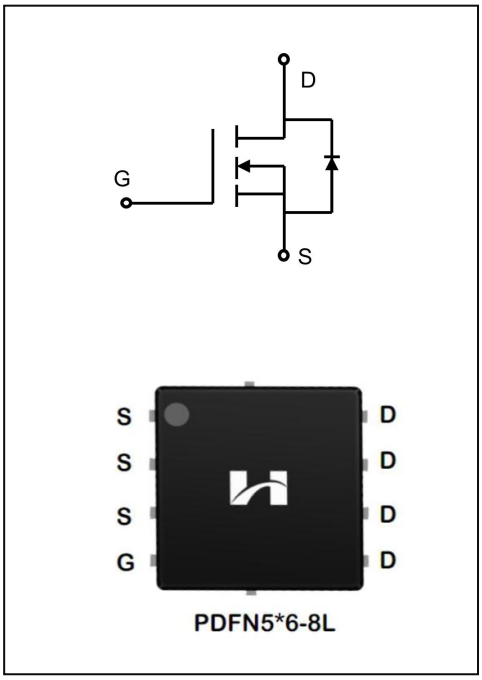
30V, 280A N-CHANNEL POWER MOSFET



GENERAL DESCRIPTION

The SGM030R7T uses 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}=30V,I_D=280A
- ◆$R_{DS(on)}$
  TYP:0.55mΩ@V_{GS}=10V

Applications

- ◆Power faction correction (PFC)
- ◆Switched mode power supplies (SMPS)
- ◆Uninterruptible power supply (UPS)
- ◆LED lighting power

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGM030R7T	PDFN5*6-8L	SGM030R7T	Pb Free	Reel

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Drain Current	T_C = 25°C	I_D	280	A
	T_C = 100°C		176	
Drain Current Pulsed(Note 1)		I_{DM}	1120	
Power Dissipation(T_C=25°C) -Derate above 25°C		P_D	139	W
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	135	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	260	

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.9	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	30	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, 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	1.3	1.6	2.3	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=30A	--	0.55	0.7	mΩ
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V, f=1.0MHZ	1	1.6	10	Ω
Input Capacitance	C_{iss}	V_{DS}=15V	--	9043	--	pF
Output Capacitance	C_{oss}	V_{GS}=0V	--	5388	--	
Reverse Transfer Capacitance	C_{rss}	f=1.0MHZ	--	291	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V, V_{DS}=10V	--	25	--	ns
Turn-on Rise Time	t_r	R_G=3Ω, I_D=20A	--	70	--	
Turn-off Delay Time	$t_{d(off)}$	(Note 3.4)	--	105	--	
Turn-off Fall Time	t_f		--	30	--	ns
Total Gate Charge	Q_g	V_{DS}=15V, I_D=45A	--	122	--	nc
Gate-Source Charge	Q_{gs}	V_{GS}=10V	--	37	--	
Gate-Drain Charge	Q_{gd}	(Note 3.4)	--	7.7	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	280	A
Pulsed Source Current	I_{SM}		--	--	1120	
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V	--	0.75	1.2	V
Reverse Recovery Time	T_{rr}	I_F=13.5A,V_R=30V, dIF/dt=100A/μS	--	102	--	ns
Reverse Recovery Charge	Q_{rr}		--	171	--	nC

