$V_{GS(th_Typ)}$	-0.7	V
$R_{DS(ON_Typ)}$ (@ $V_{GS} = -10V$)	31	m Ω
I_D (at $V_{GS} = -10V$) ⁽¹⁾	-4.2	A

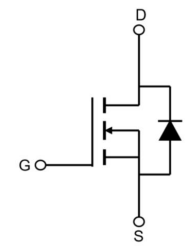
Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM035PU02S	SOT-23	2305	Tape	7" Reel	3000



SOT-23 top view



Pin Assignment



Schematic Diagram

Absolute Maximum Ratings (Rating at $T_J=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ⁽¹⁾	I_D	$T_c=25^\circ C$	-4.2
		$T_c=100^\circ C$	-2.7
Pulsed Drain Current ⁽²⁾	I_{DM}	-17	A
Body-Diode Continuous Current	I_S	-4.2	A
Avalanche Current ⁽³⁾	I_{AS}	-6.5	A
Avalanche Energy ⁽³⁾	E_{AS}	4.9	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_c=25^\circ C$	2
		$T_c=100^\circ C$	1
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

Electrical Characteristics (Rating at $T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$	-	-	-1 -5	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-0.4	-0.7	-1.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5\text{V}$, $I_D=-4.1\text{A}$	-		35	m Ω
		$V_{GS}=-2.5\text{V}$, $I_D=-3\text{A}$	-		53	
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-15\text{A}$	-	6.6	-	S
V_{SD}	Diode Forward Voltage	$I_S=-4.1\text{A}$, $V_{GS}=0\text{V}$	-	-0.9	-1.2	V
DYNAMIC PARAMETERS ⁽⁵⁾						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-10\text{V}$, $f=1\text{MHz}$	-	816	-	pF
C_{oss}	Output Capacitance		-	84	-	pF
C_{rss}	Reverse Transfer Capacitance		-	67	-	pF
R_g	Gate Resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	-	-	-	Ω
SWITCHING PARAMETERS ⁽⁵⁾						
Q_g	Total Gate Charge	$V_{GS}=-4.5\text{V}$, $V_{DS}=-10\text{V}$, $I_D=-2\text{A}$	-	8.9	-	nC
Q_{gs}	Gate Source Charge		-	1.5	-	nC
Q_{gd}	Gate Drain Charge		-	2.1	-	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-4.5\text{V}$, $V_{DS}=-10\text{V}$, $I_D=-3.3\text{A}$, $R_{GEN}=1\Omega$	-	11	-	ns
t_r	Turn-On Rise Time		-	33	-	ns
$t_{D(off)}$	Turn-Off Delay Time		-	51	-	ns
t_f	Turn-Off Fall Time		-	53	-	ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-10\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	-	23	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-10\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	-	11	-	nC

