

SDM2007AD

20V N-Channel MOSFETs

Rev A.0

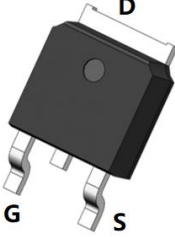
Feature

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

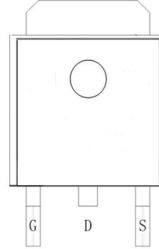
Product Summary

V_{DS}	20	V
$V_{GS(th_Typ)}$	0.75	V
$R_{DS(ON_Typ)}$ (at $V_{GS}=4.5V$)	6.2	mΩ
I_D	50	A

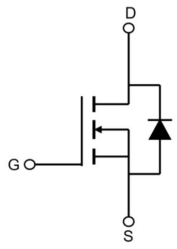
Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM2007AD	TO-252	M2007A	Tape	13" Reel	2500



TO-252 top view



pin Assignment



Schematic Diagram

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

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_A=25^\circ C$	I_D	50	A
	$T_A=100^\circ C$		32	
Pulsed Drain Current ⁽¹⁾		I_{DM}	200	A
Maximum Body-Diode Continuous Current		I_S	50	A
Avalanche Energy ⁽²⁾		E_{AS}	49	mJ
Power Dissipation	$T_A=25^\circ C$	P_D	31	W
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 =250μA, V _{GS} =0V	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} =0V, V _{GS} =±12V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	0.5	0.75	1.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance ⁽⁴⁾	V _{GS} =4.5V, I _D =25A	-	6.2	8.1	mΩ
		V _{GS} =2.5V, I _D =10A	-	8.2	10.7	mΩ
V _{SD}	Diode Forward Voltage	I _S =30A, V _{GS} =0V	-	-	1.2	V
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz	-	1611	-	pF
C _{oss}	Output Capacitance		-	227	-	pF
C _{rss}	Reverse Transfer Capacitance		-	199	-	pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =0 to 4.5V, V _{DS} =10V, I _D =25A	-	17	-	nC
Q _{gs}	Gate Source Charge		-	3.3	-	nC
Q _{gd}	Gate Drain Charge		-	5.3	-	nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =4.5V, V _{DS} =10V, I _D =25A, R _{GEN} =3Ω	-	8.9	-	ns
t _r	Turn-On Rise Time		-	17	-	ns
t _{D(off)}	Turn-Off Delay Time		-	37	-	ns
t _f	Turn-Off Fall Time		-	23	-	ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =25A, di/dt=100A/μs	-	7.3	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =25A, di/dt=100A/μs	-	1.5	-	nC

Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal resistance from junction to Ambient ⁽³⁾	-	32	°C /W
$R_{\theta JC}$	Thermal resistance from junction to Case	-	4.0	°C /W

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J=25^{\circ}\text{C}$, $V_{DD}=10\text{V}$, $V_G=10\text{V}$, $R_G=25\text{ohm}$, $L=0.5\text{mH}$, $I_{AS}=14\text{A}$
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Typical Electrical and Thermal Characteristics

