

SDM055PL03S

-30V P-Channel MOSFETs

Rev 2.0

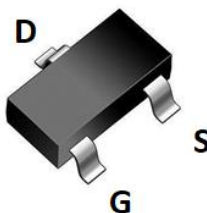
Feature

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

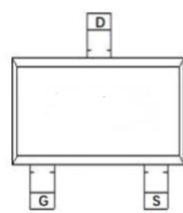
Product Summary

V_{DS}	-30	V
$V_{GS(th_Typ)}$	-1.6	V
$R_{DS(ON_Typ)}$ (@ $V_{GS} = -10V$)	47	m Ω
I_D (at $V_{GS} = -10V$) ⁽¹⁾	-4.1	A

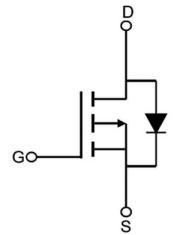
Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM055PL03S	SOT-23	055P03	Tape	7" Reel	3000



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}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_A=25^\circ C$	-4.1
		$T_A=100^\circ C$	-2.6
Pulsed Drain Current ⁽²⁾	I_{DM}	-14.2	A
Maximum Body-Diode Continuous Current	I_S	-4.1	A
Avalanche Current ⁽³⁾	I_{AS}	-10.9	A
Avalanche Energy ⁽³⁾	E_{AS}	12.0	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_A=25^\circ C$	2
		$T_A=100^\circ C$	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	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$	-	-	-1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	-1	-1.6	-2.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$, $I_D=-5\text{A}$ $V_{GS}=-4.5\text{V}$, $I_D=-4\text{A}$	-	47	55	m Ω
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-5\text{A}$	-	5.0	-	S
V_{SD}	Diode Forward Voltage	$I_S=-5\text{A}$, $V_{GS}=0\text{V}$	-	-0.9	-1.2	V
DYNAMIC PARAMETERS ⁽⁵⁾						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$	-	498	-	pF
C_{oss}	Output Capacitance		-	52	-	pF
C_{rss}	Reverse Transfer Capacitance		-	53	-	pF
R_g	Gate Resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	-	18.7	-	Ω
SWITCHING PARAMETERS ⁽⁵⁾						
$Q_g(-10\text{V})$	Total Gate Charge	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-4\text{A}$	-	8.3	-	nC
$Q_g(-4.5\text{V})$	Total Gate Charge		-	0.9	-	nC
Q_{gs}	Gate Source Charge		-	2.9	-	nC
Q_{gd}	Gate Drain Charge		-	7.3	-	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-1\text{A}$ $R_{GEN}=3.3\Omega$	-	2.3	-	ns
t_r	Turn-On Rise Time		-	4.9	-	ns
$t_{D(off)}$	Turn-Off Delay Time		-	27	-	ns
t_f	Turn-Off Fall Time		-	8.7	-	ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-3\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	-	8.1	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-3\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	-	3.1	-	nC

