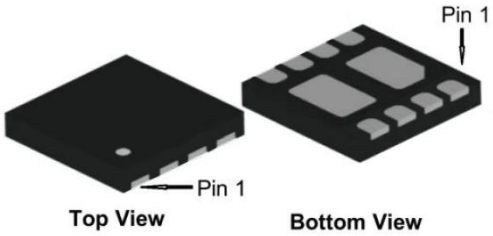
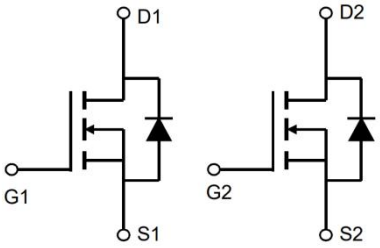
Dual N-Channel Enhancement Mode MOSFET

Features

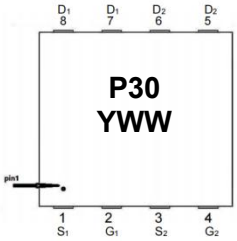
- Advanced SGT MOS technology
- Low Thermal Resistance
- Low Gate Charge
- Fast Switching Speed





Application

- Load Switch
- DC-DC converters
- Load Switch for Portable Devices
- Voltage controlled small signal switch



DFN2020B-8L
Marking: P30
Data Code： YWW

Single N-Channel MOS Absolute Maximum Ratings (at Ta = 25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	8	A
Peak Drain Current, Pulsed [1]	I_{DM}	28	A
Single Pulse Avalanche Energy [2]	E_{AS}	8	mJ
Power Dissipation Tc=25℃	P_{tot}	13	W
Operating Junction	T_J	-55~150	℃
Storage Temperature Range	T_{stg}	-55~150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	9	℃/W

Note:

1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$ = 150°C.

2) Limited by $T_{J(MAX)}$, starting T_J = 25 °C,L= 0.1mH, R_g = 25 Ω, V_{GS} = 10 V.

3) Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

Single N-Channel MOS Characteristics at T_a = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 μA	BV_{DSS}	100			V
Drain-Source Leakage Current at V_{DS} = 100 V	I_{DSS}			1	μA
Gate Leakage Current at V_{GS} = ± 20 V	I_{GSS}			±100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, I_D = 250 μA	$V_{GS(th)}$	2.2		3.8	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 10 A	$R_{DS(on)}$		75	90	mΩ
DYNAMIC PARAMETERS					
Input Capacitance at V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz	C_{iss}		520		pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz	C_{oss}		40		pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz	C_{rss}		2.4		pF
Gate charge total at V_{DS} = 50 V, I_D = 12 A, V_{GS} = 10 V	Q_g		6		nC
Gate to Source Charge at V_{DS} = 50 V, I_D = 12 A, V_{GS} = 10 V	Q_{gs}		1.1		nC
Gate to Drain Charge at V_{DS} = 50 V, I_D = 12 A, V_{GS} = 10 V	Q_{gd}		1.3		nC
Turn-On Delay Time at V_{GS} = 10 V, V_{DS} = 50 V, I_D = 10 A, R_g = 6 Ω	$t_{d(on)}$		16.2		nS
Turn-On Rise Time at V_{GS} = 10 V, V_{DS} = 50 V, I_D = 10 A, R_g = 6 Ω	t_r		3.2		nS
Turn-Off Delay Time at V_{GS} = 10 V, V_{DS} = 50 V, I_D = 10 A, R_g = 6 Ω	$t_{d(off)}$		13		nS
Turn-Off Fall Time at V_{GS} = 10 V, V_{DS} = 50 V, I_D = 10 A, R_g = 6 Ω	t_f		22		nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = 20 A, V_{GS} = 0 V	V_{SD}			1.3	V
Body Diode Reverse Recovery Time at I_S = 10 A, di/dt = 100 A / μs	t_{rr}		45		nS
Body Diode Reverse Recovery Charge at I_S = 10 A, di/dt = 100 A / μs	Q_{rr}		63		nC