Figure 1: Saturation Characteristics

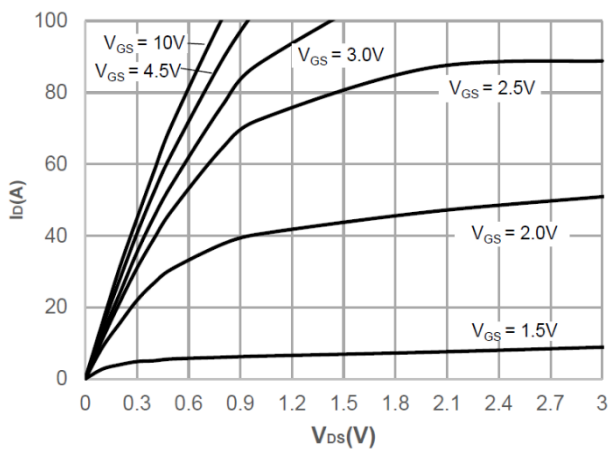


Figure 2: Transfer Characteristics

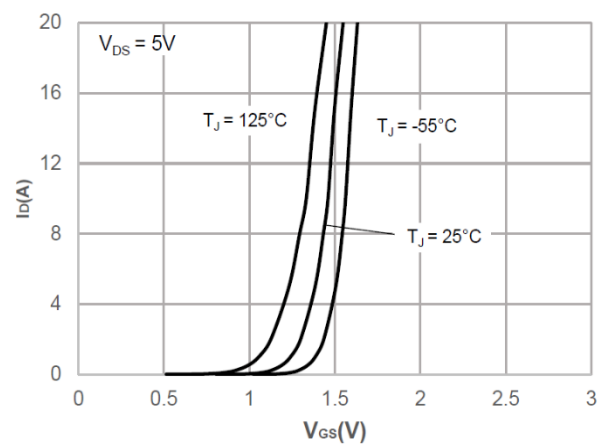
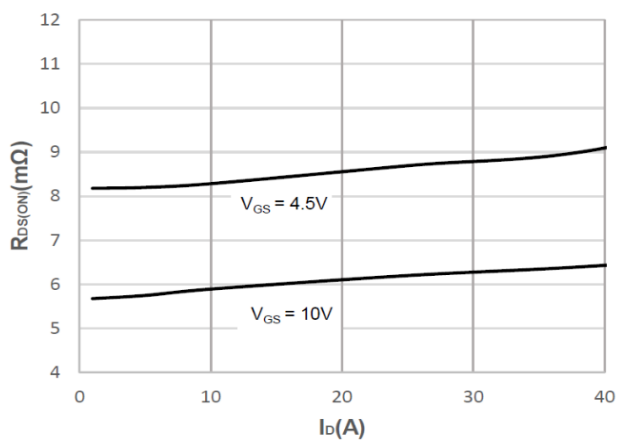
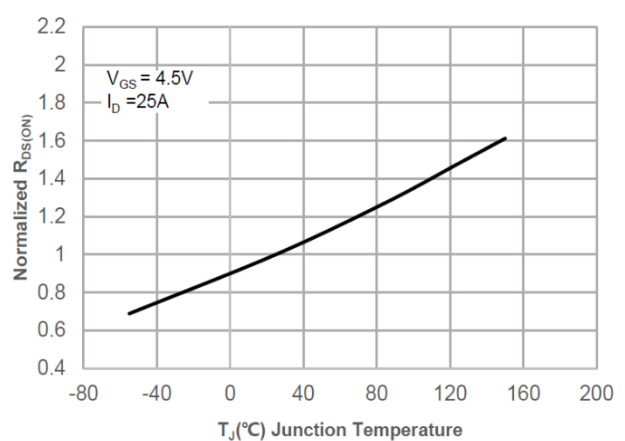
Figure 3: $R_{DS(ON)}$ vs. Drain CurrentFigure 4: $R_{DS(ON)}$ vs. Junction Temperature

Figure 5: Normalized Breakdown voltage vs. Junction Temperature

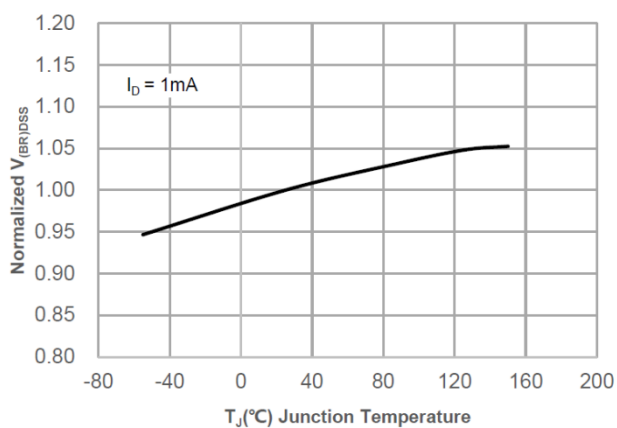
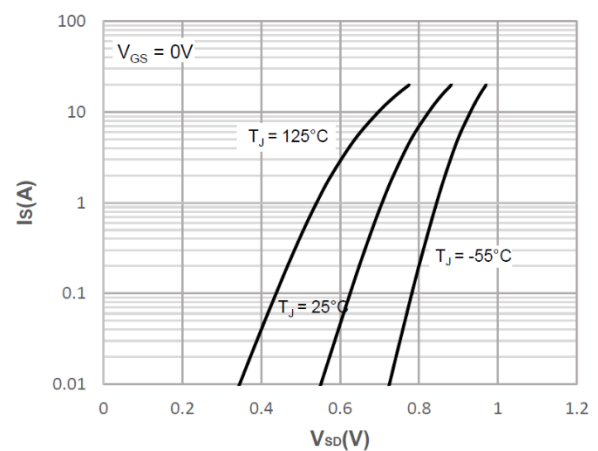


