

SDM005G06K

60V SGT N-Channel MOSFETs

Rev A.0

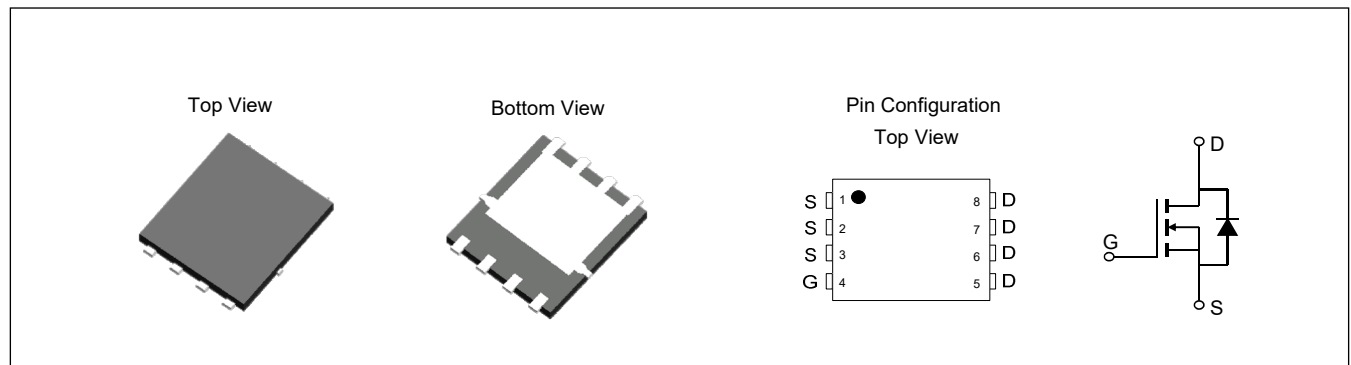
Feature

- ✧ 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}	60	V
$V_{GS(th_Typ)}$	1.8	V
$R_{DS(ON)_Typ}$ (at $V_{GS} = 10V$)	4.0	m Ω
I_D (at $V_{GS} = 10V$) ⁽¹⁾	97	A

Type	Package	Marking	Outline	Media	Quantity (pcs)
SDM005G06K	PDFN5x6-8L	M005G06	Tape	13" Reel	5000



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

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	$T_C=25^\circ C$	I_D	97	A
	$T_C=100^\circ C$		61	
Pulsed Drain Current ⁽²⁾		I_{DM}	360	A
Maximum Body-Diode Continuous Current		I_S	121	A
Avalanche Current ⁽³⁾		I_{AS}	39	A
Avalanche Energy ⁽³⁾		E_{AS}	76	mJ
Power Dissipation ⁽⁴⁾	$T_C=25^\circ C$	P_D	78	W
	$T_C=100^\circ C$		31	
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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=48\text{V}, V_{GS}=0\text{V}$	-	-	1	μA
		$T_J=55^{\circ}\text{C}$	-	-	5	
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	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2	1.8	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$	-	4.0	5.0	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=15\text{A}$	-	5.2	6.5	$\text{m}\Omega$
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$	-	0.7	1.0	V
DYNAMIC PARAMETERS ⁽⁵⁾						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$	-	2031	-	pF
C_{oss}	Output Capacitance		-	447	-	pF
C_{rss}	Reverse Transfer Capacitance		-	4.5	-	pF
R_g	Gate Resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	-	1.79	-	Ω
SWITCHING PARAMETERS ⁽⁵⁾						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=0 \text{ to } 10\text{V}, V_{DS}=30\text{V}, I_D=20\text{A}$	-	33	-	nC
$Q_g(4.5\text{V})$	Total Gate Charge		-	15.1	-	nC
Q_{gs}	Gate Source Charge		-	4.5	-	nC
Q_{gd}	Gate Drain Charge		-	5.1	-	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, R_L=1.5\Omega, R_{GEN}=6\Omega$	-	6.5	-	ns
t_r	Turn-On Rise Time		-	7.9	-	ns
$t_{D(off)}$	Turn-Off Delay Time		-	41	-	ns
t_f	Turn-Off Fall Time		-	15.7	-	ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, di/dt=100\text{A}/\mu\text{s}$	-	41	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, di/dt=100\text{A}/\mu\text{s}$	-	47	-	nC

