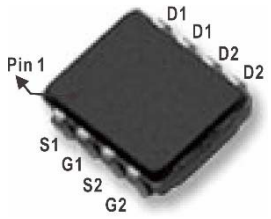
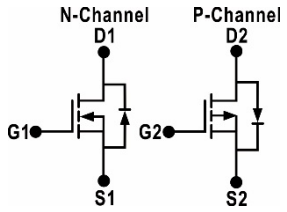
SGD3225J

30V / -30V Complementary, Power MOSFET

N-Channel :	P-Channel :	JSOT-8	
V_{DSS} , 30V $R_{DS(ON)}$, 18mΩ (max.) @ V_{GS}=10V $R_{DS(ON)}$, 28mΩ (max.) @ V_{GS}=4.5V I_D , 7A	V_{DSS} , -30V $R_{DS(ON)}$, 45mΩ (max.) @ V_{GS}=-10V $R_{DS(ON)}$, 78mΩ (max.) @ V_{GS}=-4.5V I_D , -4.7A		

Description

The SGD3225J uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge.

The complementary Power MOSFETs may be used in H-bridge, Inverters and other applications.

Features

- Low On-Resistance
- Low Input Capacitance
- Low Miller Charge
- Low Input / Output Leakage
- Pb-free lead plating; RoHS compliant

Applications

- Motor / Body Load Control
- Automotive Systems
- Load Switch

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SGD3225J	Halogen-Free	JSOT-8	J	Tape & Reel	3,000

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Value		Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20		V
Drain Current-Continuous	T_A=25°C	I_D	7	-4.7	A
	T_A=70°C		5.6	-3.7	A
Drain Current-Pulsed Note 1		I_{DM}	34	-22	A
Maximum Power Dissipation	T_A=25°C	P_D	1.4	1.4	W
	T_A=25°C		0.9	0.9	W
Storage Temperature Range		T_{STG}	-55 to +150		°C
Operating Junction Temperature Range		T_J	-55 to +150		°C

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient Note 2	$R_{\theta JA}$	t<10 sec.	-	-	85	°C/W
Maximum Junction-to-Case Note 2	$R_{\theta JC}$	Steady State	-	-	23	°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	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, 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	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_{DS}=4A	-	-	18	mΩ
		V_{GS}=4.5V, I_{DS}=2A	-	-	28	

DYNAMIC CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	539	-	pF
Output Capacitance	C_{oss}		-	66	-	
Reverse Transfer Capacitance	C_{rss}		-	54	-	
Forward Transconductance	gfs	V_D=15V, I_D=4A	-	20	-	S
Gate Resistance	R_g	V_{DS}=0V, V_{GS}=0V, f=1MHz	-	2	-	Ω

SWITCHING CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=15V, V_{GS}=10V, R_G=3.3Ω, I_D=4A	-	3	-	ns
Rise Time	t_r		-	7.6	-	
Turn-Off Delay Time	$T_{d(off)}$		-	21	-	
Fall Time	t_f		-	4	-	
Total Gate Charge at 4.5V	Q_g	V_{DS}=15V, I_{DS}=4A, V_{GS}=4.5V	-	6.2	-	nC
Gate to Source Gate Charge	Q_{gs}		-	2.4	-	
Gate to Drain “Miller” Charge	Q_{gd}		-	2.5	-	

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	-	-	7	A
Pulsed Source Current	I_{SM}		-	-	34	A

Notes:

1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. $R_{\theta JA}$ 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. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on 2oz 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	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V, 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	-	-	45	mΩ
		V_{GS}=-4.5V, I_{DS}=-2A	-	-	78	

DYNAMIC CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	554	-	pF
Output Capacitance	C_{oss}		-	95	-	
Reverse Transfer Capacitance	C_{rss}		-	80	-	
Forward Transconductance	gfs	V_D=-10V, I_D=-3A	-	13	-	S

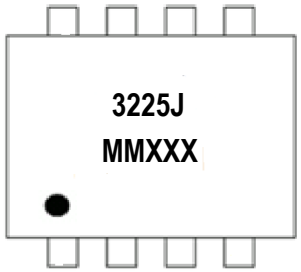
SWITCHING CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-24V, V_{GS}=-10V, R_G=3.3Ω, I_D=-1A	-	2.4	-	ns
Rise Time	t_r		-	8.1	-	
Turn-Off Delay Time	$T_{d(off)}$		-	31.7	-	
Fall Time	t_f		-	5.6	-	
Total Gate Charge at -4.5V	Q_g	V_{DS}=-15V, V_{GS}=-4.5V, I_D=-1A	-	5.7	-	nC
Gate to Source Gate Charge	Q_{gs}		-	2.9	-	
Gate to Drain “Miller” Charge	Q_{gd}		-	1.7	-	

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	-	-	-24	A
Pulsed Source Current	I_{SM}		-	-	-48	A
Body Diode Reverse Recovery Time	t_{rr}	I_F=1A, dI/dt=100A/μs, T_J=25°C	-	5.6	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	1.3	-	nC