Electrical Characteristics Curves

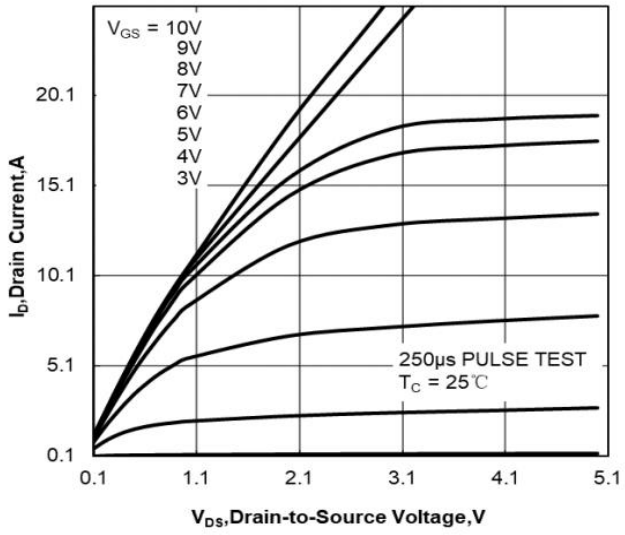


Figure 1. Output Characteristics

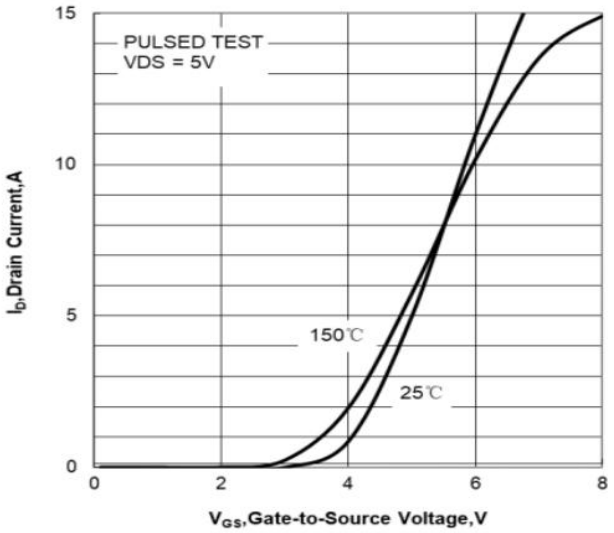


Figure 2. Transfer Characteristics

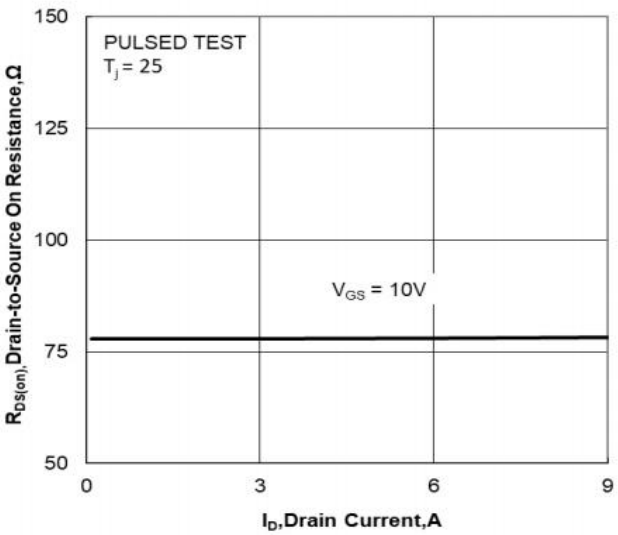


Figure 3. Drain-to-Source On Resistance vs Drain Current

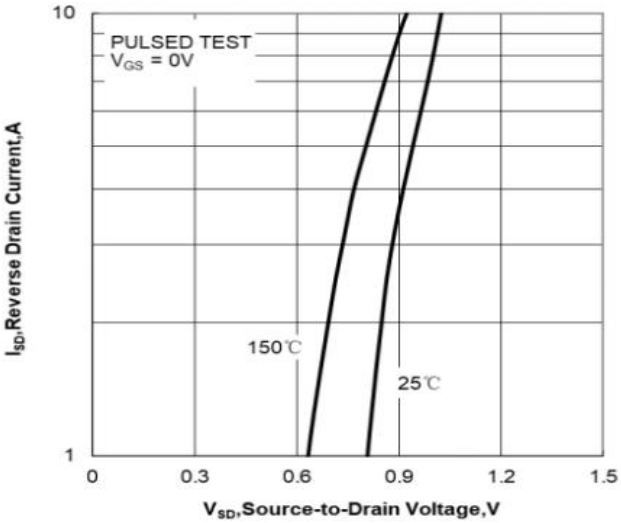


