SDM029N06D

60V N-Channel MOSFETs

Rev A.1

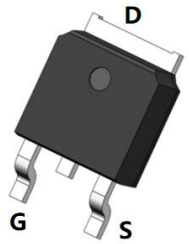
Feature

- ✧ Excellent $R_{DS(ON)}$
- ✧ Low Gate Charge
- ✧ High current Capability
- ✧ Green product (RoHS compliant), lead free
- ✧ 100% UIS Tested
- ✧ AEC-Q101 qualified

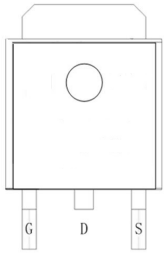
Product Summary

V_{DS}	60	V
$V_{GS(th)\_Typ}$	1.6	V
$R_{DS(ON)\_Typ}$ (at V_{GS} =10V)	25	mΩ
I_D (at V_{GS} =10V)	30	A

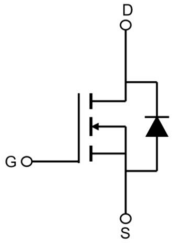
Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM029N06D	TO-252	M029N06	Tape	13" Reel	2500



TO-252 top view



pin Assignment



Schematic Diagram

Absolute Maximum Ratings (Rating at T_C=25°C unless otherwise noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	30	A
	T_C=100°C		19	
Maximum Body-Diode Continuous Current		I_S	30	A
Avalanche Energy (1)		E_{AS}	44	mJ
Power Dissipation	T_C=25°C	P_D	37	W
	T_C=100°C		15	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (Rating at T_J=25°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	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS} =0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V, V_{GS} =±25V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.1	1.6	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance(3)	V_{GS}=10V, I_D=20A	-	25	29	mΩ
		V_{GS}=4.5V, I_D=15A	-	28	40	
V_{SD}	Diode Forward Voltage	I_S=20A, V_{GS}=0V	-	-	1.2	V
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz	1019	1429	1929	pF
C_{oss}	Output Capacitance		45	65	87	pF
C_{rss}	Reverse Transfer Capacitance		37	53	71	pF
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	2.4	-	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=0 to 10V, V_{DS}=30V, I_D=20A	19	27	37	nC
Q_{gs}	Gate Source Charge		3.9	5.7	7.9	nC
Q_{gd}	Gate Drain Charge		3.7	4.9	6.7	nC
$t_{D(on)}$	Turn-On Delay Time	V_{GS}=10V,V_{DD}=30V,I_D=20A, R_{GEN}=3Ω	-	5.9	-	ns
t_r	Turn-On Rise Time		-	13	-	ns
$t_{D(off)}$	Turn-Off Delay Time		-	25	-	ns
t_f	Turn-Off Fall Time		-	3.9	-	ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, di/dt=100A/μs	15	21	29	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, di/dt=100A/μs	-	27	-	nC

Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal resistance from junction to case	-	3.4	°C /W
$R_{\theta JA}$	Thermal resistance from junction to Ambient(2)	-	39	°C /W

Notes:

1. E_{AS} condition: Starting T_J=25C, V_{DD}=30V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=10.92A, V_{DD}=0V during time in avalanche.
2. RθJA is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
3. Pulse Test: Pulse Width≤300 μs, Duty Cycle≤0.5%.