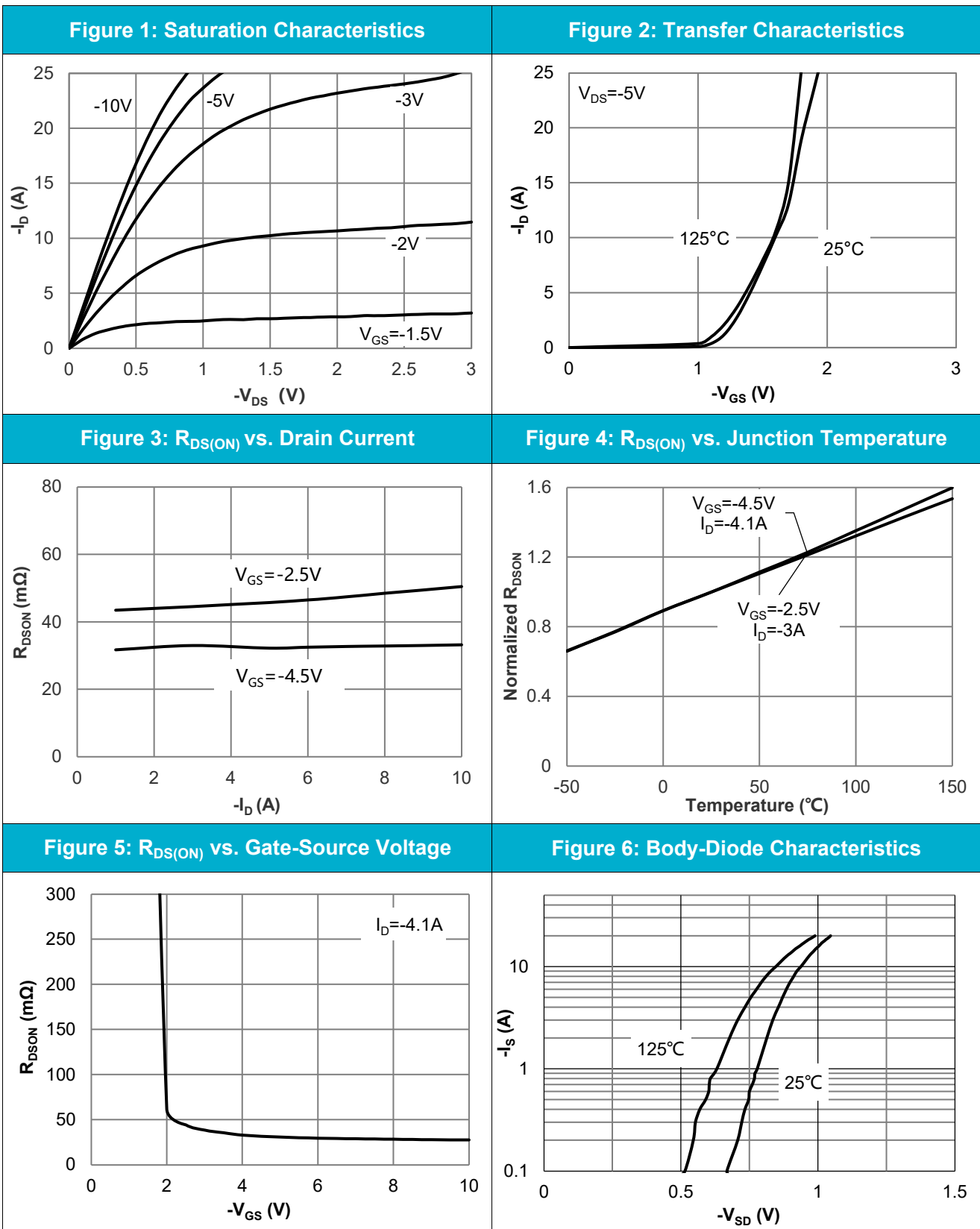
Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal resistance from junction to case	-	-	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal resistance from junction to ambient	-	125	$^\circ\text{C}/\text{W}$