1.Pulse width limited by maximum junction temperature

2.L=0.1mH, V_{DD}=24V,V_G=10V, R_G=25Ω, starting T_J=25°C

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

4.Essentially independent of operating temperature

Typical Performance Characteristics

Figure1.OutputCharacteristics

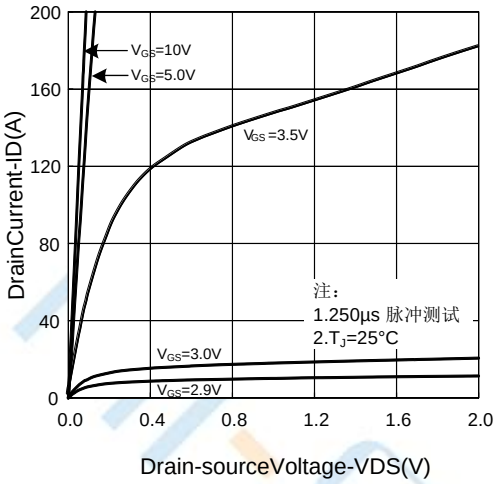


Figure2.TransferCharacteristics

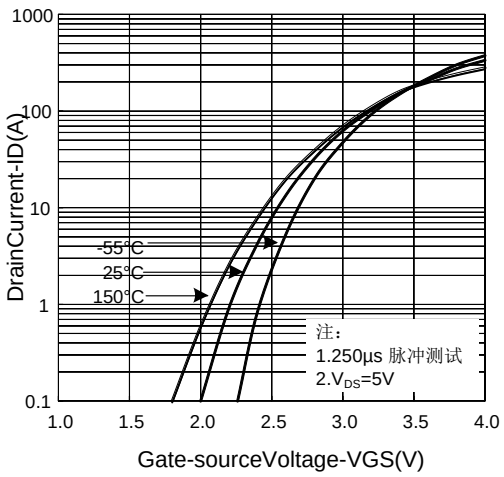


Figure3.On-resistancevs.DrainCurrent

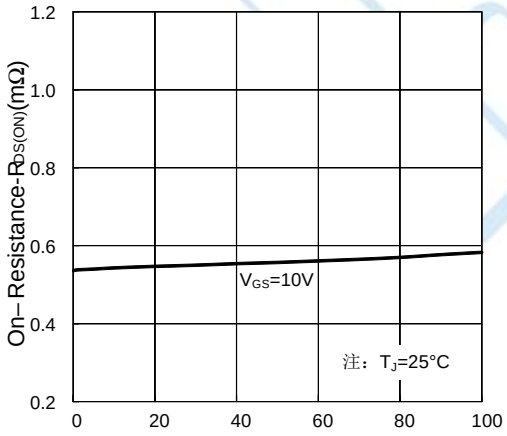


Figure4.BodyDiodeForwardVoltage Variationvs.SourceCurrentandTemperature

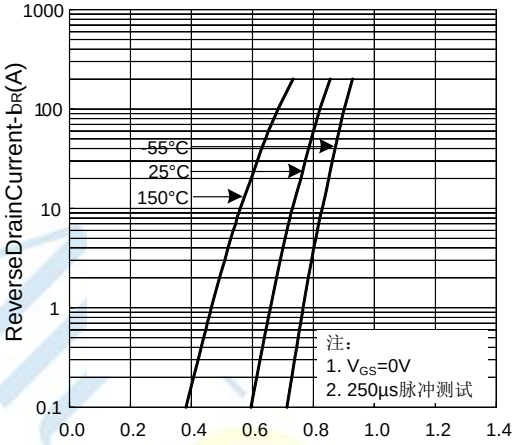


Figure5.CapacitanceCharacteristics

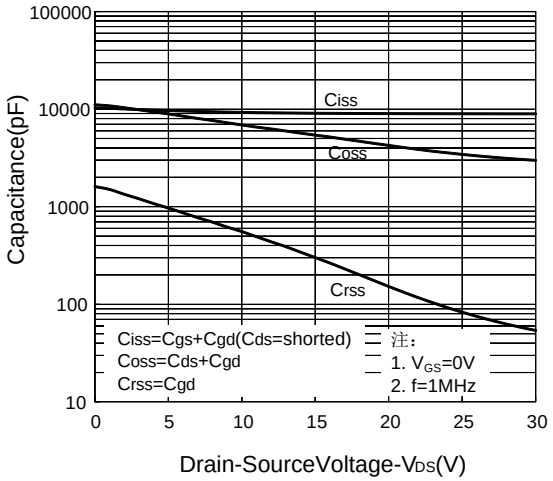
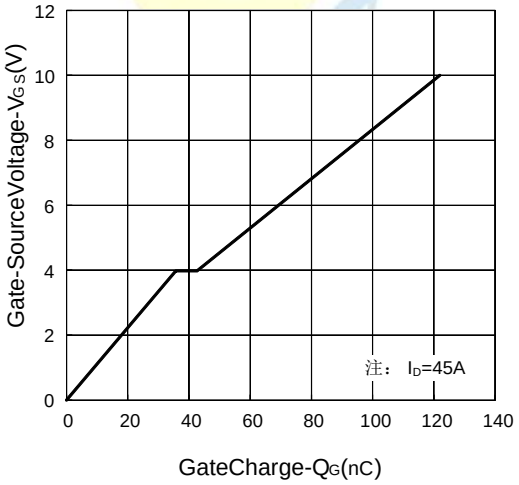