Typical Electrical and Thermal Characteristics

Figure 1: Saturation Characteristics

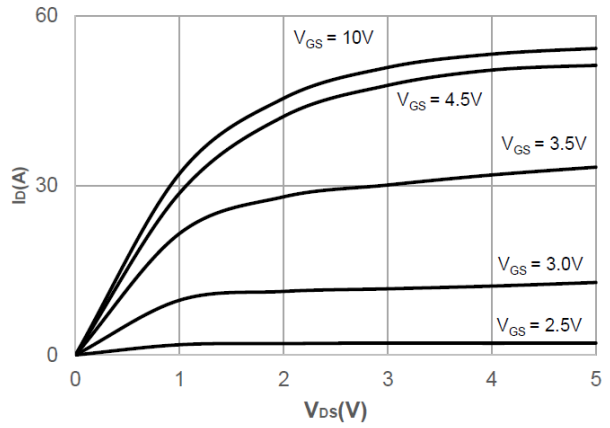


Figure 2: Transfer Characteristics

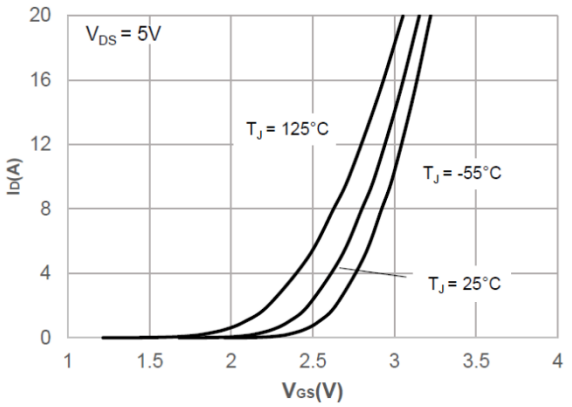


Figure 3: $R_{DS(ON)}$ vs. Drain Current

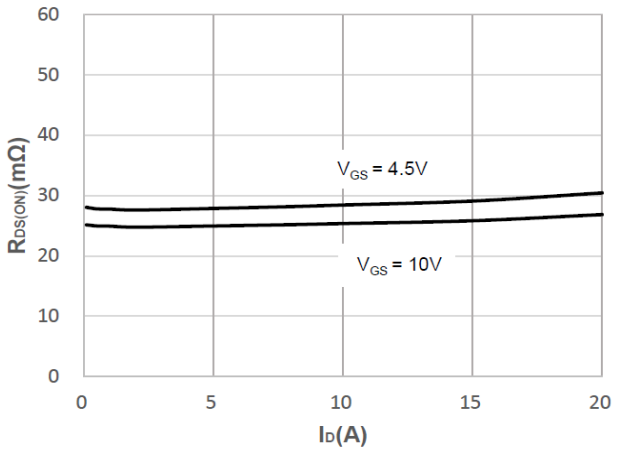


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

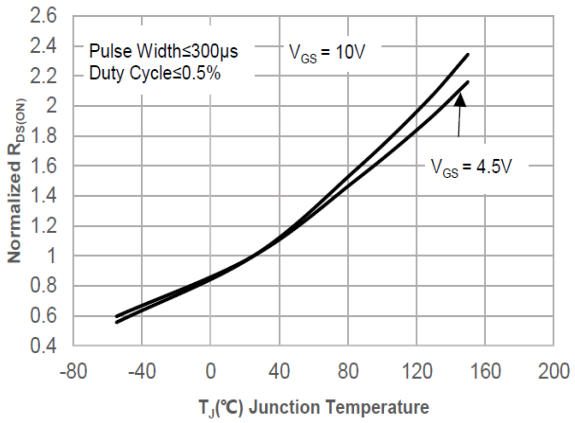


Figure 5: $R_{DS(ON)}$ vs. Gate-Source Voltage

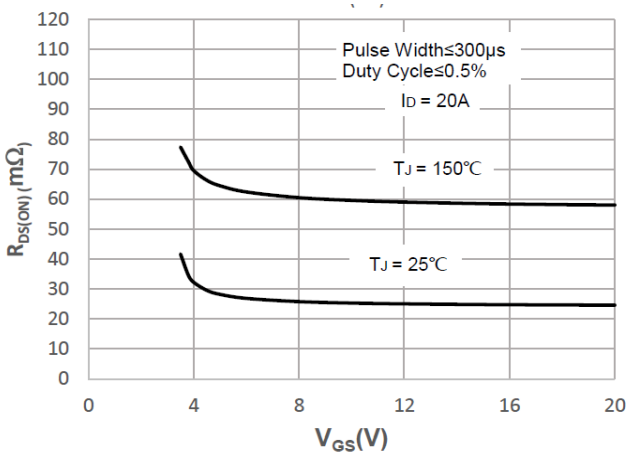
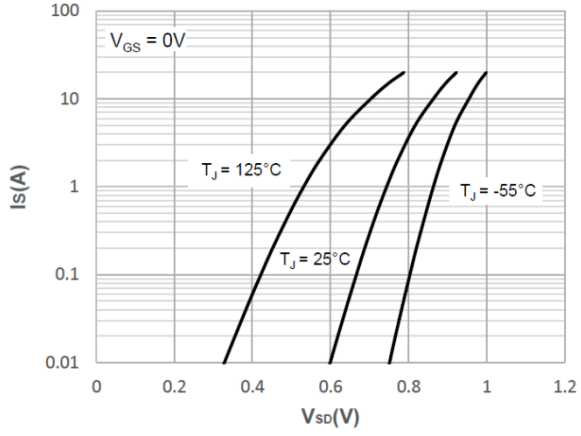