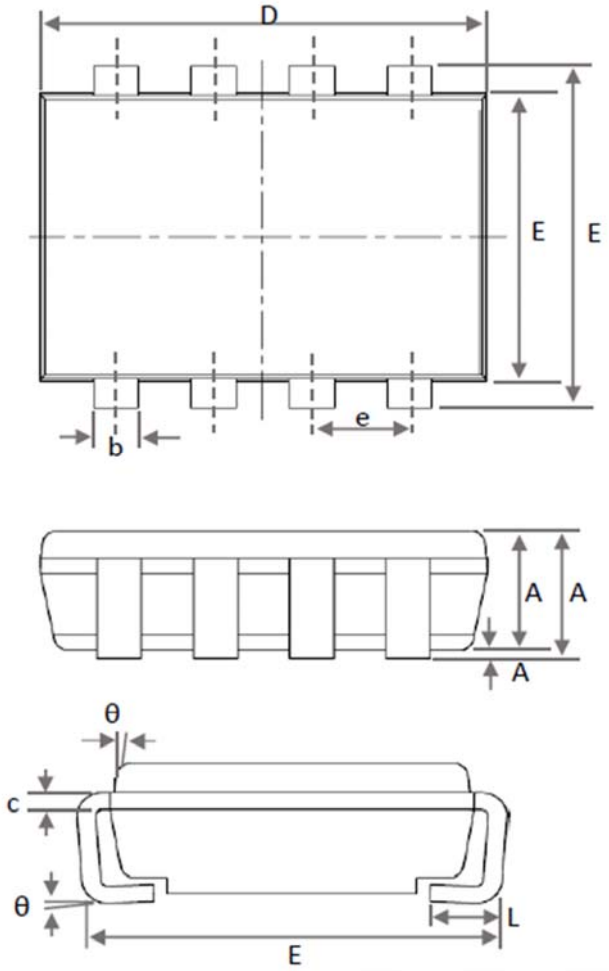
Notes:

1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. $R_{\theta JA}$ 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. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on 2oz FR-4 in still air.

Marking Information

JSOT-8 (J)	Marking Rule
Laser Marking  Diagram	Line 1：Device 3225J Line 2：Date Code MMXXX MM：Month Code XXX：Serial Number

Package of Dimension



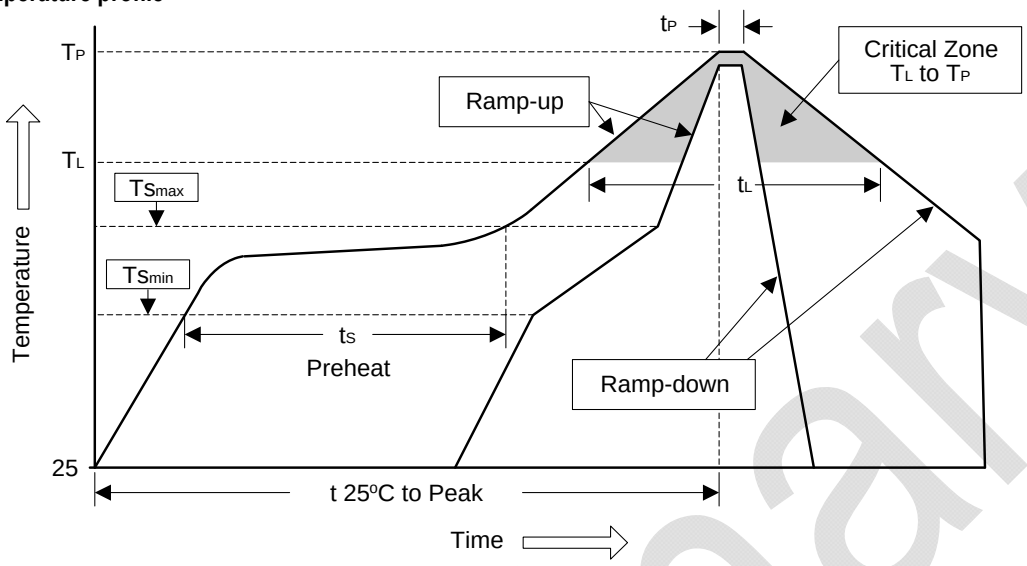
Symbol	Min	Nor	Max
E	2.50	-	3.00
E1	2.30	2.40	2.50
E2	2.65	2.85	3.05
L	0.30	0.45	0.60
A	0.935	-	1.10
A1	0.01	-	0.10
A2	0.925	-	1.00
D	2.95	3.05	3.10
e	0.65 BSC		
b	0.25	0.32	0.40
c	0.10	0.15	0.20
θ	0°	4°	8°
θ1	7° NOM.		

1. All dimension are in millimeters.
2. Dimension dose not include burrs and mold flash/protrusions.

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 (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60 to 120 sec	 150°C 200°C 60 to 180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60 to 150 sec	 217°C 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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