Figure 6: Body-Diode Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Gate-Charge characteristics

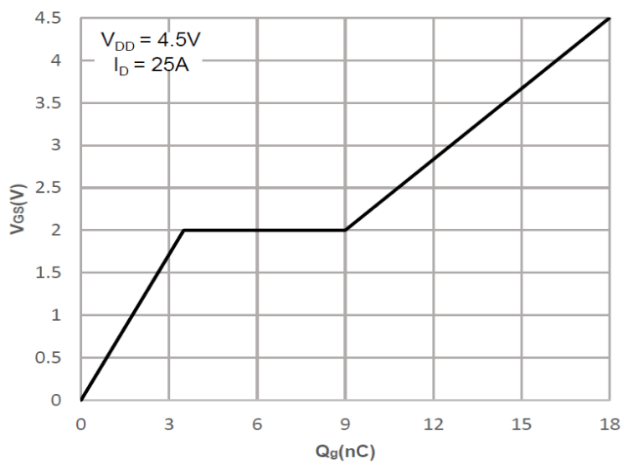


Figure 8: Capacitance characteristics

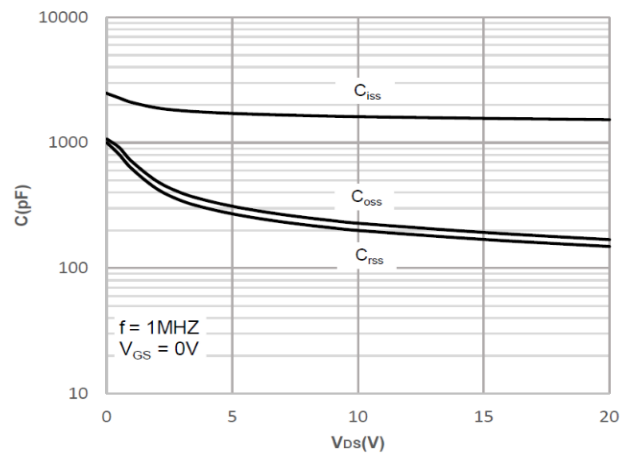


Figure 9: Current De-rating

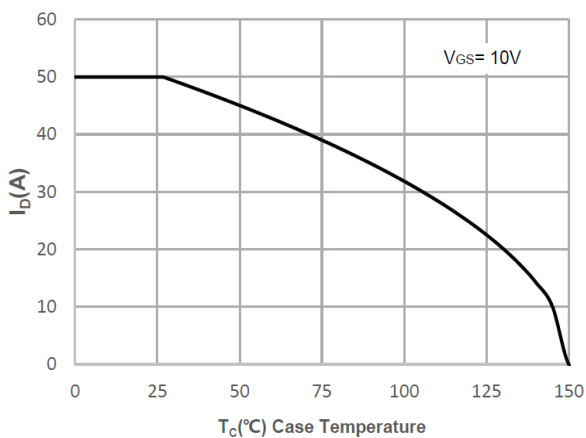


Figure 10: Peak Current Capacity

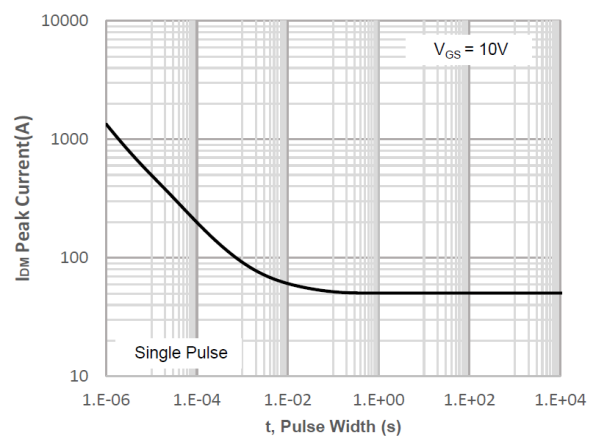


Figure 11: Maximum Safe Operating Area

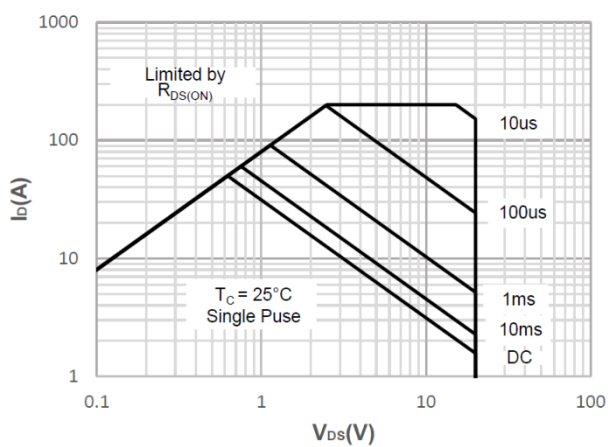
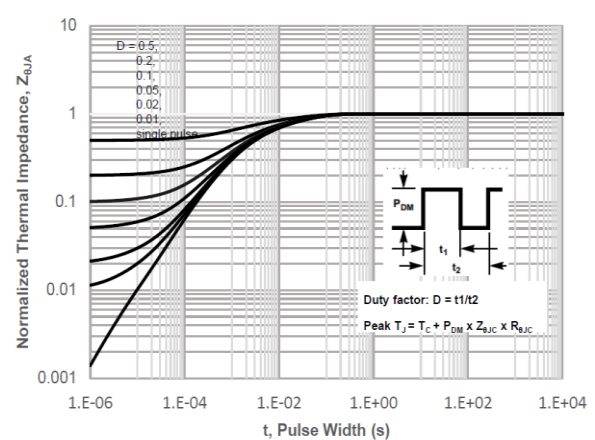