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

Electrical Characteristics Curves

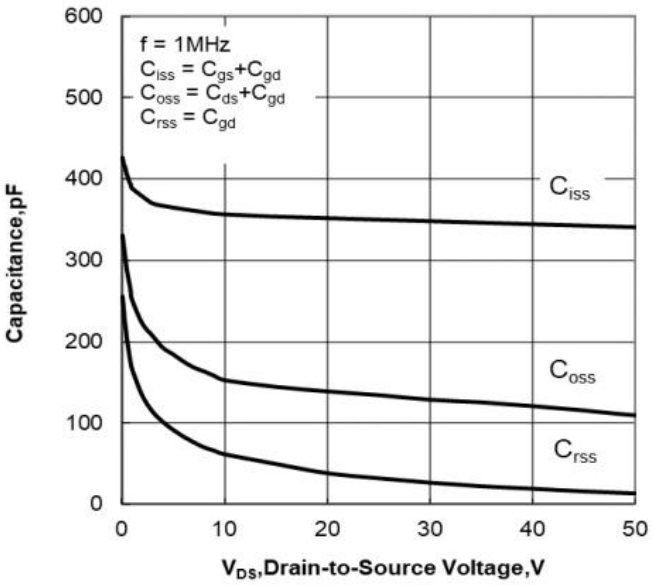


Figure 5. Capacitance Characteristics

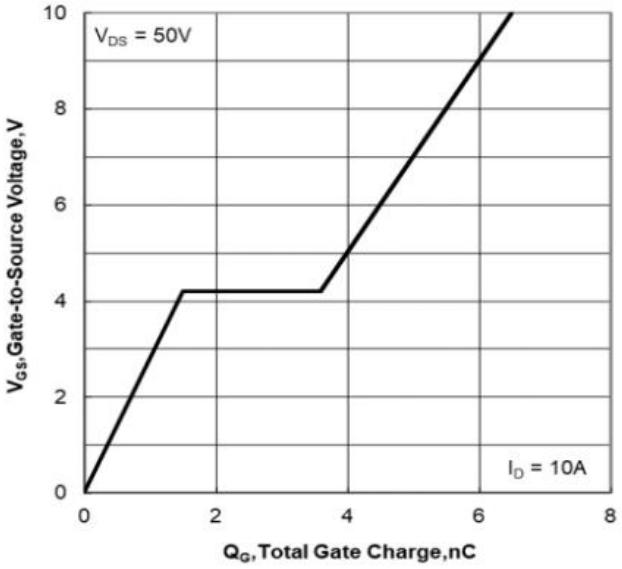


Figure 6. Gate Charge Characteristics

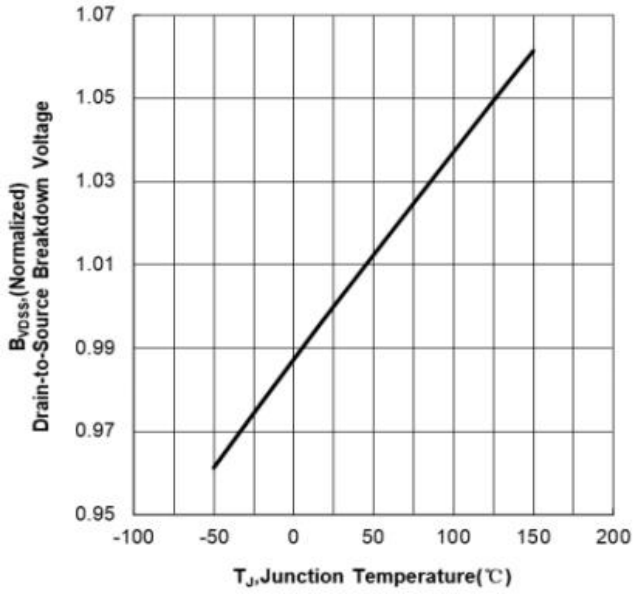


Figure 7. Normalized Breakdown Voltag vs Junction Temperature