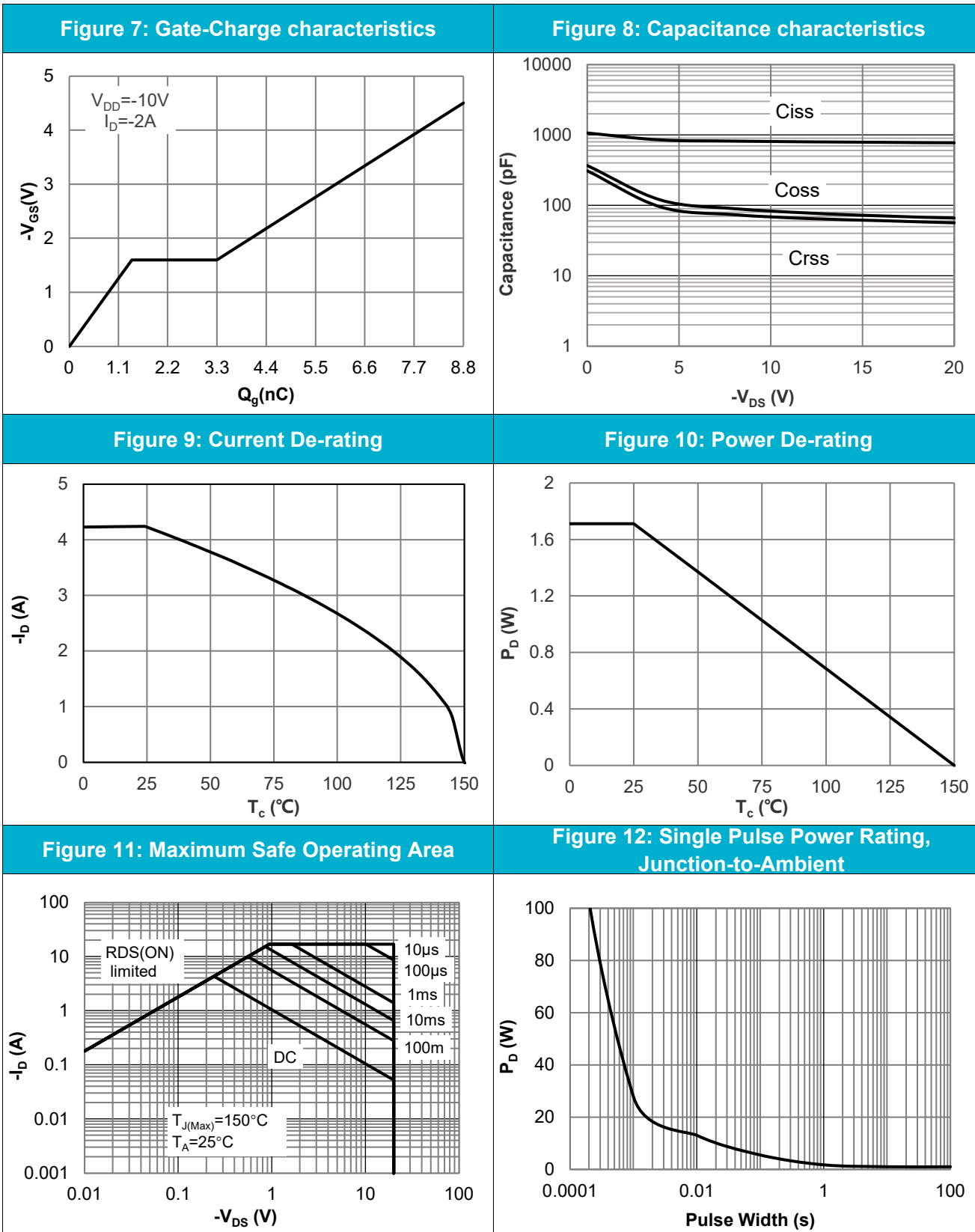
Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
3. This single-pulse measurement was taken under the following condition [$L=0.1\text{mH}$, $V_{GS}=-10\text{V}$, $V_{DS}=-10\text{V}$] while its value is limited by $T_{J_Max}=150^\circ\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max}=150^\circ\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical and Thermal Characteristics