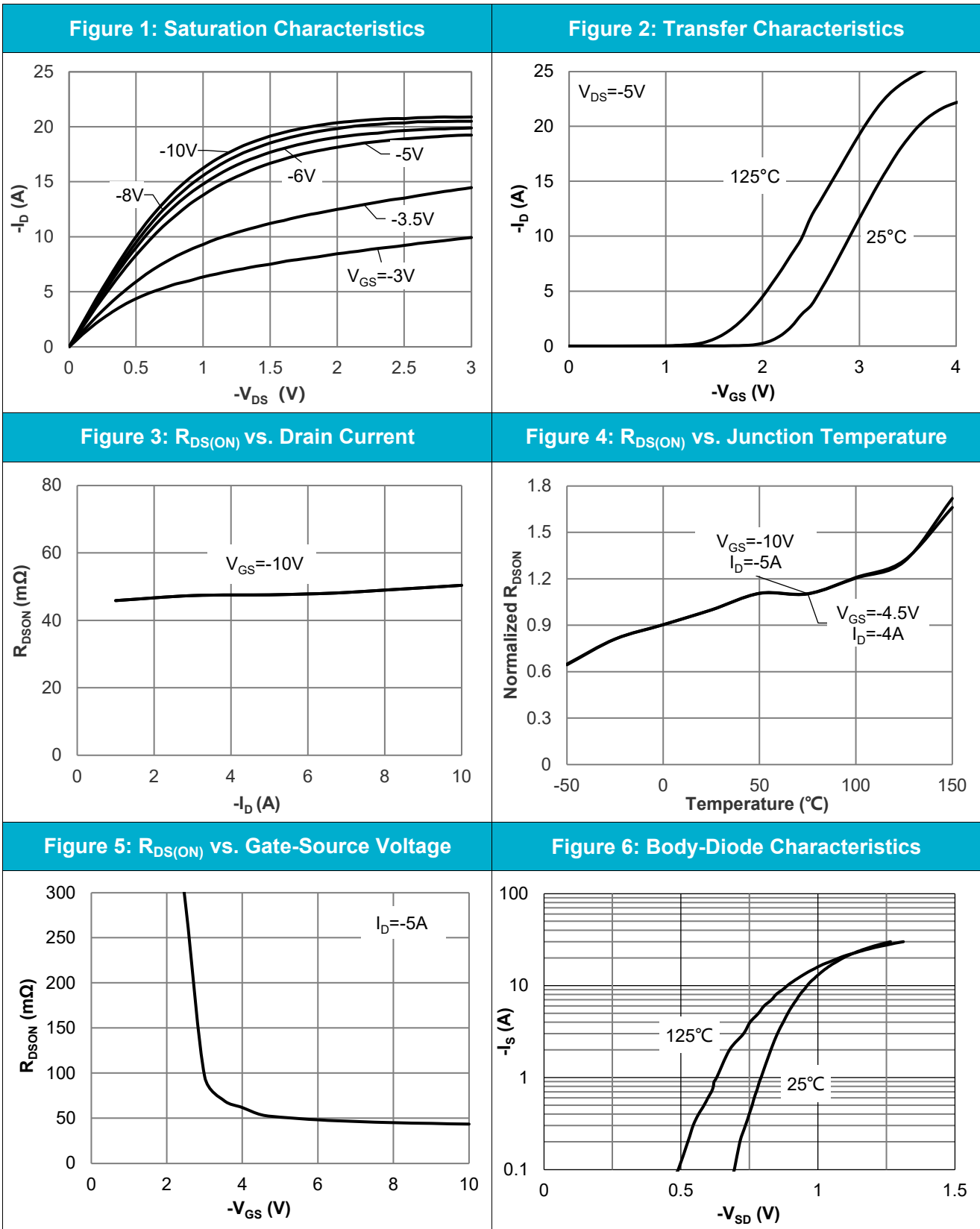
Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal resistance from junction to ambient	-	108	$^\circ\text{C}/\text{W}$

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 [$L=0.5\text{mH}$, $V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$] 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

