

SDM009P03Q

-30V P-Channel MOSFETs

Rev A.0

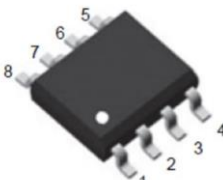
Feature

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

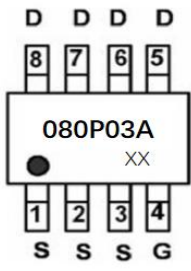
Product Summary

V_{DS}	-30	V
$V_{GS(th)}_{Typ}$	-1.8	V
$R_{DS(ON)}_{Typ}$ (at $V_{GS} = -10V$)	7	mΩ
I_D (at $V_{GS} = -10V$) ⁽¹⁾	-15	A

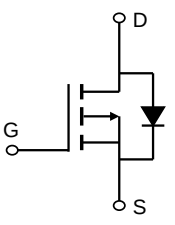
Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM009P03Q	SOP-8	080P03A	Tape	13" Reel	4000



SOP-8



Marking and 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	-15	A
		-10	
Pulsed Drain Current ⁽²⁾	I_{DM}	-60	A
Maximum Body-Diode Continuous Current	I_S	-15	A
Avalanche Energy ⁽³⁾	E_{AS}	132	mJ
Power Dissipation ⁽⁴⁾	P_D	1.7	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	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V	-	-	-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =-250μA	-1	-1.8	-2.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-15A	-	7	9	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	10	14	
V _{SD}	Diode Forward Voltage	I _S =-15A, V _{GS} =0V	-	-	-1.2	V
DYNAMIC PARAMETERS ⁽⁵⁾						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz	-	3367	-	pF
C _{oss}	Output Capacitance		-	473	-	pF
C _{rss}	Reverse Transfer Capacitance		-	325	-	pF
SWITCHING PARAMETERS ⁽⁵⁾						
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DD} =-15V, I _D =-10A	-	61	-	nC
Q _{gs}	Gate Source Charge		-	11	-	nC
Q _{gd}	Gate Drain Charge		-	15	-	nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =-10V, V _{DS} =-15V, I _D =-10A, R _{GEN} =3.0Ω	-	7.1	-	ns
t _r	Turn-On Rise Time		-	6.1	-	ns
t _{D(off)}	Turn-Off Delay Time		-	113	-	ns
t _f	Turn-Off Fall Time		-	79	-	ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-10A, di/dt=100A/μs	-	23	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-10A, di/dt=100A/μs	-	11	-	nC

Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal resistance from junction to ambient	-	73	$^{\circ}\text{C} / \text{W}$

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. This single-pulse measurement was taken under $T_{J_Max}=150^{\circ}\text{C}$.
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

