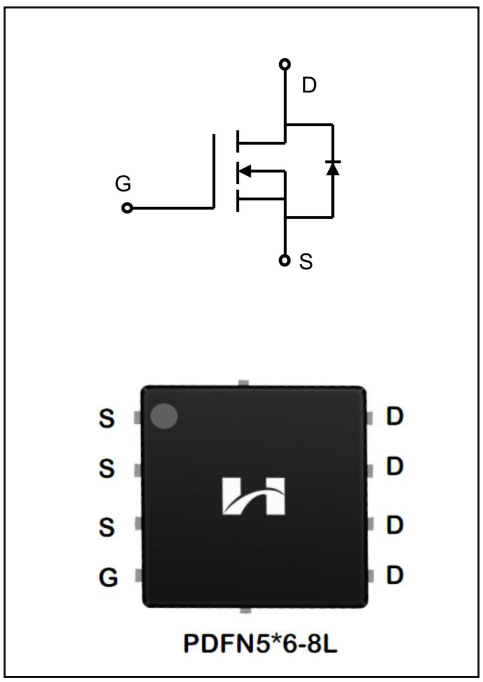
60V, 140A N-CHANNEL POWER MOSFET



GENERAL DESCRIPTION

The SGM062R5Tuses advanced SGT technology and design to provide excellent $R_{DS(on)}$ with low gate charge.
It can be used in a wide variety applications.

Features

- ◆V_{DS}=60V, I_D=140A
- ◆$R_{DS(on)}$
  - TYP: 2.1mΩ @V_{GS}=10V
  - TYP: 2.9mΩ @V_{GS}=4.5V

Applications

- ◆PWM applications
- ◆Load Switching
- ◆Power management

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGM062R5T	PDFN5*6-8L	SGM062R5T	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C = 25°C	I_D	140	A
	T_C = 100°C		98	
Drain Current Pulsed(Note 1)		I_{DM}	560	A
Power Dissipation	T_C = 25°C	P_D	120	W
	T_C = 100°C		0.96	
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	512	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300	℃

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.04	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	60	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	--	--	1.0	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	1.0	1.8	2.5	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A	--	2.1	2.5	mΩ
		V_{GS}=4.5V, I_D=15A	--	2.9	3.4	
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V; f=1.0MHZ	--	1.6	--	Ω
Input Capacitance	C_{iss}	V_{DS}=30V V_{GS}=0V f=1.0MHZ	--	3040	--	pF
Output Capacitance	C_{oss}		--	1507	--	
Reverse Transfer Capacitance	C_{rss}		--	69	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=30V, V_{GS}=10V R_G=3.0Ω; I_D=25A	--	22.8	--	ns
Turn-on Rise Time	t_r		--	6.8	--	
Turn-off Delay Time	$t_{d(off)}$		--	81	--	
Turn-off Fall Time	t_f		--	28	--	

Total Gate Charge	Q_g	V_{DS}=50V, I_D=50A	--	92	--	nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V	--	17	--	
Gate-Drain Charge	Q_{gd}		--	15	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-NJunction Diode in the MOSFET	--	--	140	A
Pulsed Source Current	I_{SM}		--	--	560	
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V	--	--	1.2	V
Reverse Recovery Time	T_{rr}	I_F=20A,V_R=10V, dIF/dt=100A/μS	--	67	--	ns
Reverse Recovery Charge	Q_{rr}		--	75	--	nC