Figure 6: Body-Diode Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Gate-Charge characteristics

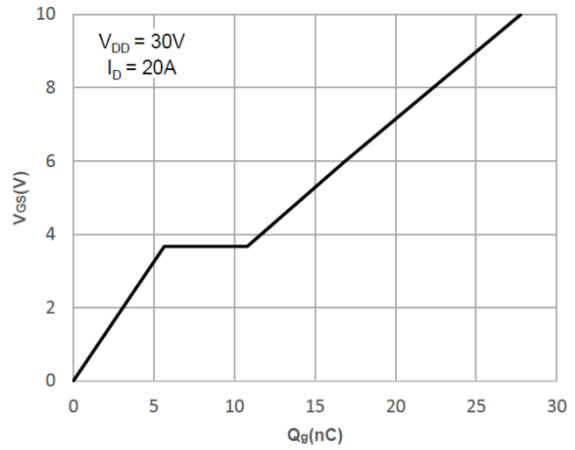


Figure 8: Capacitance characteristics

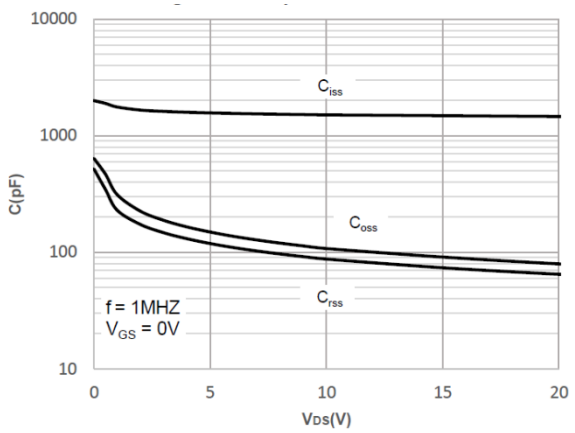


Figure 9: Current De-rating

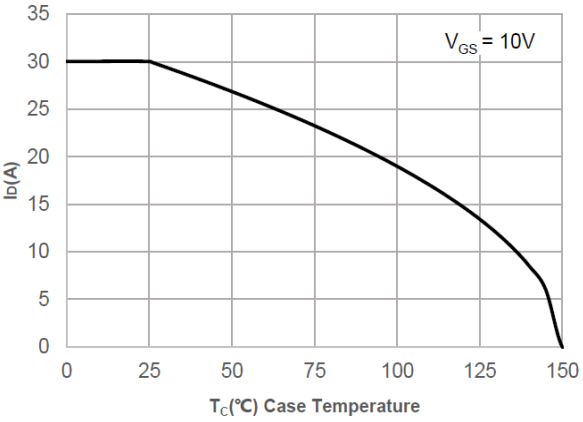


Figure 10: Power De-rating

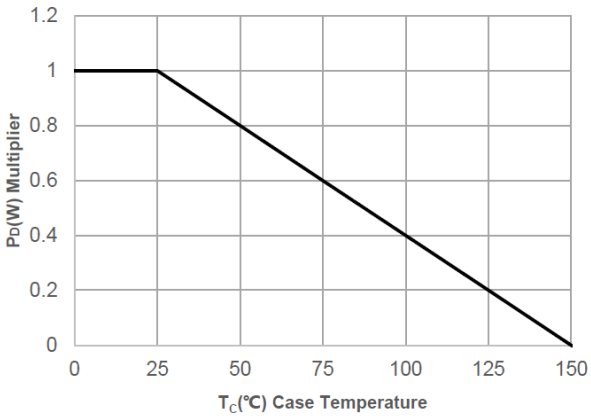


Figure 11: Maximum Safe Operating Area

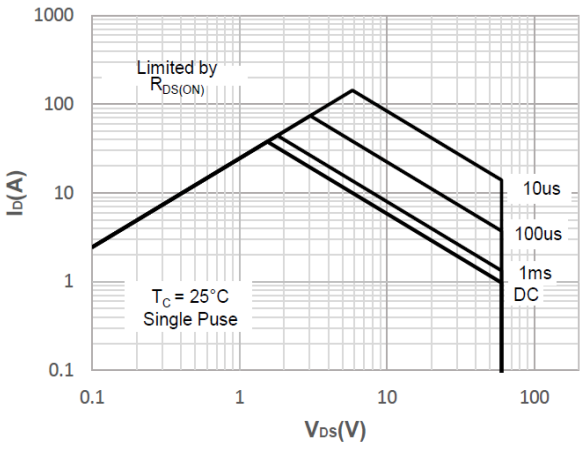
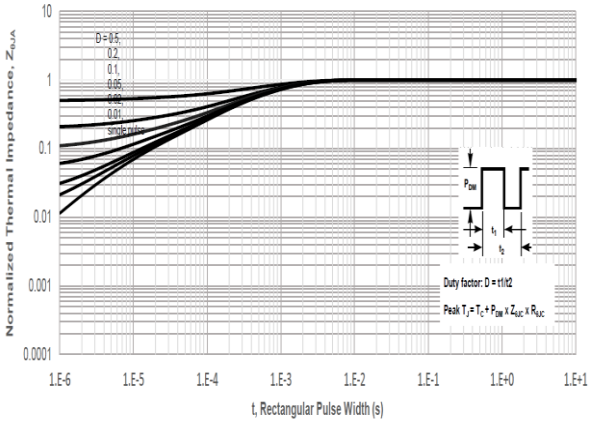