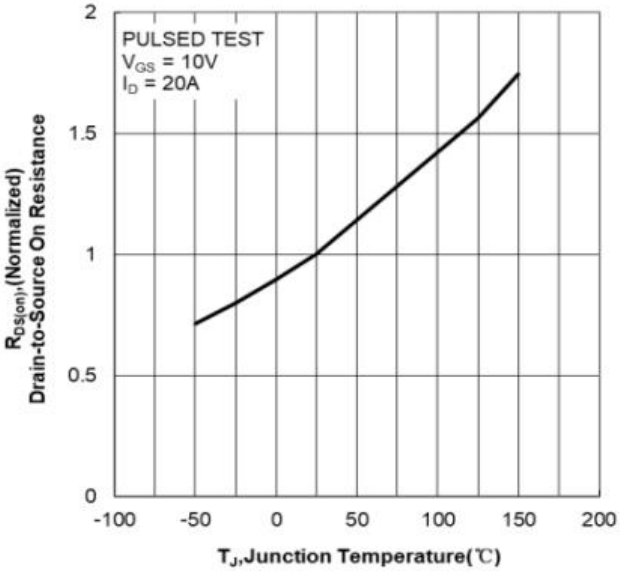


Figure 8. Normalized On Resistance vs Junction Temperature

Electrical Characteristics Curves

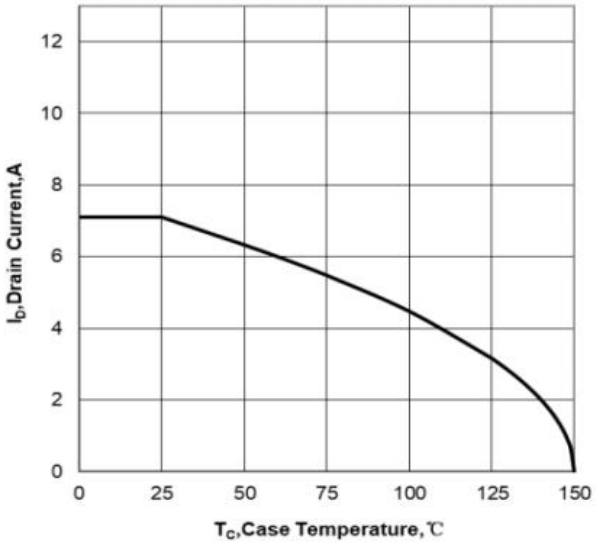


Figure 9. Maximum Continuous Drain Current vs Case Temperature

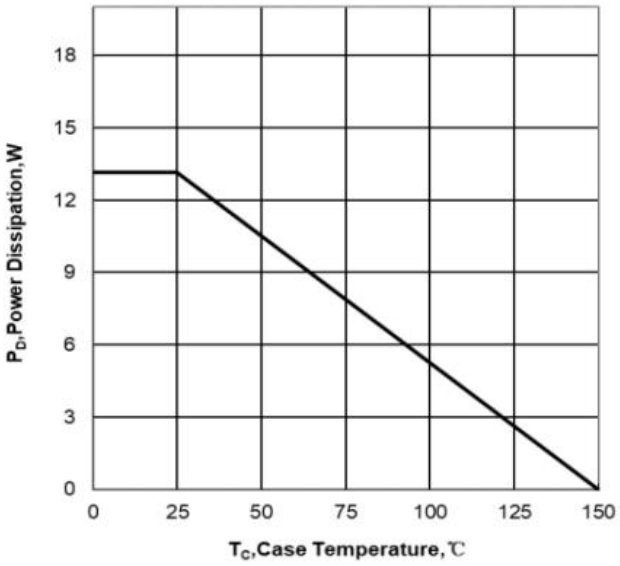


Figure 10. Maximum Power Dissipation vs Case Temperature