Figure 7: Gate-Charge characteristics

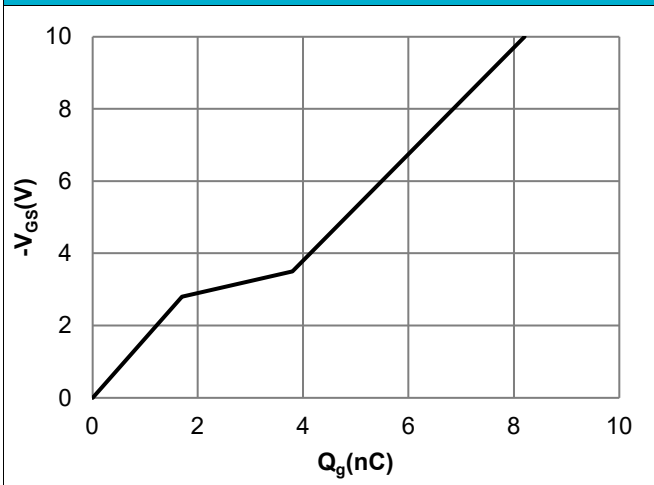


Figure 8: Capacitance characteristics

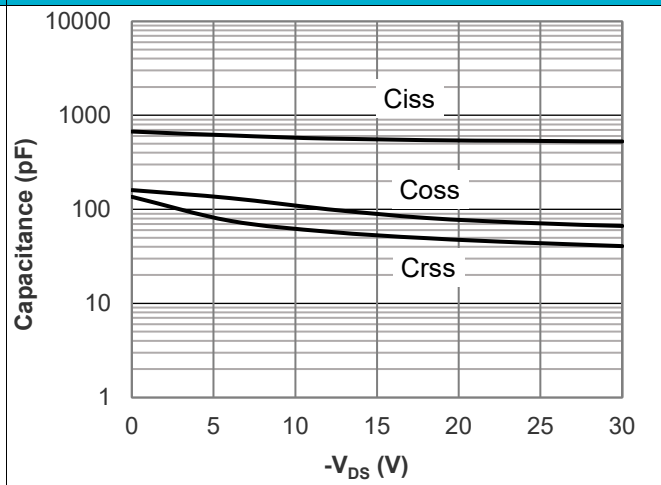


Figure 9: Current De-rating

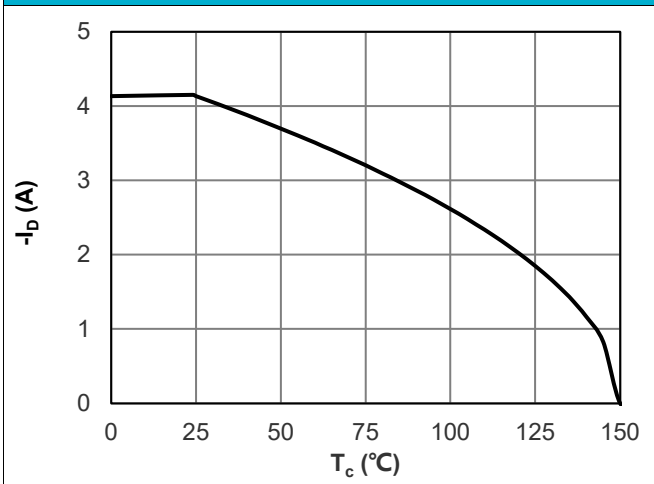


