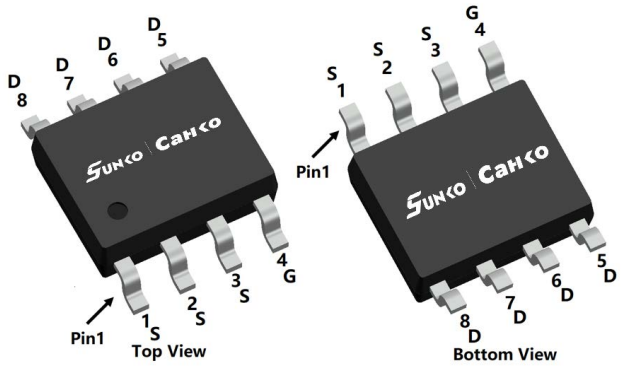
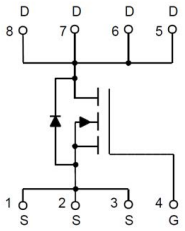
N-Channel Enhancement Mode Field Effect Transistor



SOP-8



Product Summary

- V_{DS} 60V
- I_D 12A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜8.5 mohm
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜12 mohm
- 100% EAS Tested

General Description

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC-DC Converters
- Power management functions
- Industrial and Motor Drive application

■ Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current (Silicon limited)	T_A=25℃	I_D	12	A
	T_A=100℃		7.5	
Pulsed Drain Current [A]		I_{DM}	48	A
Avalanche energy [B]		E_{AS}	132	mJ
Total Power Dissipation [C]		P_D	3.1	W
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+150	℃

■Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient [D]	t≤10S	$R_{\theta JA}$	31	40	℃/W
Thermal Resistance Junction-to-Ambient [D]	Steady-State		59	75	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JL}$	16	24	

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCS12G06D	F2	Q12G06D	4000	8000	64000	13“ reel

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Static Parameter							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA		60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	T_J=25℃			1	μA
			T_J=55℃			5	
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V				±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA		1.2	1.7	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=12A			6.8	8.5	mΩ
		V_{GS}= 4.5V, I_D=10A			8.3	12	
Diode Forward Voltage	V_{SD}	I_S=12A,V_{GS}=0V			0.85	1.3	V
Maximum Body-Diode Continuous Current	I_S					12	A
Dynamic Parameters							
Input Capacitance	C_{iss}	V_{DS}=35V,V_{GS}=0V,f=1MHZ			2000		pF
Output Capacitance	C_{oss}				390		
Reverse Transfer Capacitance	C_{rss}				13		
Gate Resistance	R_g	f=1MHZ, Open drain			1.6		Ω
Switching Parameters							
Total Gate Charge	Q_g(10V)	V_{DS}=30V,I_D=12A			34		nC
Total Gate Charge	Q_g(4.5V)				15.8		
Gate-Source Charge	Q_{gs}				7.8		
Gate-Drain Charge	Q_{gd}				5.2		
Reverse Recovery Charge	Q_{rr}	I_F=12A, di/dt=200A/us			36		
Reverse Recovery Time	t_{rr}				27		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=30V,I_D=12A R_{GEN}=3Ω			10		
Turn-on Rise Time	t_r				36		
Turn-off Delay Time	$t_{D(off)}$				30		
Turn-off fall Time	t_f				57		

A. Repetitive rating; pulse width limited by max. junction temperature.
B. V_{DD}=50V, R_G=25Ω, L=0.5mH, I_{AS}=23A,.
C. Pd is based on max. junction temperature, using ≤10s junction-ambient thermal resistance.
D. The value of RθJA is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with TA =25° C. The Power dissipation PDSM is based on RθJA t≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

