

N-Channel : V_{DSS} , 100V $R_{DS(ON)}$, 150m Ω (max.) @ $V_{GS}=10V$ $R_{DS(ON)}$, 155m Ω (max.) @ $V_{GS}=4.5V$ I_D , 13A	P-Channel : V_{DSS} , -100V $R_{DS(ON)}$, 264m Ω (max.) @ $V_{GS}=-10V$ $R_{DS(ON)}$, 324m Ω (max.) @ $V_{GS}=-4.5V$ I_D , -9A	PDFN 5x6-8L (Dual)		

Description	Features
<p>The SGD100C03QD uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge.</p> <p>The complementary Power MOSFETs may be used in H-bridge, Inverters and other applications.</p>	<ul style="list-style-type: none"> • Low On-Resistance • Low Input Capacitance • Low Miller Charge • Low Input/Output Leakage • Pb-free lead plating; RoHS compliant
	Applications
	<ul style="list-style-type: none"> • Motor / Body Load Control • Automotive Systems • Load Switch

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SGD100C03QD	Halogen-Free	PDFN 5x6-8L (Dual)	QD	Tape & Reel	2,500

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value		Unit	
Drain-Source Voltage	V_{DS}	100	-100	V	
Gate-Source Voltage	V_{GS}	± 20		V	
Drain Current-Continuous	I_D	$T_C=25^\circ\text{C}$	13	-9	A
		$T_C=100^\circ\text{C}$	8	-6	A
Drain Current-Pulsed ^{Note 1}	I_{DM}	30	-20	A	
Maximum Power Dissipation	P_D	35.7		W	
Storage Temperature Range	T_{STG}	-55 to +175		$^\circ\text{C}$	
Operating Junction Temperature Range	T_J	-55 to +175		$^\circ\text{C}$	

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient ^{Note 2}	$R_{\theta JA}$	Steady State	-	-	62	$^\circ\text{C/W}$
Maximum Junction-to-Case ^{Note 2}	$R_{\theta JC}$	Steady State	-	-	3.5	$^\circ\text{C/W}$

N-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250μA	100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250μA	1	-	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _{DS} =6A	-	123	150	mΩ
		V _{GS} =4.5V, I _{DS} =4A	-	128	155	

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iSS}	V _{DS} =15V, V _{GS} =0V, f=1MHz	-	1044	-	pF
Output Capacitance	C _{oss}		-	44	-	
Reverse Transfer Capacitance	C _{rSS}		-	31	-	
Forward Transconductance	g _{fs}	V _D =5V, I _D =2A	-	9.2	-	S
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	-	-	4.5	Ω

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{DD} =50V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	-	16.7	-	ns
Rise Time	t _r		-	2.7	-	
Turn-Off Delay Time	T _{d(off)}		-	48	-	
Fall Time	t _f		-	2.7	-	
Total Gate Charge at 4.5V	Q _g	V _{DS} =60V, I _{DS} =2A, V _{GS} =10V	-	24.7	-	nC
Gate to Source Gate Charge	Q _{gs}		-	4	-	
Gate to Drain "Miller" Charge	Q _{gd}		-	4.1	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A	-	-	1.2	V
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	13	A
Pulsed Source Current	I _{SM}		-	-	30	A

- Notes:**
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
 2. R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θCA} is determined by the user's board design. R_{θJA} shown below for single device operation on FR-4 in still air.

P-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =-250μA	-100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-100V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =-250μA	-1	-	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _{DS} =-3A	-	223	264	mΩ
		V _{GS} =-4.5V, I _{DS} =-2A	-	253	324	

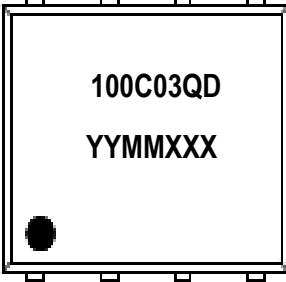
DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, f=1MHz	-	1029	-	pF
Output Capacitance	C _{oss}		-	68	-	
Reverse Transfer Capacitance	C _{rss}		-	39	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{DD} =-30V, V _{GS} =-10V, R _G =6Ω, I _D =-1.5A	-	10	-	ns
Rise Time	t _r		-	9.5	-	
Turn-Off Delay Time	T _{d(off)}		-	54	-	
Fall Time	t _f		-	29	-	
Total Gate Charge	Q _g	V _{DS} =-50V, V _{GS} =-10V, I _D =-1A	-	20	-	nC
Gate to Source Gate Charge	Q _{gs}		-	4.1	-	
Gate to Drain "Miller" Charge	Q _{gd}		-	5.1	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-1A	-	-	-1.2	V
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	-9	A
Pulsed Source Current	I _{SM}		-	-	-20	A