Figure6.GateCharge



Typical Performance Characteristics

Figure7.BreakdownVoltagevs. TemperatureCharacteristics

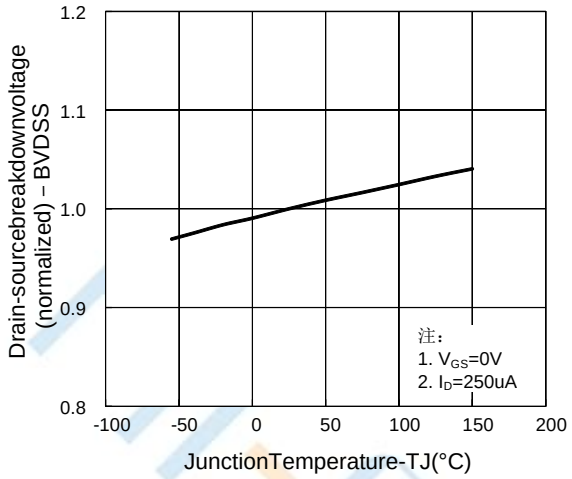


Figure8.On-resistancevs.Temperature Characteristics

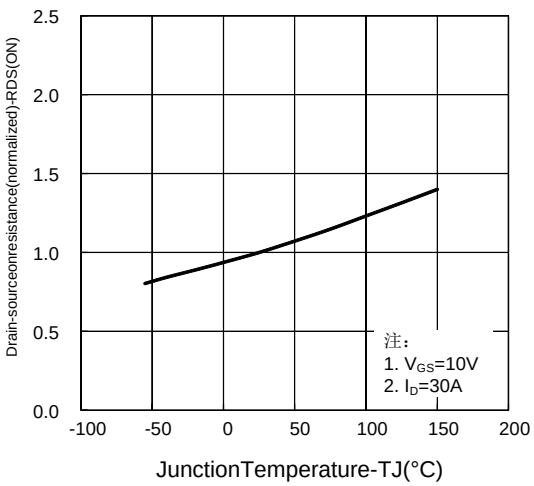
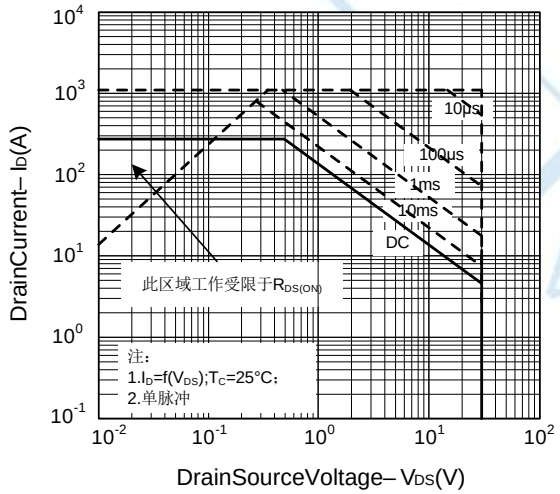
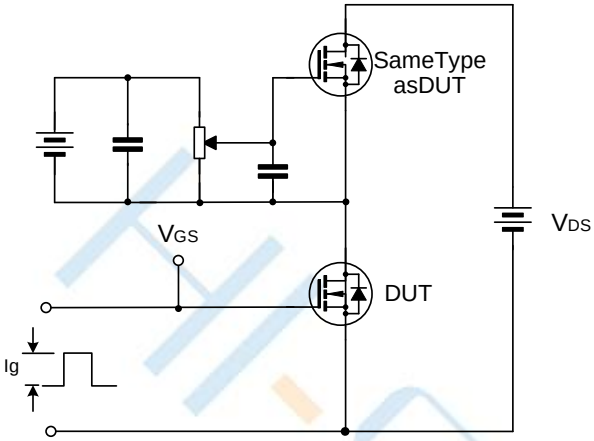