■ Typical Performance Characteristics

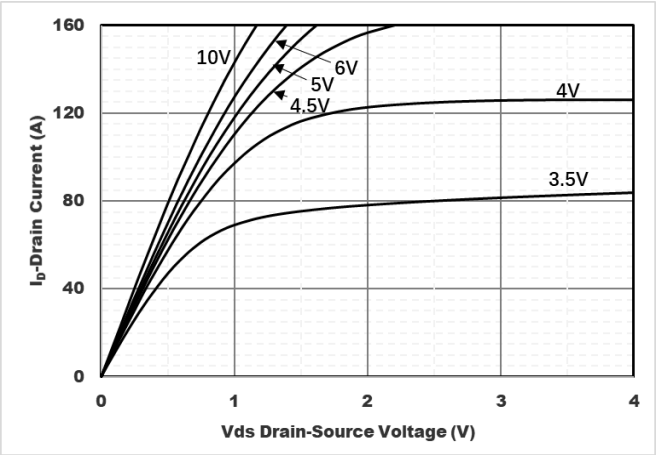


Figure1. Output Characteristics

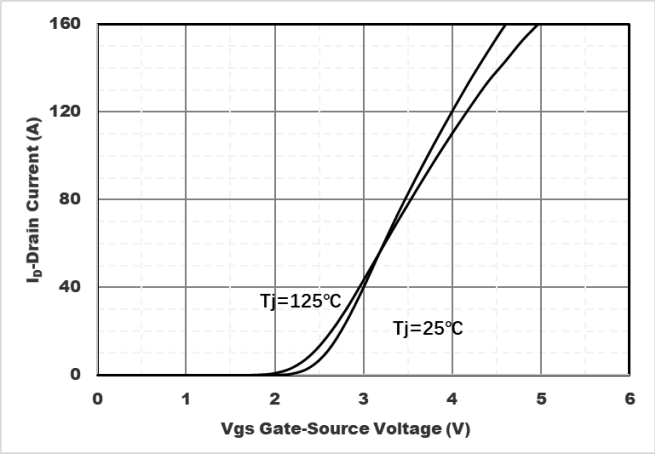


Figure2. Transfer Characteristics

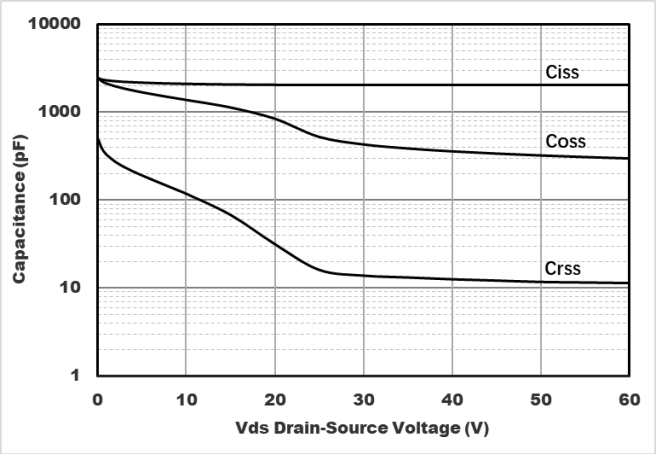


Figure3. Capacitance Characteristics

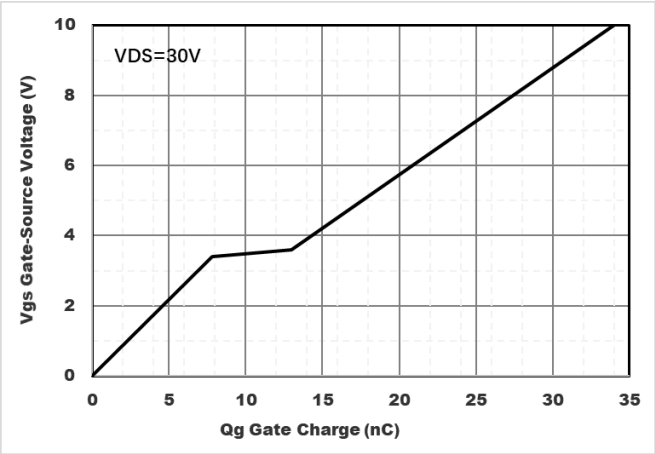


Figure4. Gate Charge

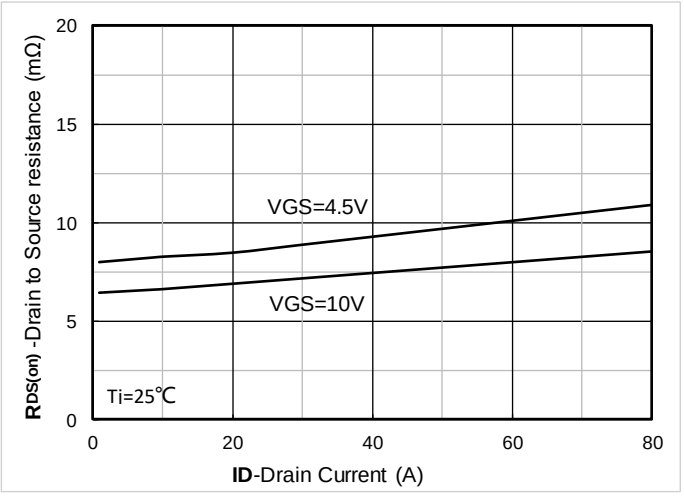


Figure5. Drain-Source on Resistance

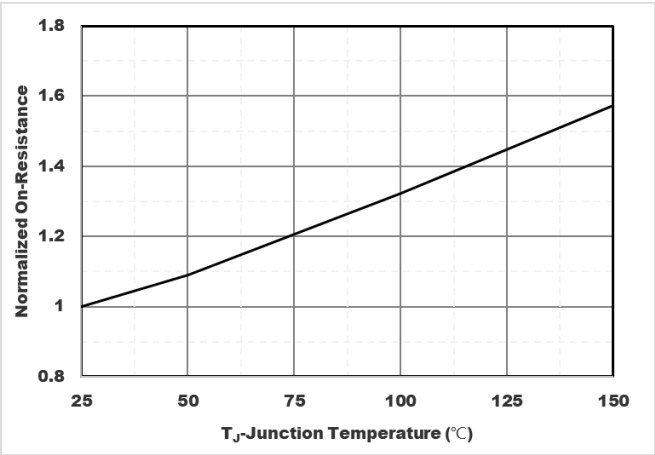