Figure 12: Normalized Maximum Transient Thermal Impedance



Test Circuit

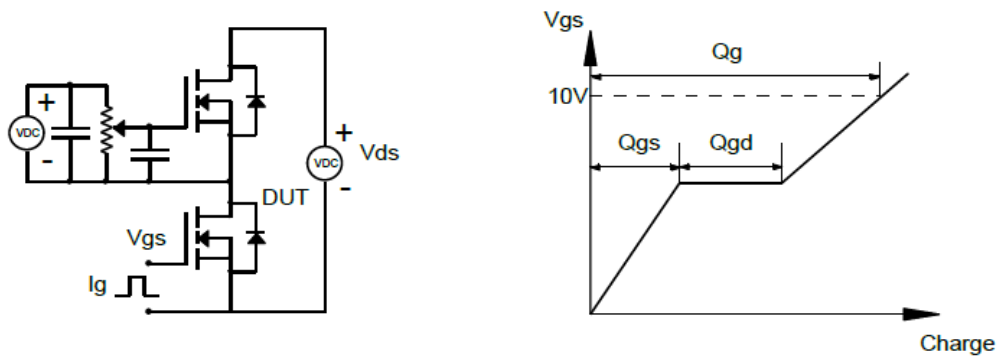


Figure1: Gate Charge Test Circuit & Waveforms

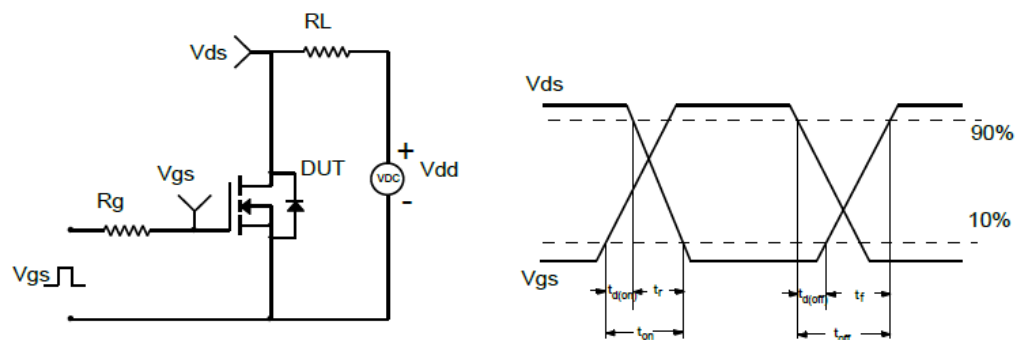


Figure2: Resistive Switching Test Circuit & Waveforms

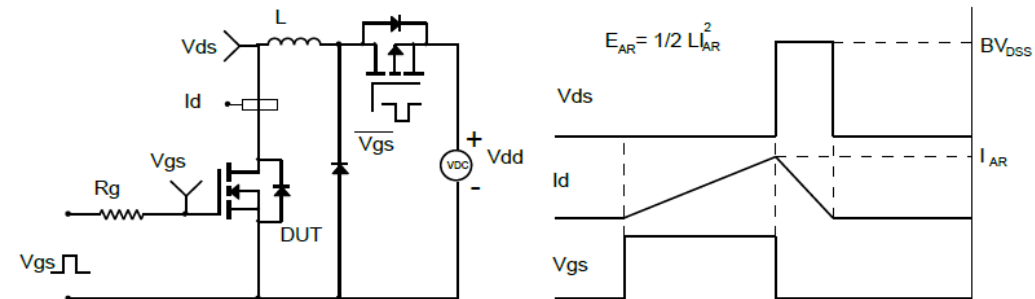