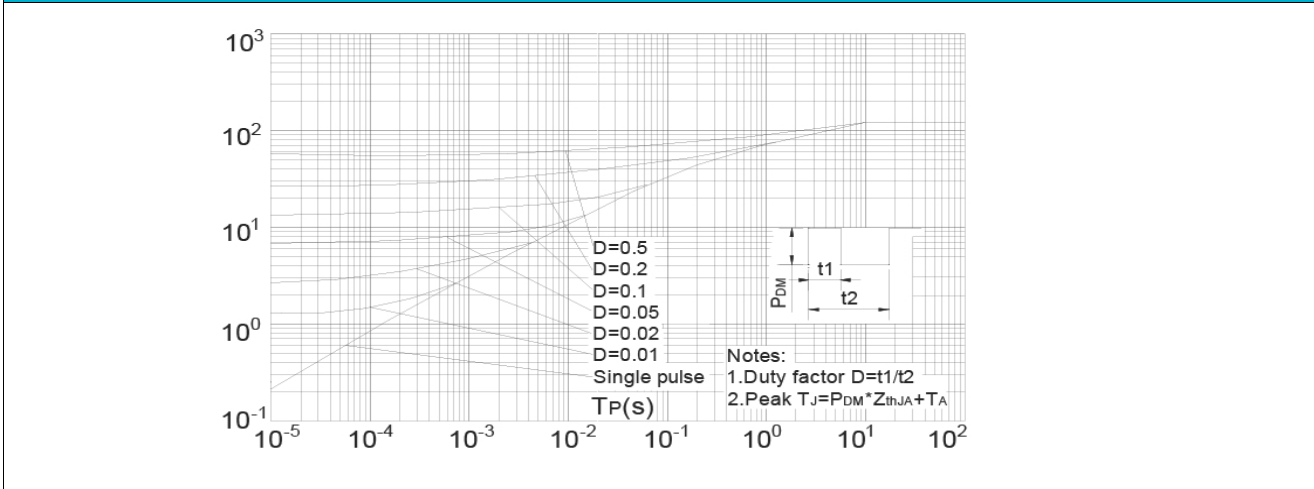


Typical Electrical and Thermal Characteristics



Typical Electrical and Thermal Characteristics

Figure 13: Normalized Maximum Transient Thermal Impedance



Test Circuit

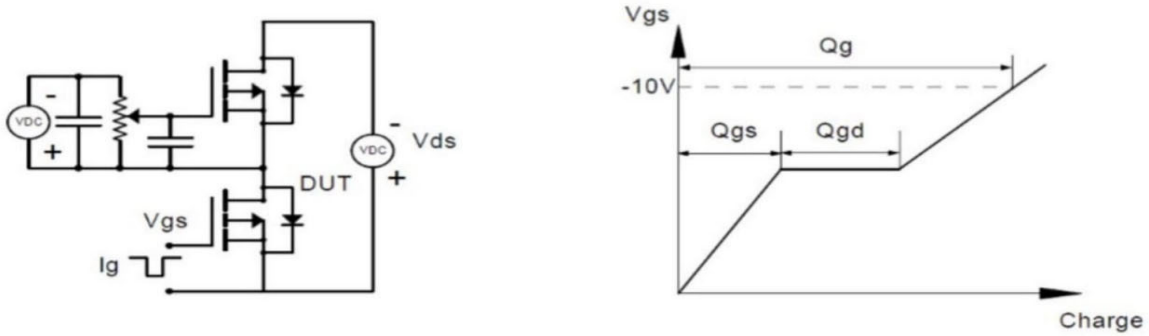


Figure1: Gate Charge Test Circuit & Waveforms

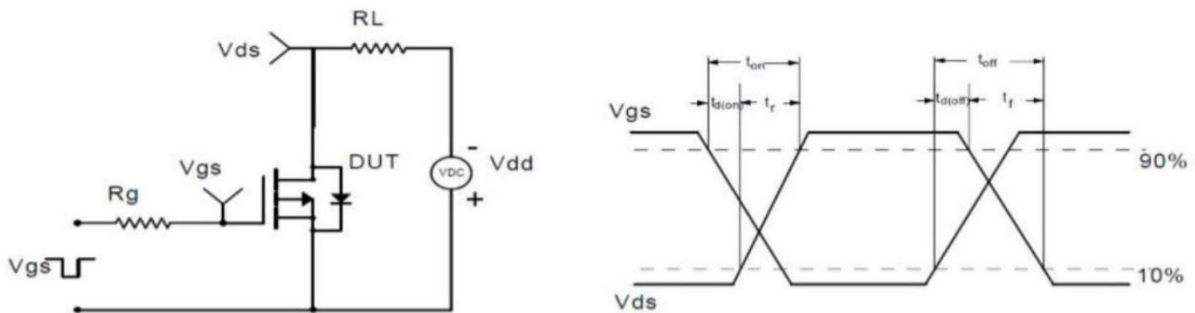


Figure2: Resistive Switching Test Circuit & Waveforms

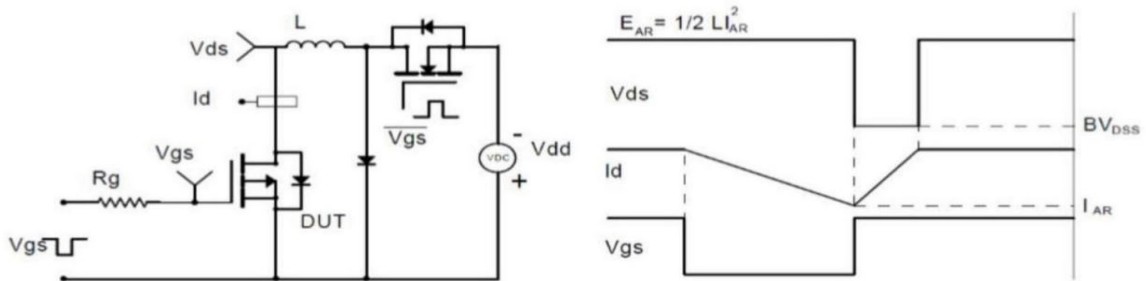


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