Figure6. Normalized On-Resistance

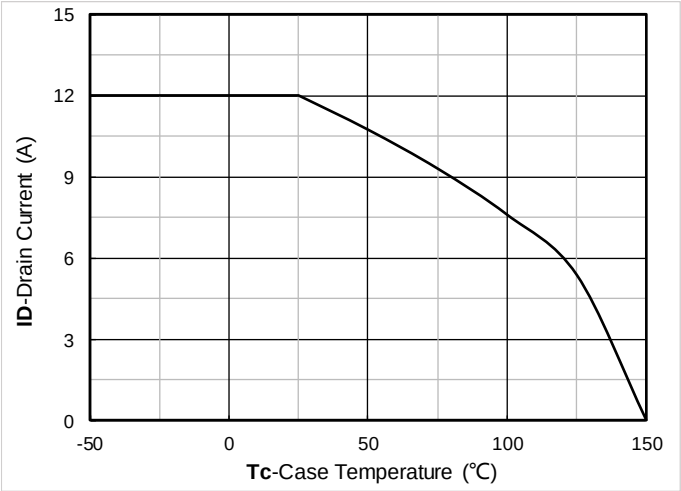


Figure7. Drain current

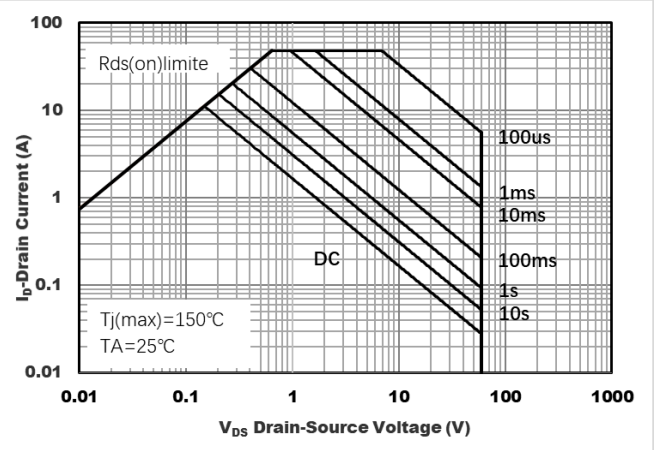


Figure8. Safe Operation Area

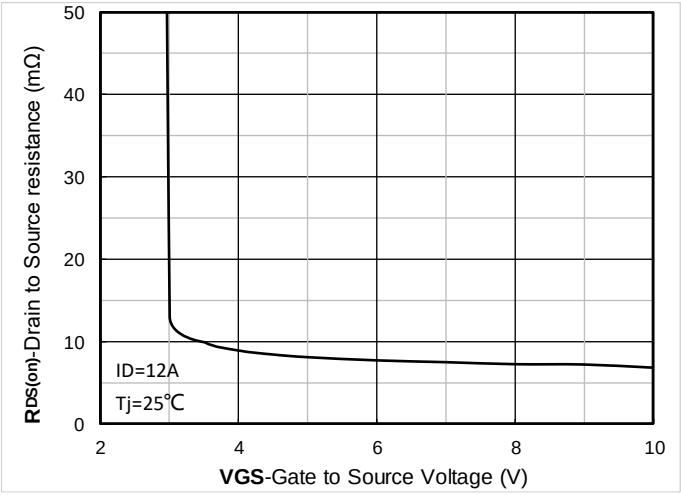


Figure 9. On-Resistance vs Gate to Source Voltage

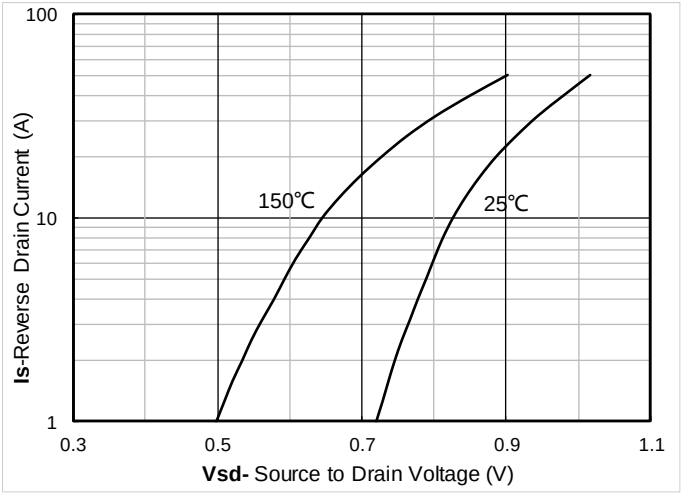


Figure 10. Forward characteristics of reverse diode

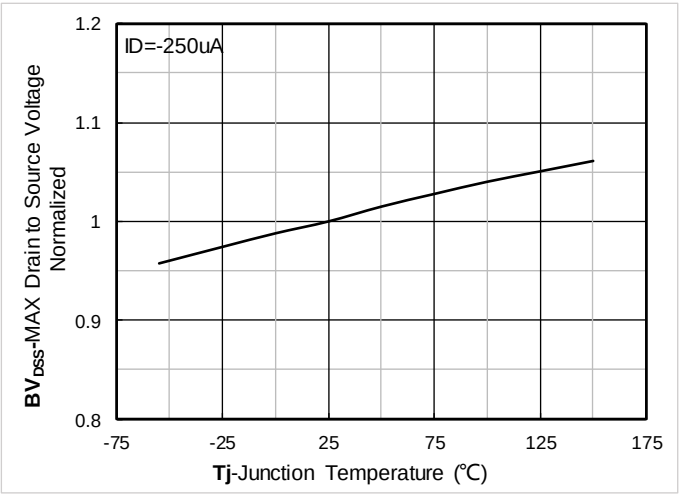


Figure 11. Normalized breakdown voltage

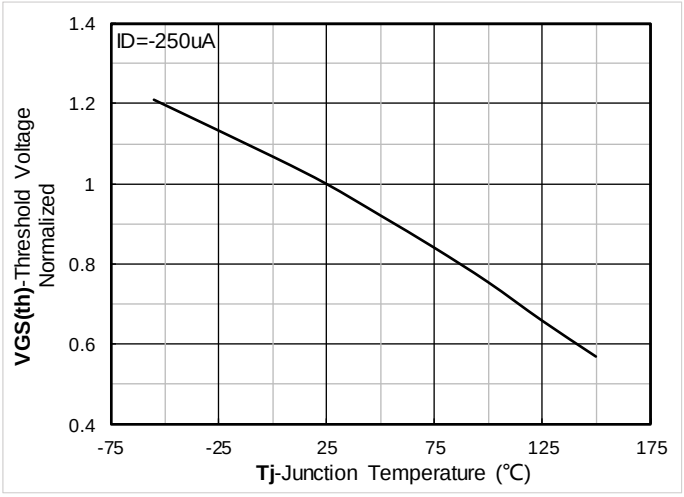