Figure 12: Normalized Maximum Transient Thermal Impedance



Test Circuit

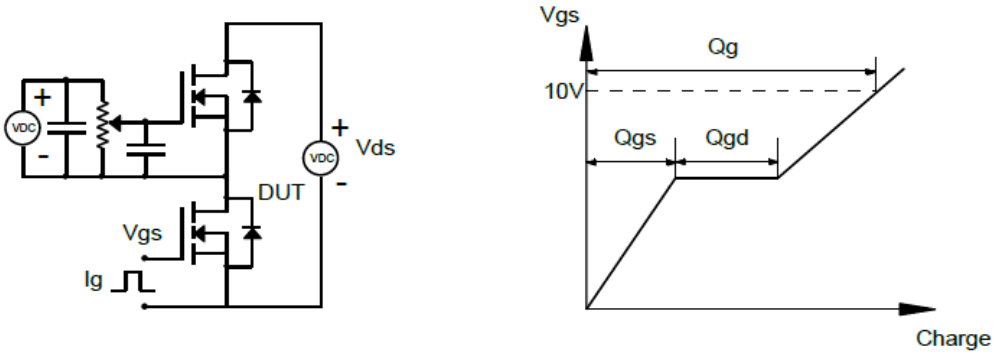


Figure1: Gate Charge Test Circuit & Waveforms

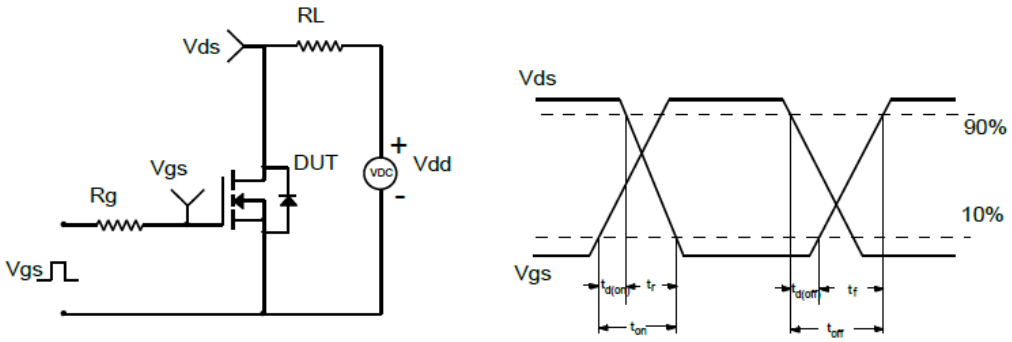


Figure2: Resistive Switching Test Circuit & Waveforms