1.Pluse width limited by maximum junction temperature

2.L=0.5mH, V_{DD}=30V R_G=25Ω, V_{GS}=10V,starting T_J=25°C

3.Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

4.Essentially independent of operating temperature

Typical Performance Characteristics

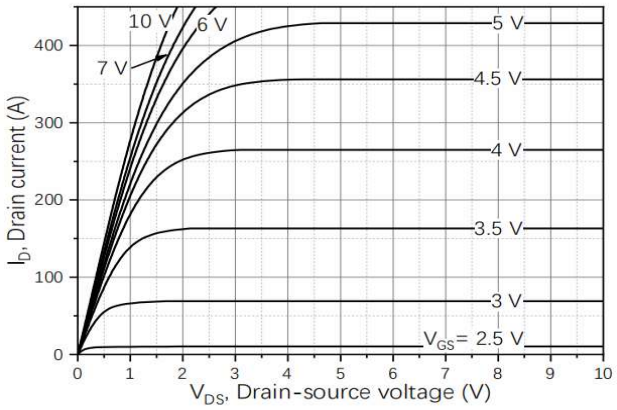


Figure1. Output Characteristics

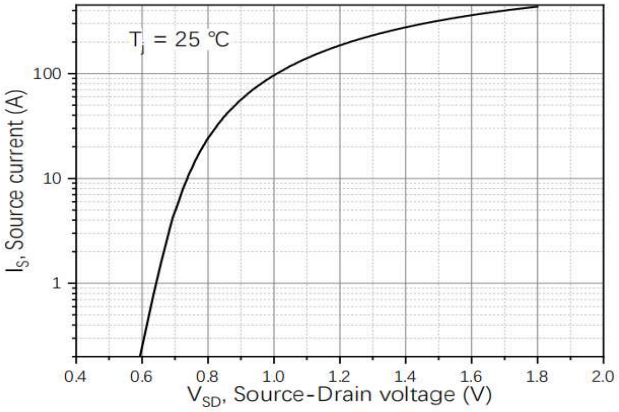


Figure2. Transfer Characteristics

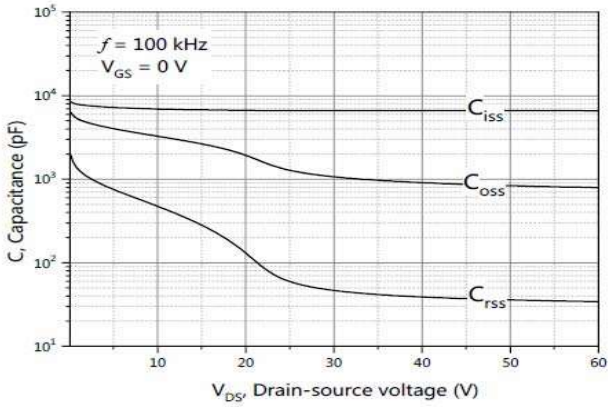


Figure3. Capacitance Characteristics

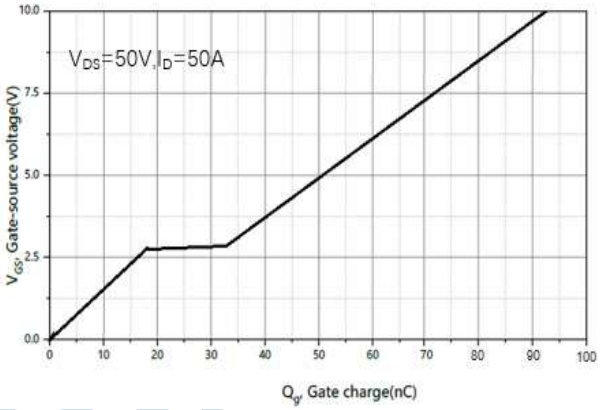