Figure 12. Normalized Threshold voltage

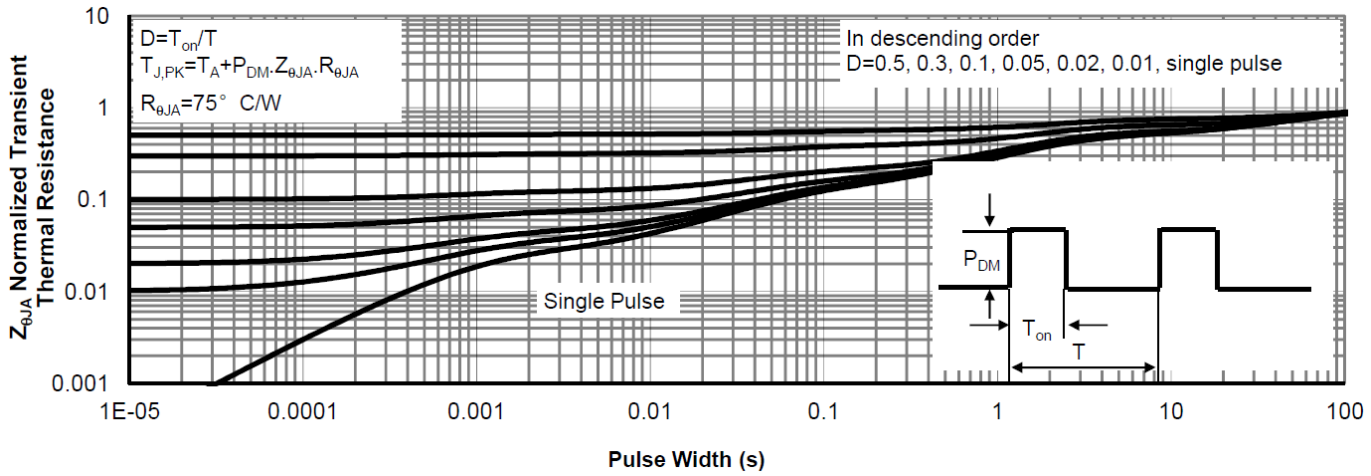
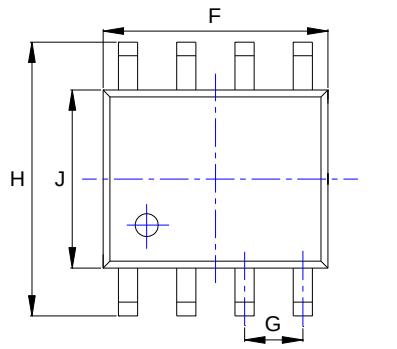
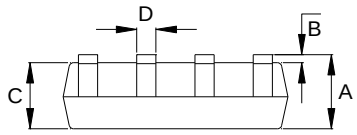


Figure13. Normalized Maximum Transient Thermal Impedance

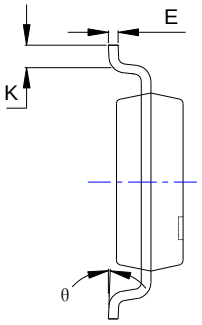
■ SOP-8 Package information



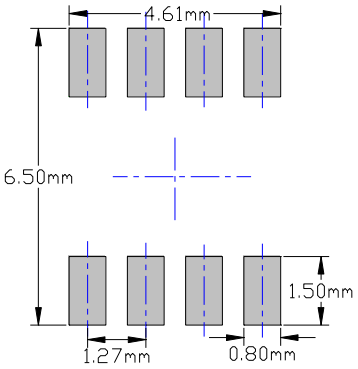
TOP VIEW



SIDE VIEW



SIDE VIEW



Suggested Solder Pad Layout

DIMENSIONS				
SYMBOL	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.053	0.069	1.350	1.750
B	0.004	0.010	0.100	0.250
C	0.053	0.061	1.350	1.550
D	0.013	0.020	0.330	0.510
E	0.007	0.010	0.170	0.250
F	0.189	0.197	4.800	5.000
G	0.050BSC		1.270BSC	
H	0.228	0.244	5.800	6.200
J	0.150	0.157	3.800	4.000
K	0.016	0.050	0.400	1.270
θ	0°	8°	0°	8°

Note:
1.Controlling dimension:in millimeters.
2.General tolerance:+/-0.05mm.
3.The pad layout is for reference purposes only.

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