Figure 1: Saturation Characteristics

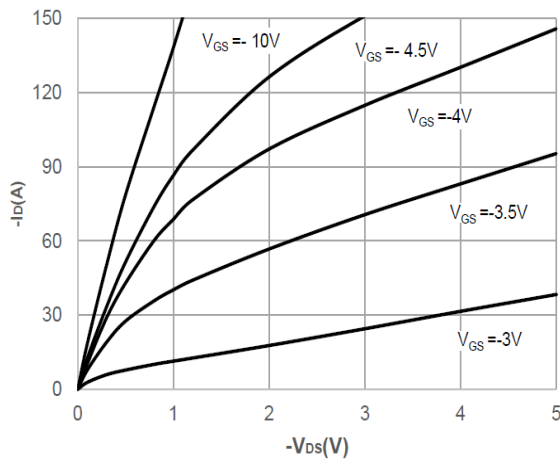


Figure 2: Transfer Characteristics

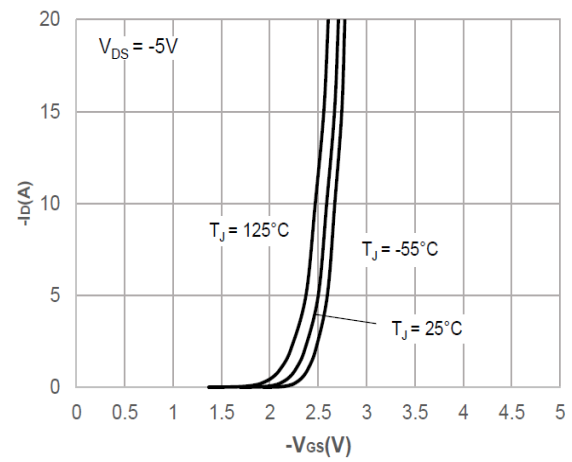
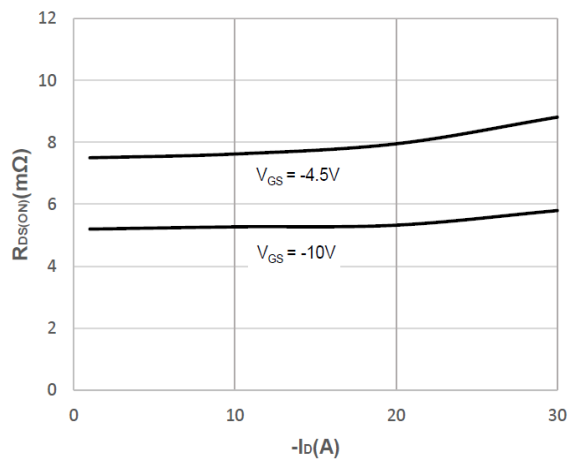
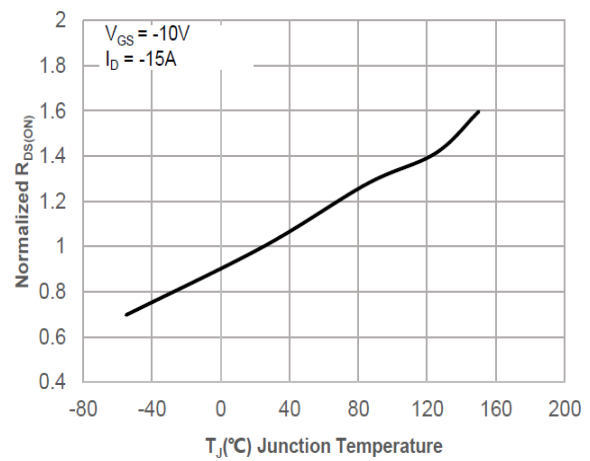
Figure 3: $R_{DS(ON)}$ vs. Drain CurrentFigure 4: $R_{DS(ON)}$ vs. Junction Temperature

Figure 5: Normalized Breakdown voltage vs. Junction Temperature

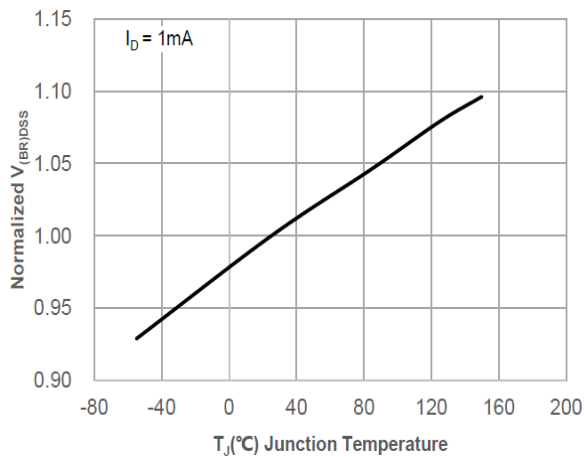
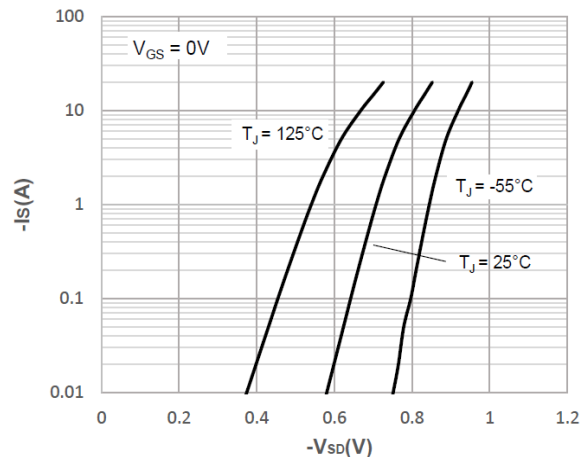