Figure4. Gate Charge

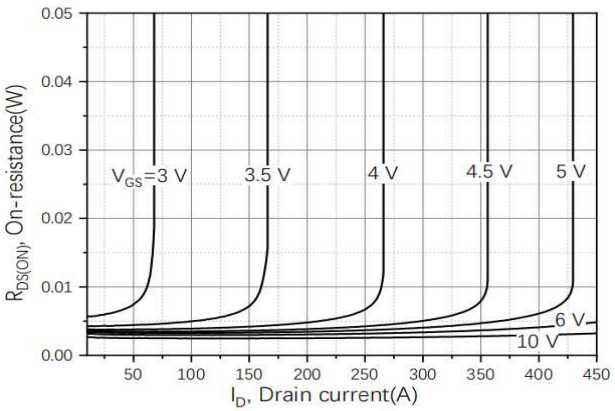


Figure5. Drain-Source on Resistance

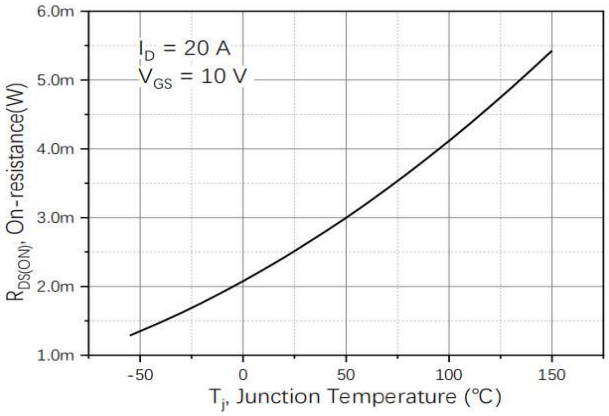


Figure6. Drain-Source on Resistance

Typical Performance Characteristics

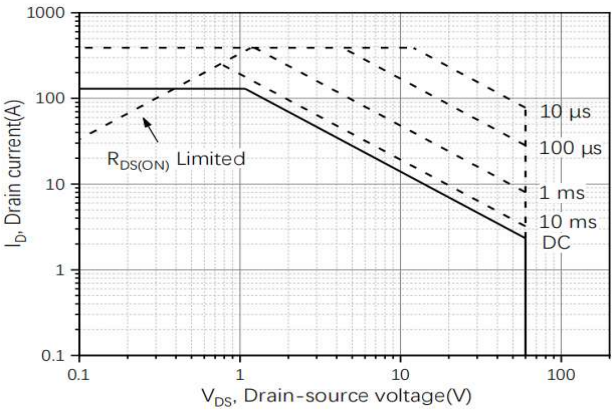


Figure7. Safe Operation Area

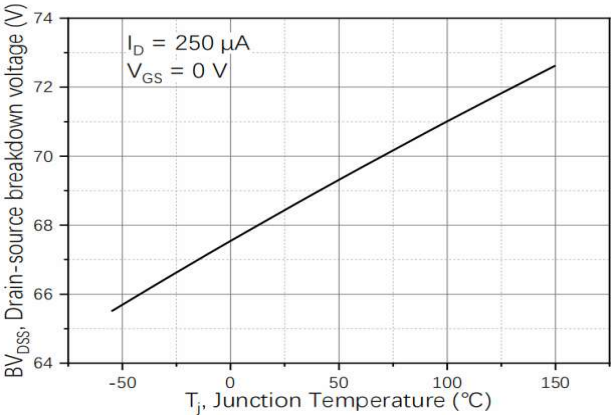


Figure8. Drain-source breakdown voltage

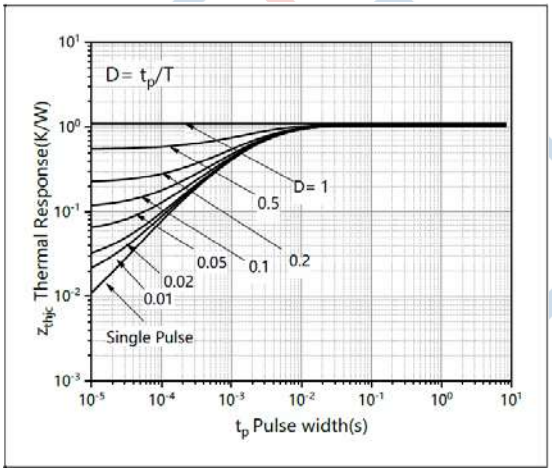
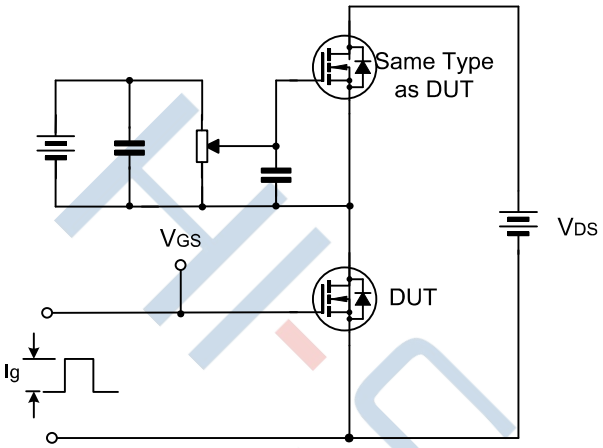
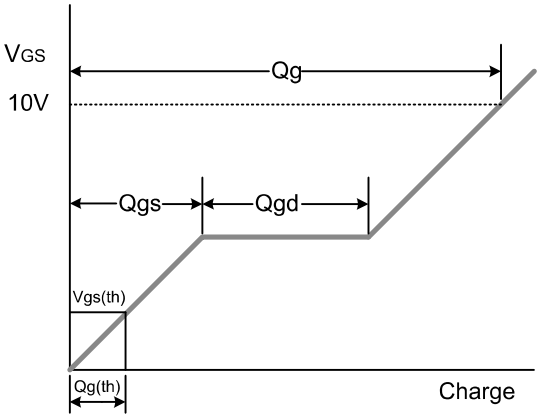