Figure 10: Power De-rating

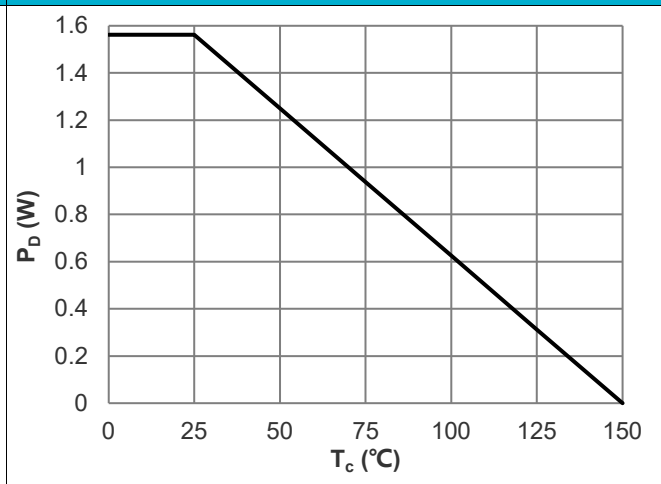


Figure 11: Maximum Safe Operating Area

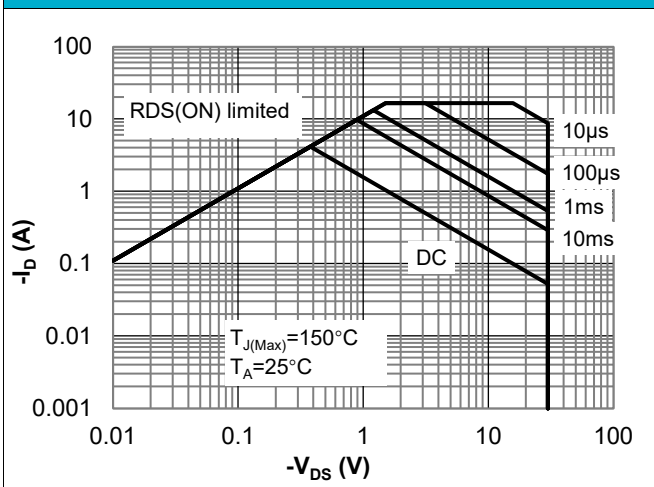
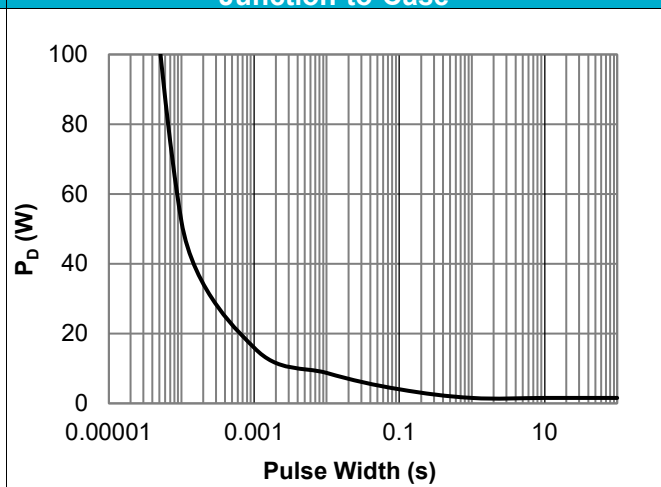
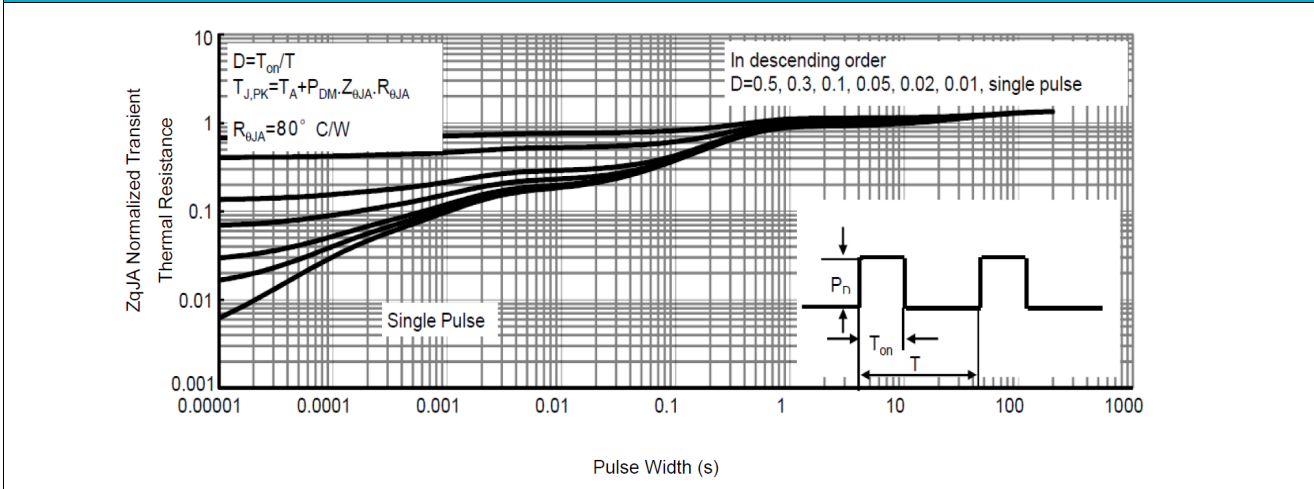