Figure 6: Body-Diode Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Gate-Charge characteristics

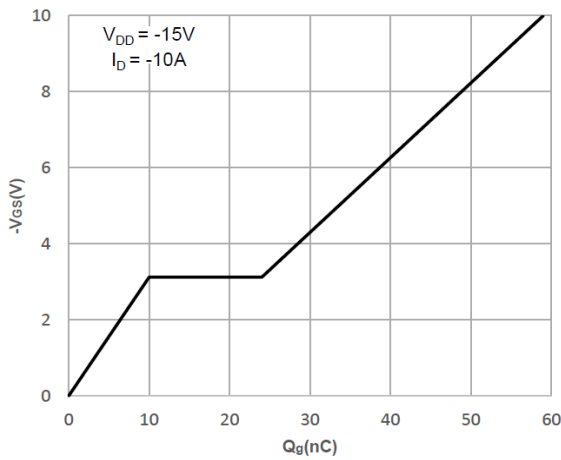


Figure 8: Capacitance characteristics

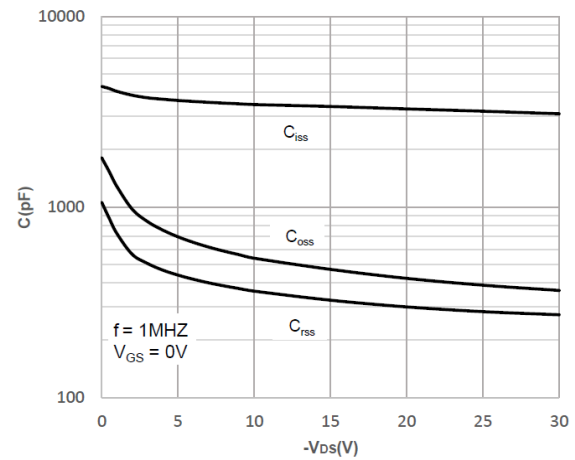


Figure 9: Current De-rating

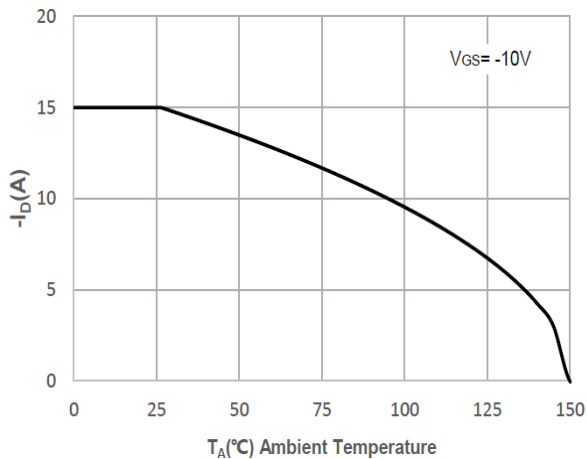


Figure 10: Maximum Safe Operating Area

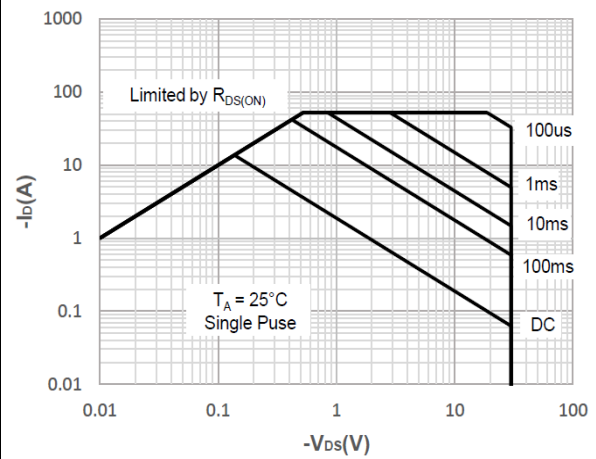
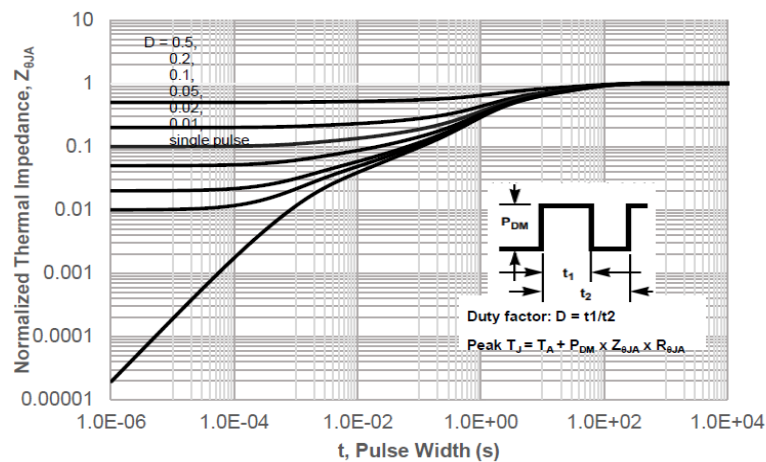