- Notes:**
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
 2. R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θCA} is determined by the user's board design. R_{θJA} shown below for single device operation on FR-4 in still air.

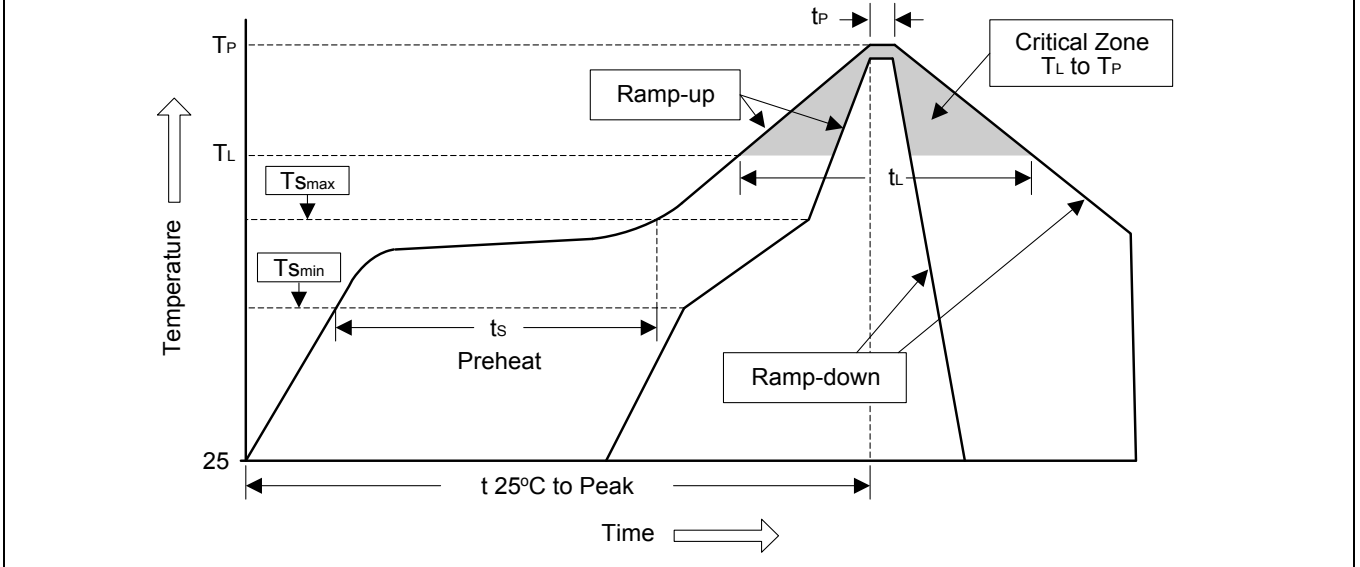
Marking Information

PDFN 5*6-8L (Dual A/B) (Q/QD/QC)	Marking Rule
<p data-bbox="129 367 296 398">Laser Marking</p> 	<p data-bbox="805 367 991 398"><u>Line 1</u> : Device</p> <p data-bbox="805 412 938 443">100C03QD</p> <p data-bbox="805 499 1037 530"><u>Line 2</u> : Date Code</p> <p data-bbox="805 544 938 575">YYMMXXX</p> <p data-bbox="805 631 999 663">YY : Year Code</p> <p data-bbox="805 676 1026 707">MM : Month Code</p> <p data-bbox="805 721 1059 752">XXX : Serial Number</p>

Soldering Methods for Silicongear's Products

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (T_{Smin})	100°C	150°C
- Temperature Max (T_{Smax})	150°C	200°C
- Time (min to max) (t_s)	60 to 120 sec	60 to 180 sec
T_{Smax} to T_L		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_L)	60 to 150 sec	60 to 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec

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