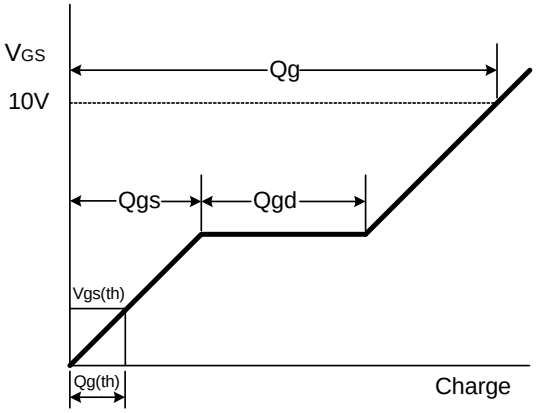
Figure9.Max.SafeOperatingArea



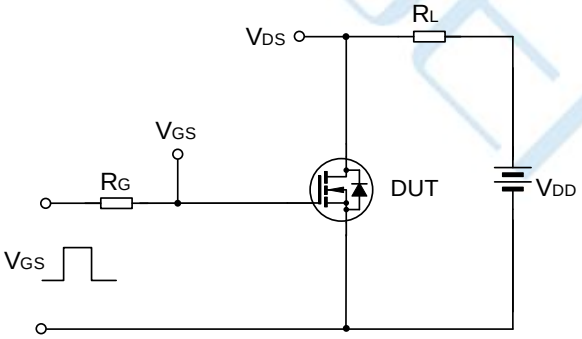
Test Circuit

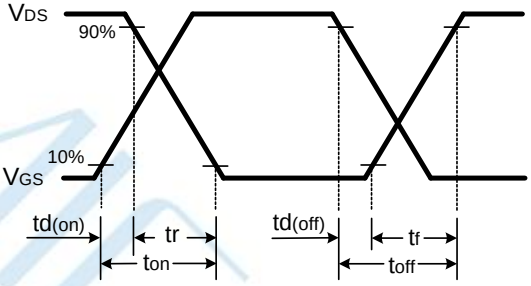
Gate Charge Test Circuit & Waveform



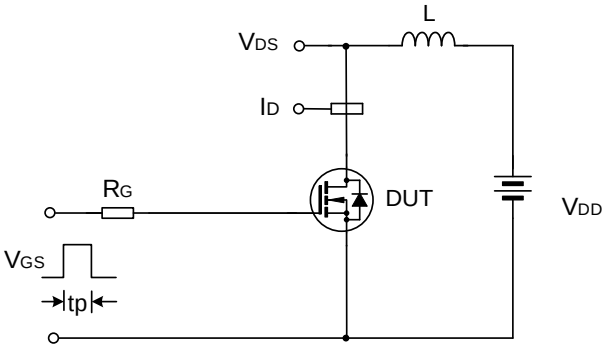


Resistive Switching Test Circuit & Waveform

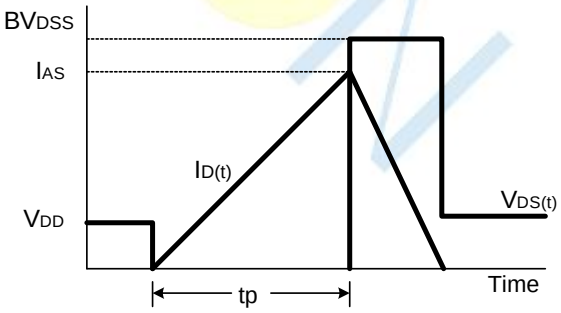




Unclamped Inductive Switching Test Circuit & Waveform

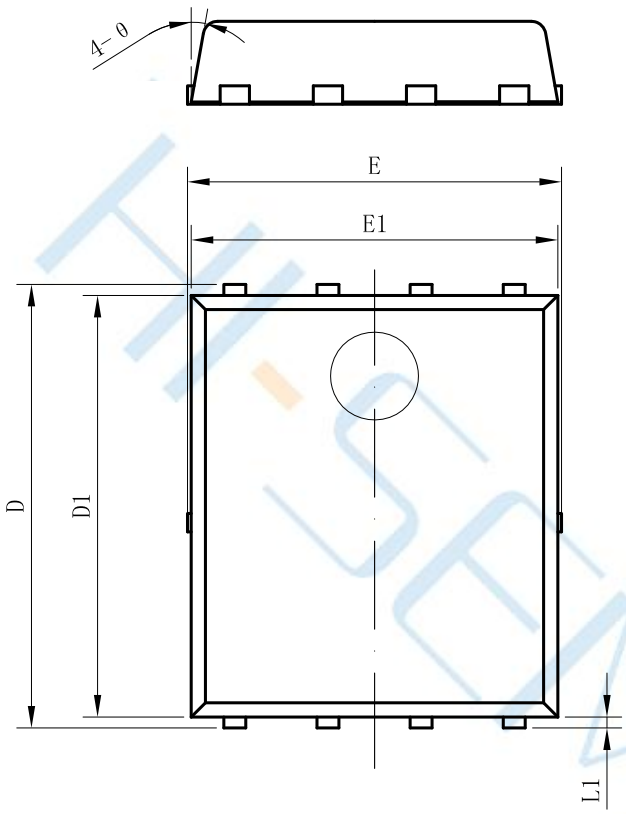


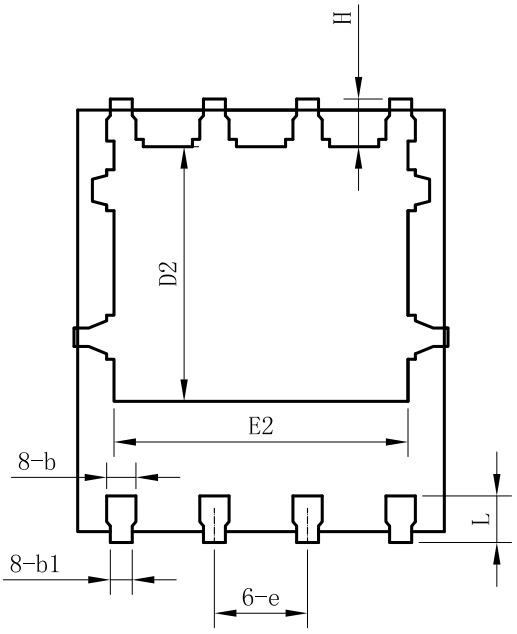
$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



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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