Figure 11: Normalized Maximum Transient Thermal Impedance



Test Circuit

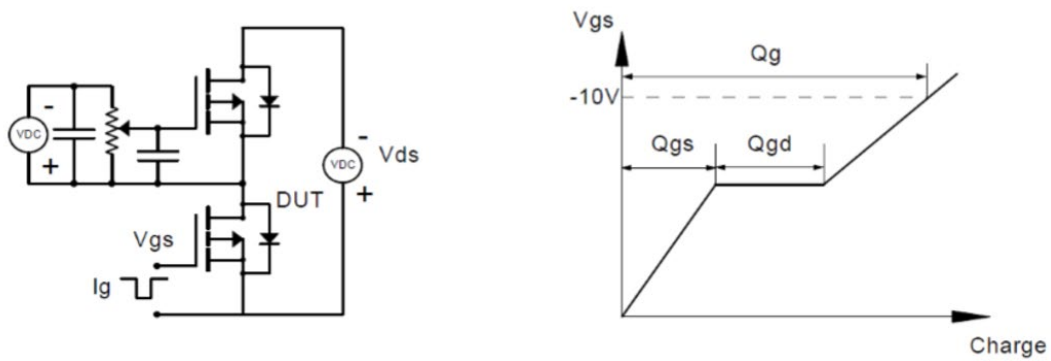


Figure1: Gate Charge Test Circuit & Waveforms

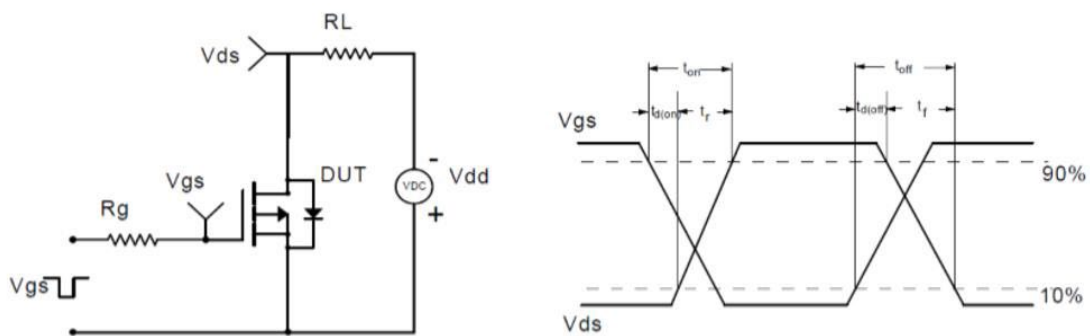


Figure2: Resistive Switching Test Circuit & Waveforms

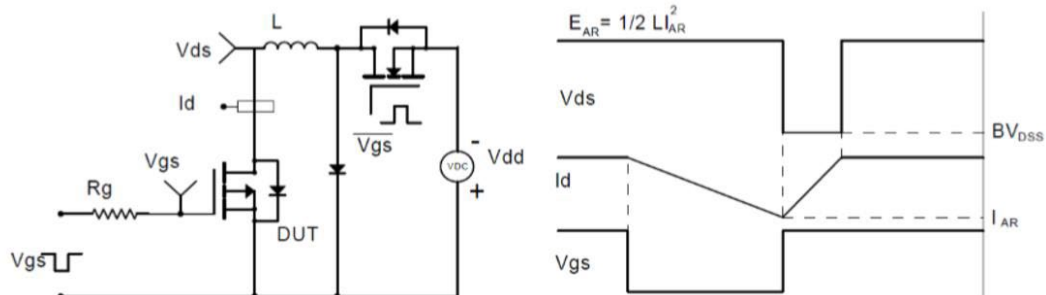


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