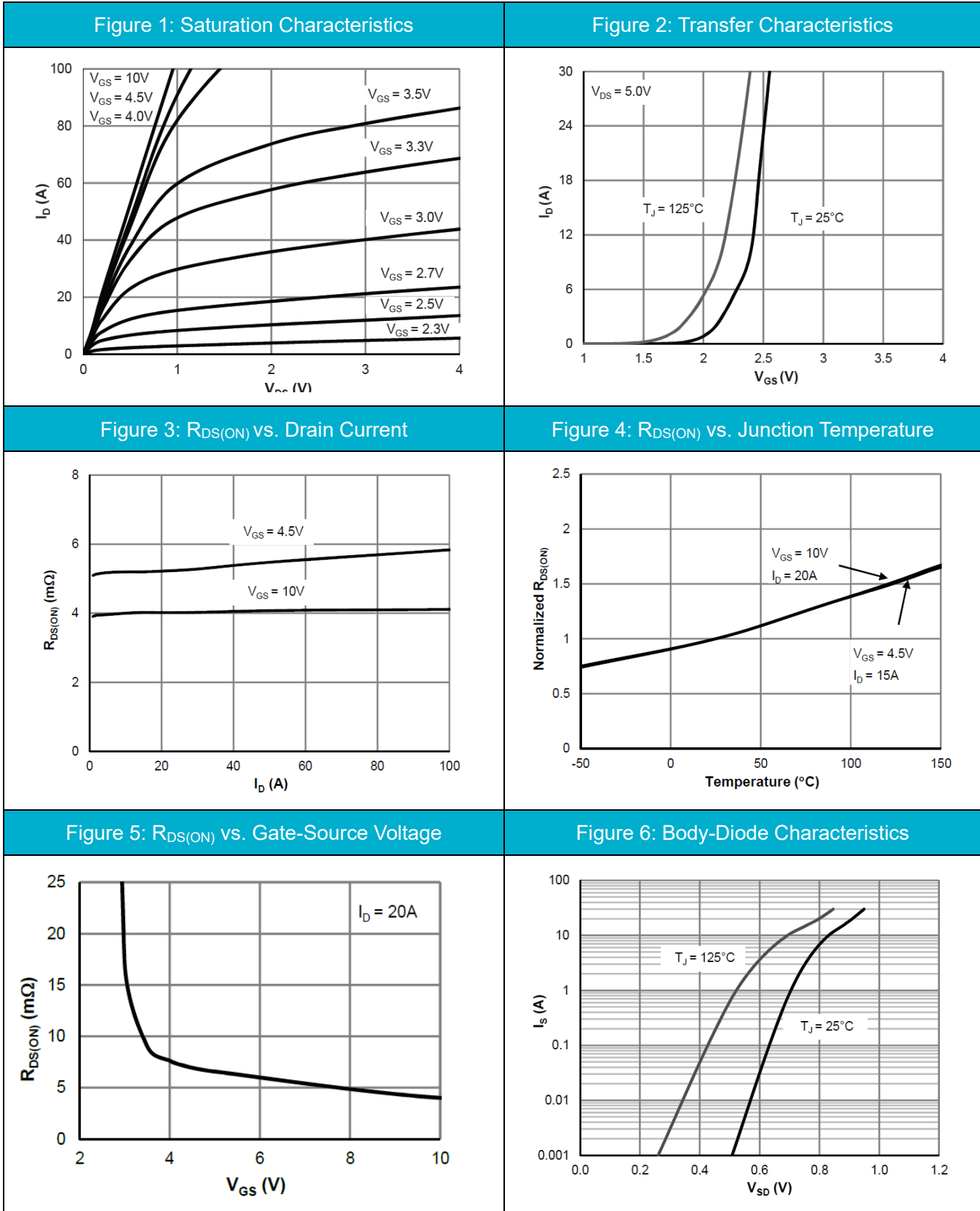
Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal resistance from junction to Ambient	50	65	$^{\circ}\text{C} / \text{W}$
$R_{\theta JC}$	Thermal resistance from junction to Case	1.3	1.6	$^{\circ}\text{C} / \text{W}$