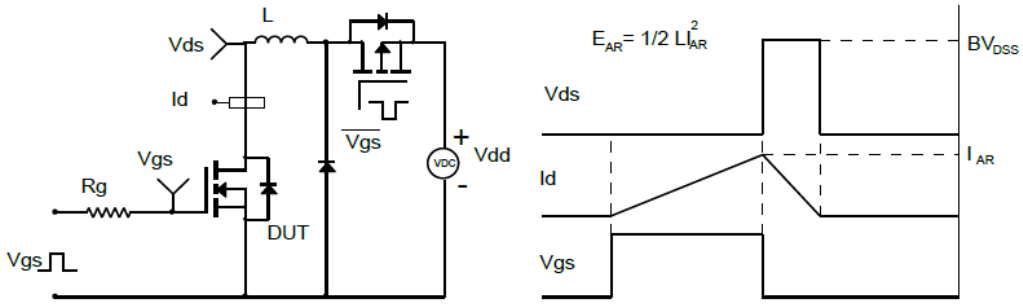


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

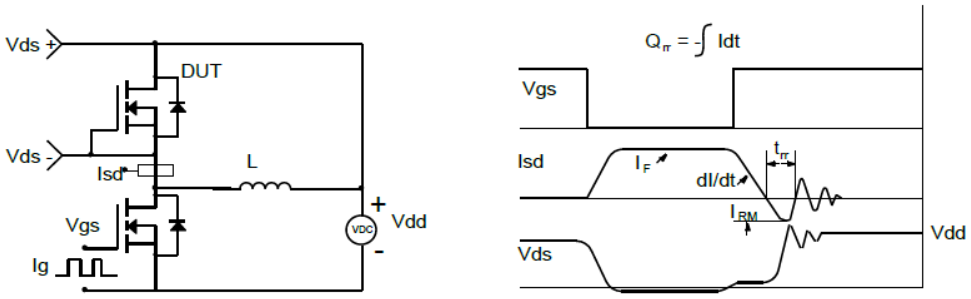
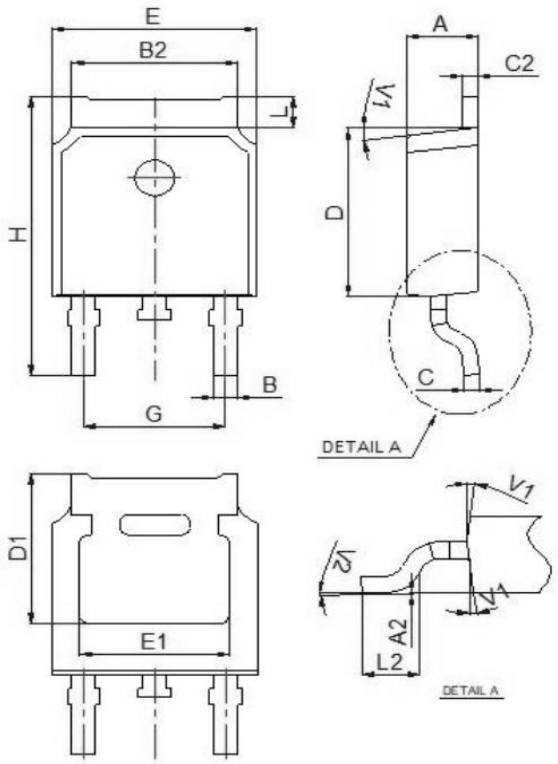


Figure4: Diode Recovery Test Circuit & Waveforms

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°