Figure 12: Single Pulse Power Rating, Junction-to-Case



Typical Electrical and Thermal Characteristics

Figure 13: Normalized Maximum Transient Thermal Impedance



Test Circuit

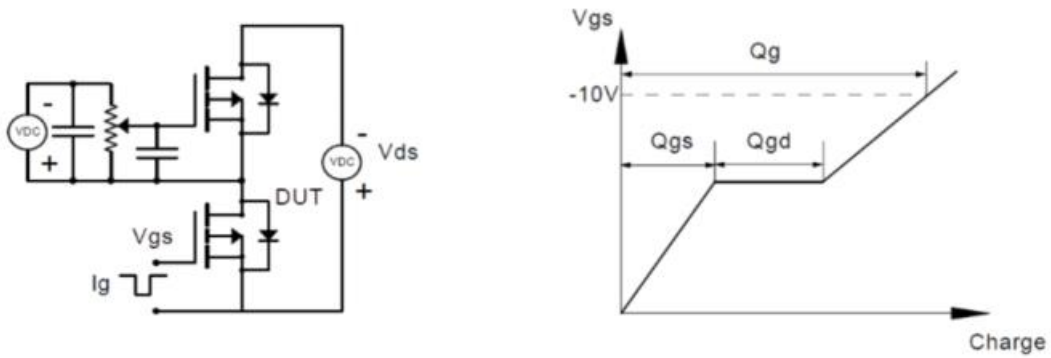


Figure1: Gate Charge Test Circuit & Waveforms

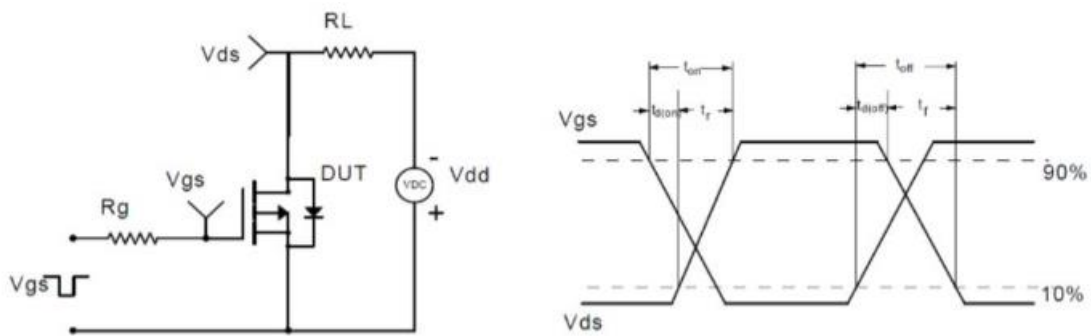


Figure2: Resistive Switching Test Circuit & Waveforms