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 [$L=100\mu\text{H}$, $V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$] 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



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Figure 7: Gate-Charge characteristics

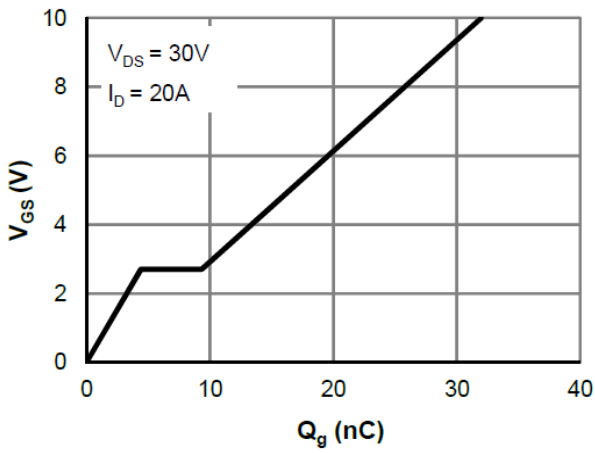


Figure 8: Capacitance characteristics

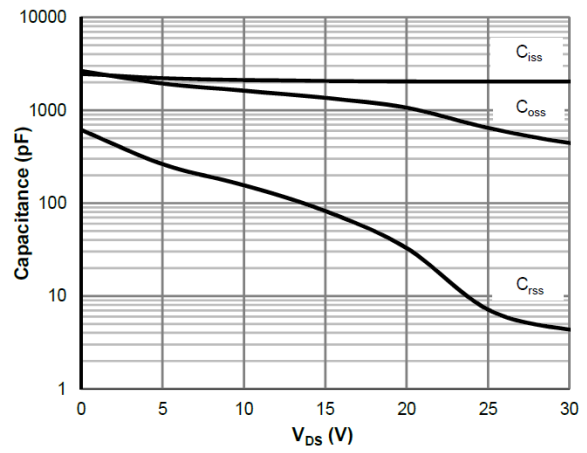


Figure 9: Current De-rating

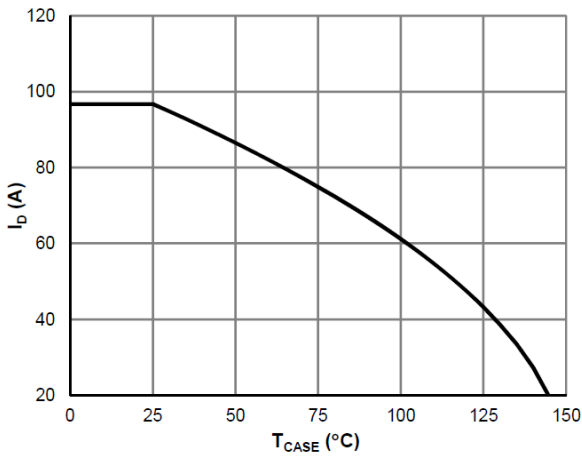


Figure 10: Power De-rating

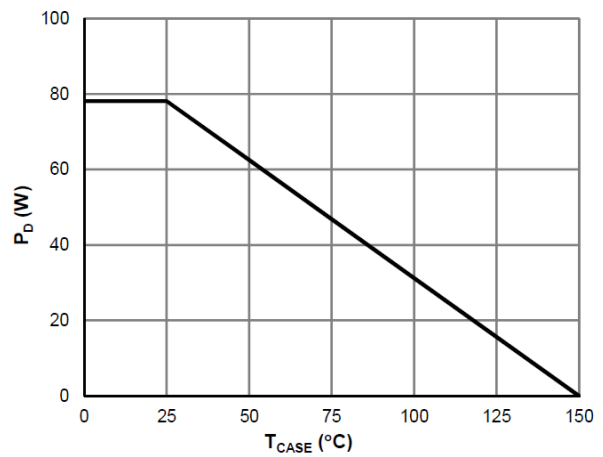


Figure 11: Maximum Safe Operating Area

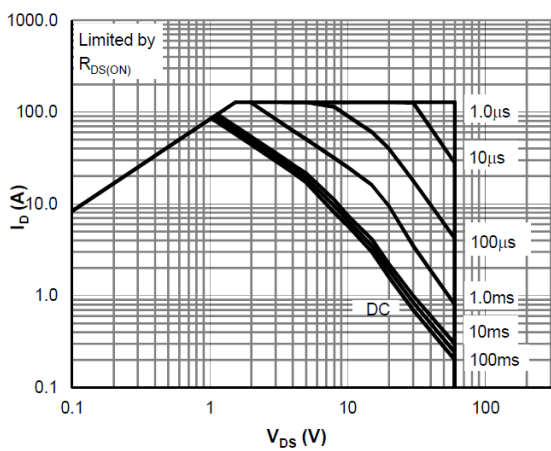
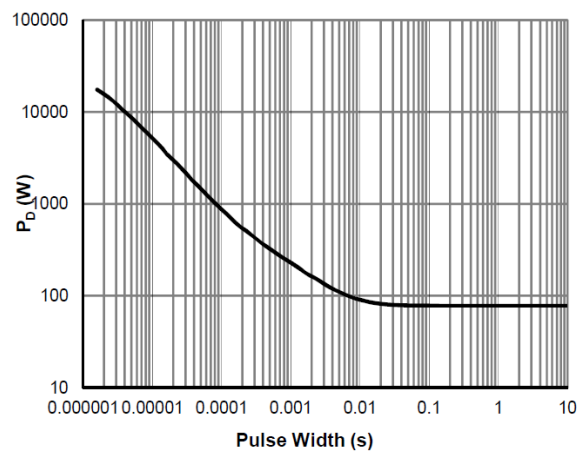
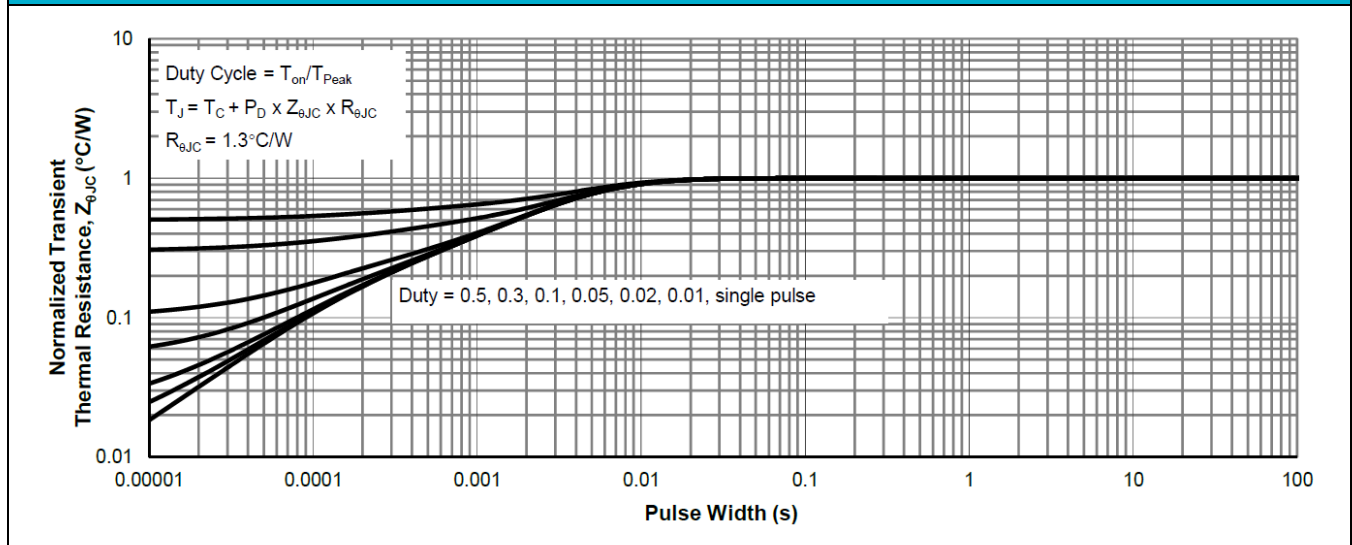