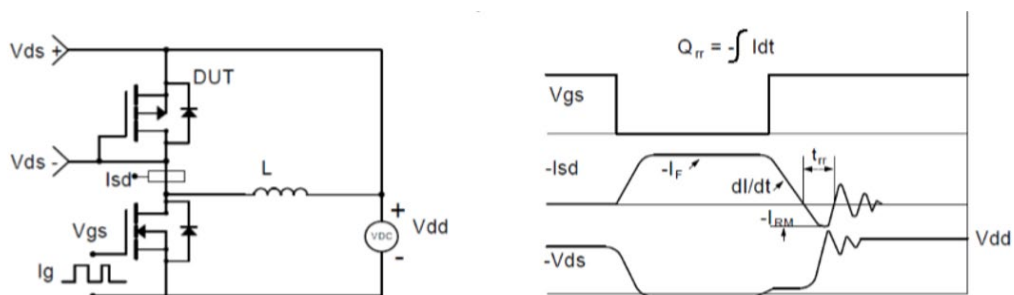
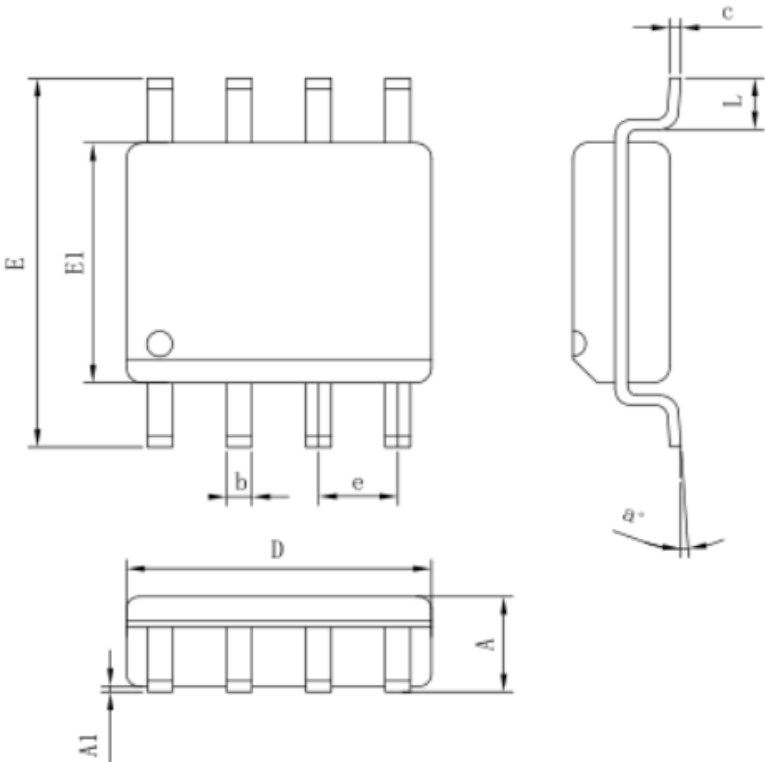


Figure4: Diode Recovery Test Circuit & Waveforms

SOP-8 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	--	--	1.75
A1	0.10	--	0.23
b	0.35	--	0.48
c	0.19	--	0.25
D	4.70	4.90	5.00
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
L	0.50	--	0.80
a*	0*	--	8*