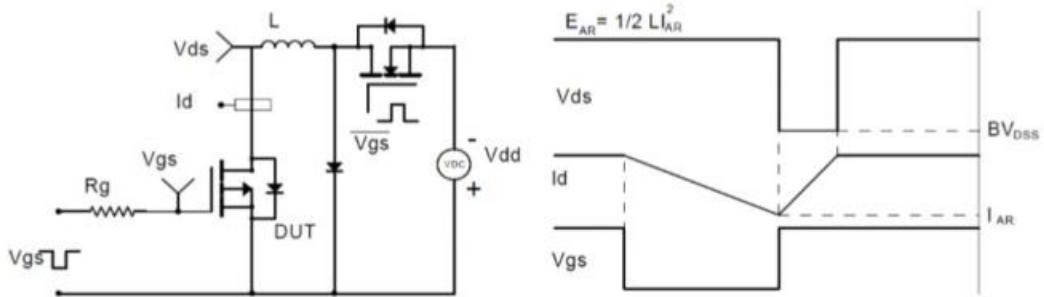


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

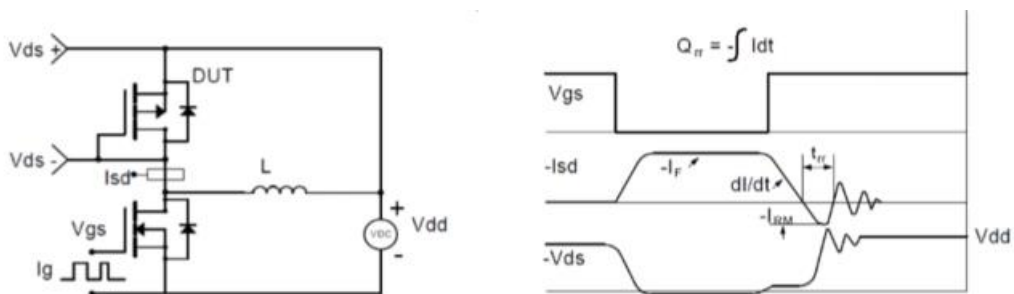
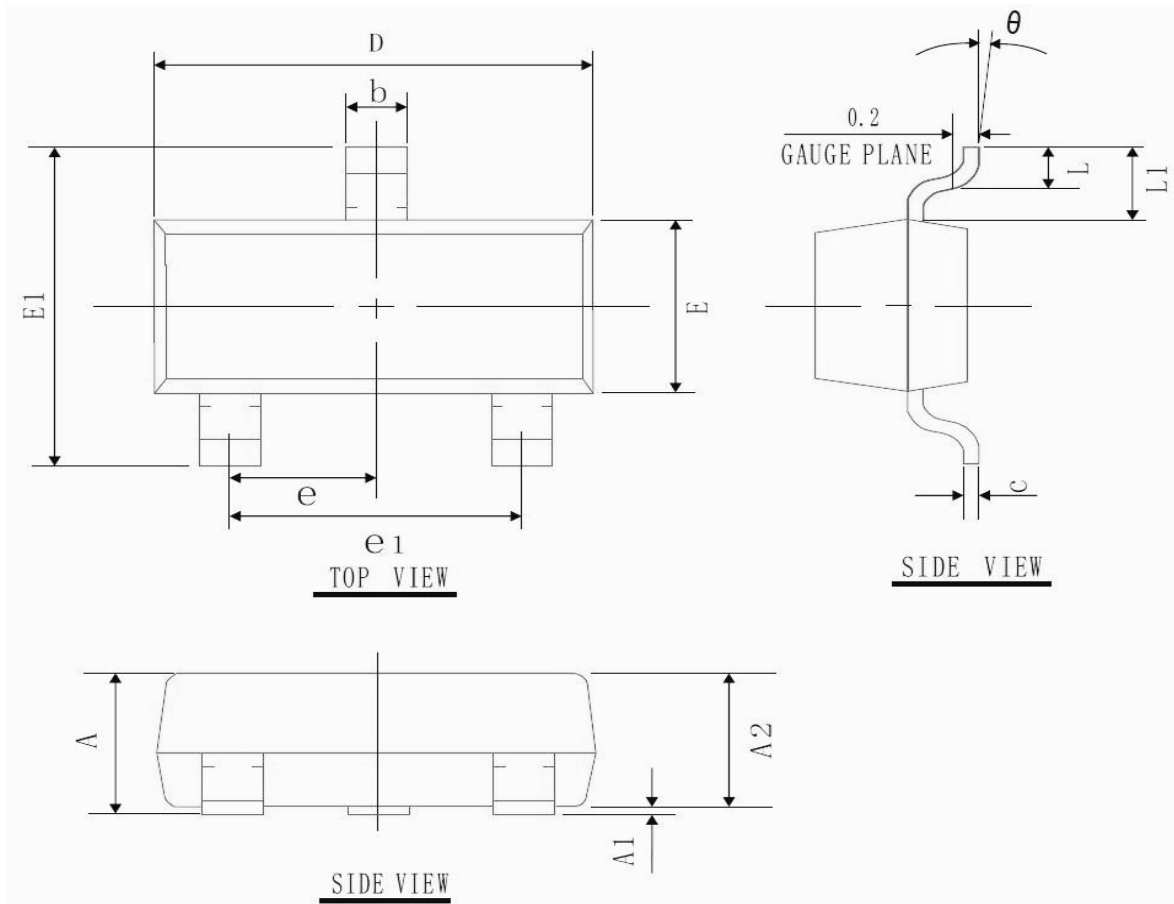


Figure4: Diode Recovery Test Circuit & Waveforms

SOT-23 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
θ	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e1	1.90 REF		