Figure 12: Single Pulse Power Rating, Junction-to-Case



Typical Electrical and Thermal Characteristics

Figure 13: Normalized Maximum Transient Thermal Impedance



Test Circuit

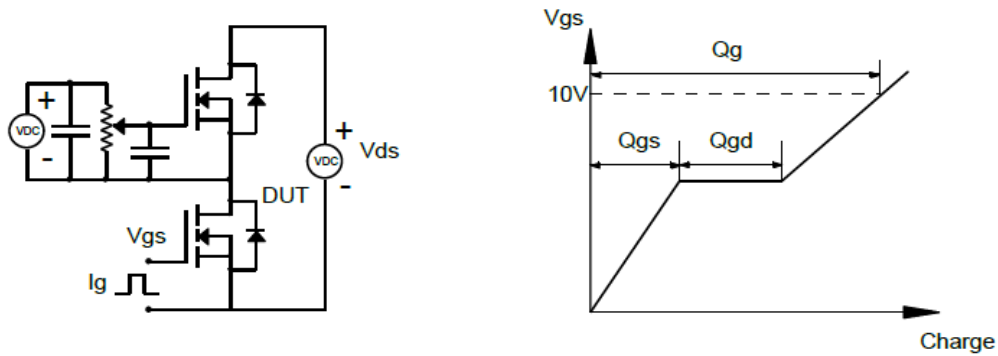


Figure1: Gate Charge Test Circuit & Waveforms

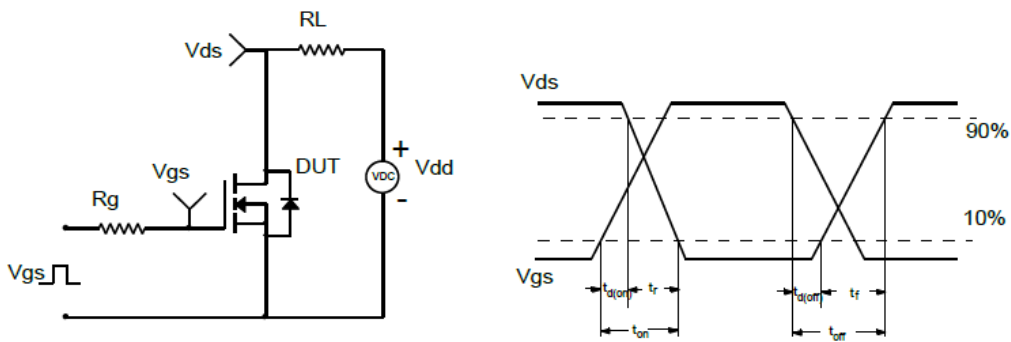


Figure2: Resistive Switching Test Circuit & Waveforms

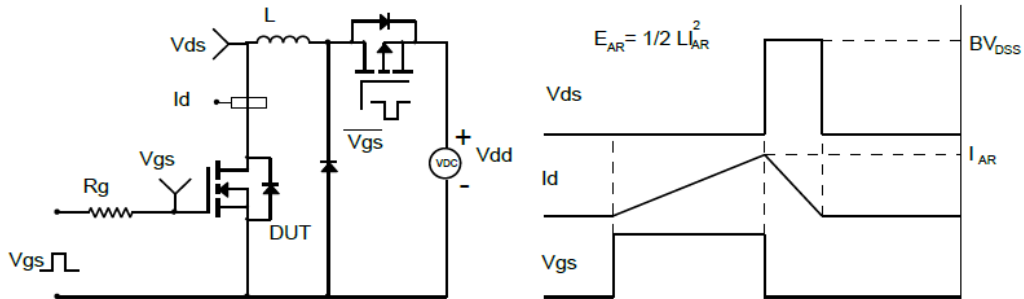


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

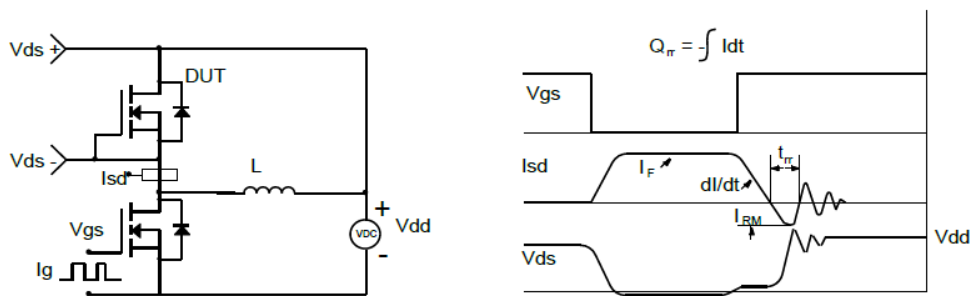