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

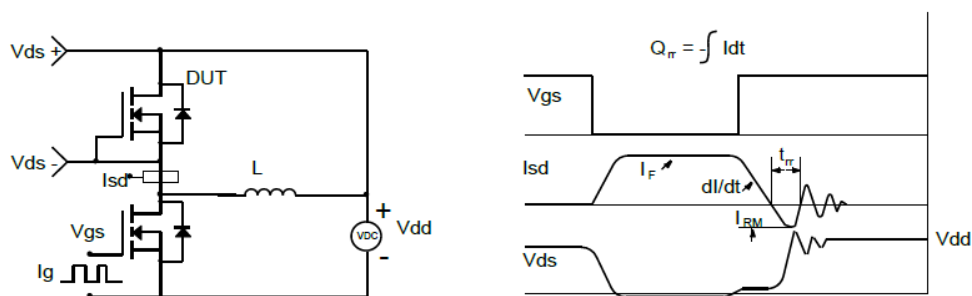
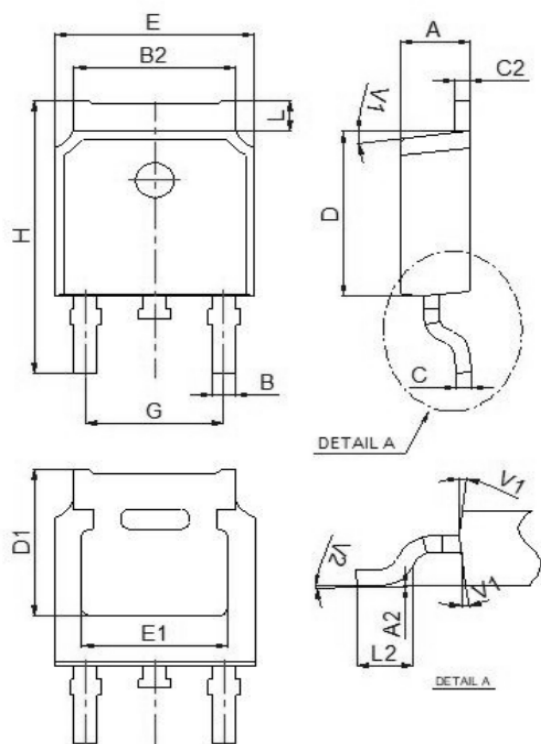


Figure4: Diode Recovery Test Circuit & Waveforms

TO-252 Package Information



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°