Figure 9.Transient thermal impedance

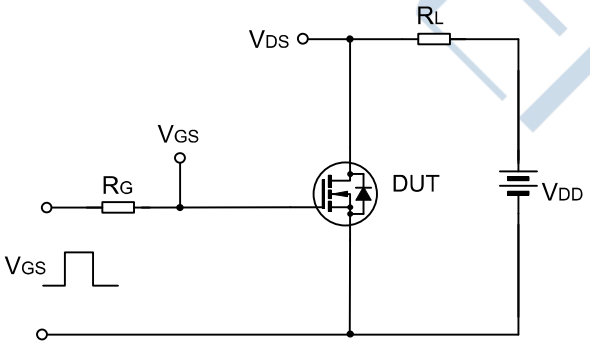
Test Circuit

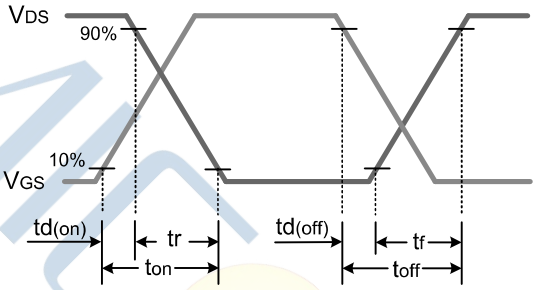
Gate Charge Test Circuit & Waveform



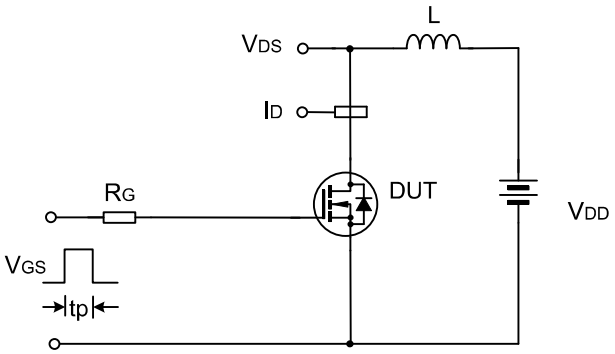


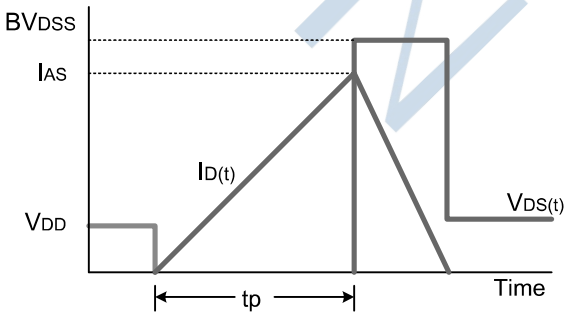
Resistive Switching Test Circuit & Waveform