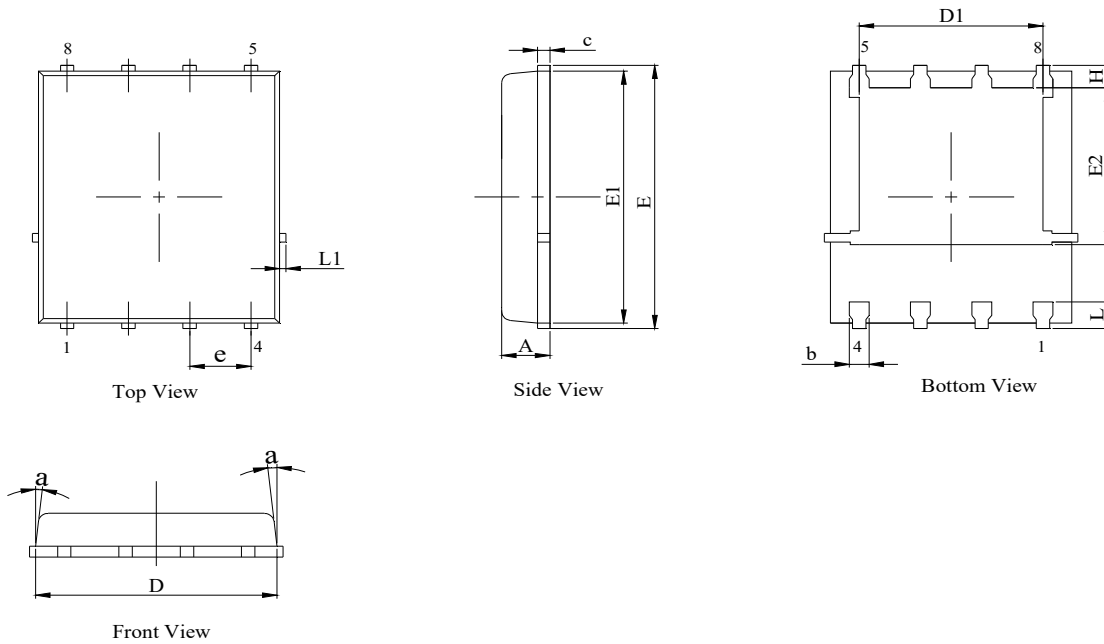


Figure4: Diode Recovery Test Circuit & Waveforms

SDM005G06K

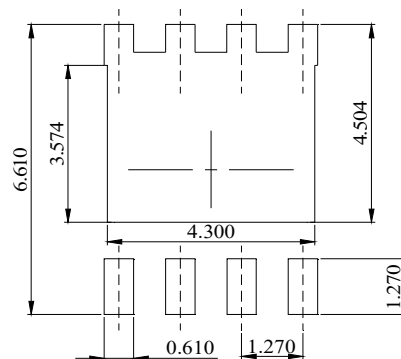
PDFN5x6-8L Package Information



NOTES:

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter (angle in degree).
3. Dimensions D and $E1$ do not include mold flash protrusions or gate burrs.

DIM.	MILLIMETER	
	MIN.	MAX.
A	0.90	1.20
b	0.33	0.51
c	0.23	0.33
D	4.80	5.40
D1	3.61	4.25
E	5.90	6.30
E1	5.55	5.95
E2	3.35	3.95
e	1.27 BSC	
H	0.41	0.80
L	0.51	0.80
L1	-	0.15
a	0°	12°



DIMENSIONS: MILLIMETERS