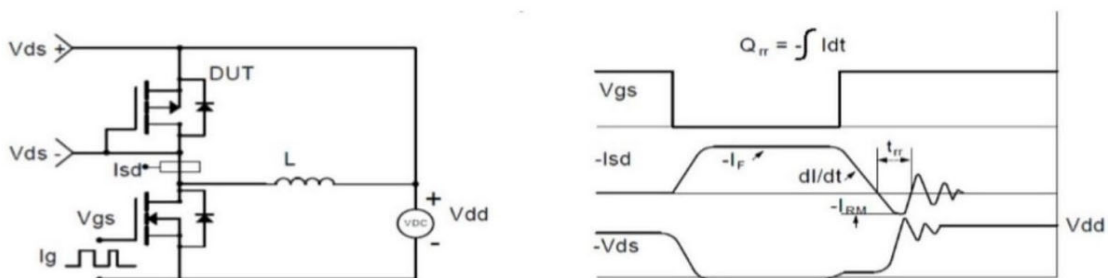
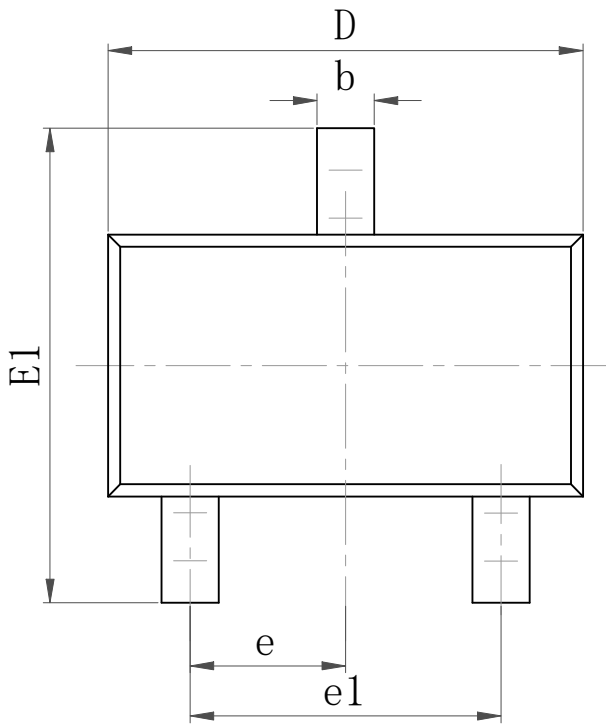
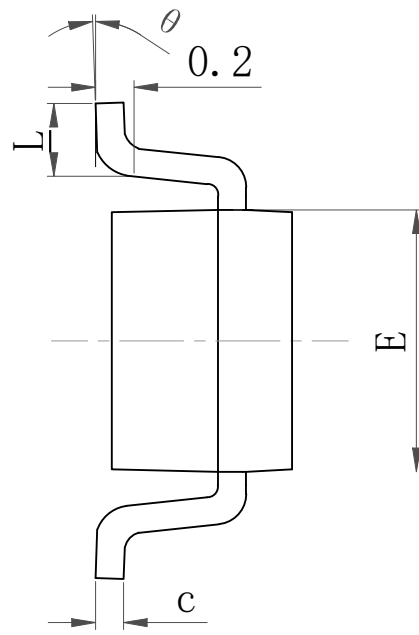


Figure4: Diode Recovery Test Circuit & Waveforms

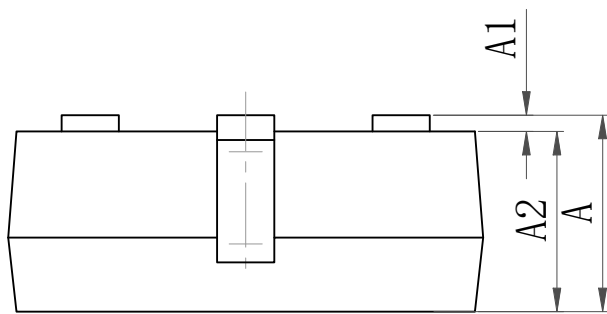
SOT-23 Package Information



TOP VIEW



SIDE VIEW



SIDE VIEW

SYMBOL	MILLIMETER	
	MIN	MAX
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.150	0.190
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 (BSC)	
e1	1.800	2.000
L	0.300	0.500
θ	0°	8°