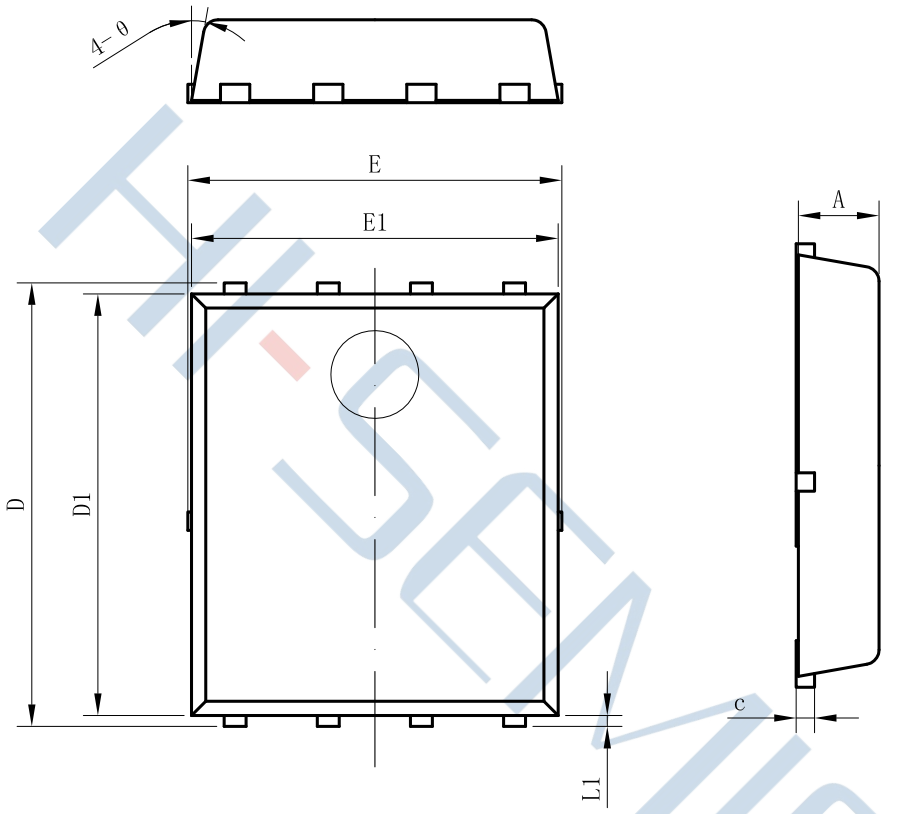
Unclamped Inductive Switching Test Circuit & Waveform

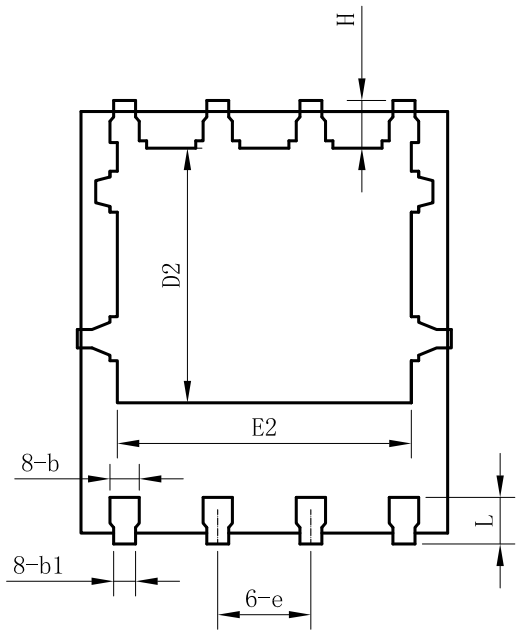




Package Dimensions of PDFN5*6-8L

Unit:mm





COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.0	1.1	1.2
b	0.35	0.4	0.45
b1		(0.3)	
c	0.2	0.25	0.35
D	5.9	6.05	6.2
D1	5.65	5.75	5.85
D2		(3.475)	
E			5.2
E1	4.9	5	5.1
E2		(4.01)	
e		1.27BSC	
H	0.5	0.65	0.75
L	0.51	0.635	0.75
L1		0.15	
θ		10°	

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