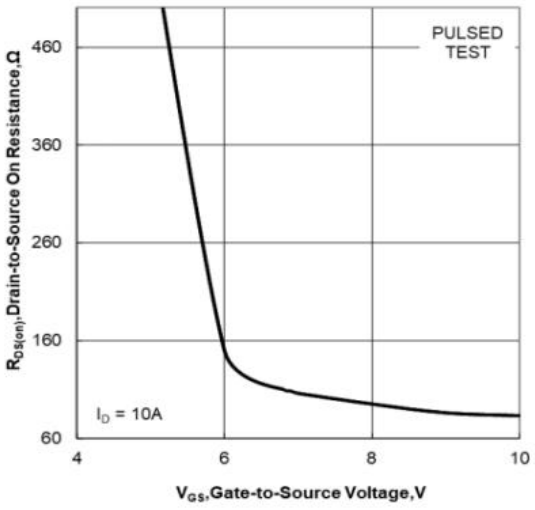


Figure11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

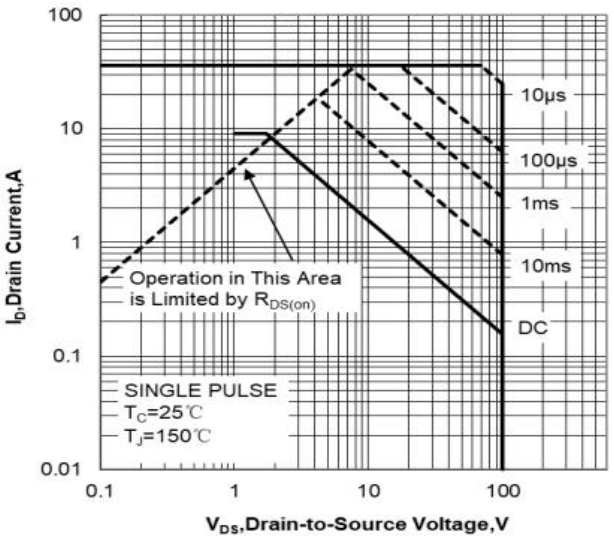


Figure 12. Maximum Safe Operating Area

Test Circuits

Fig.1-1 Switching times test circuit

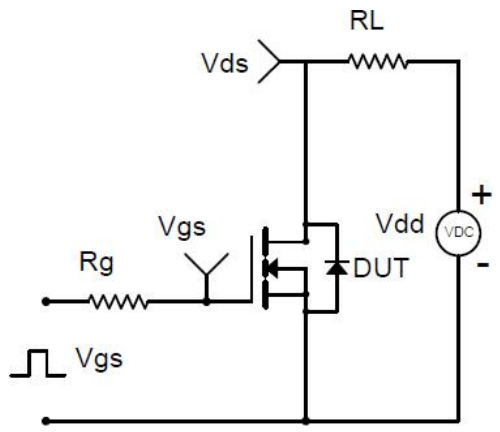


Fig.1-2 Switching Waveform

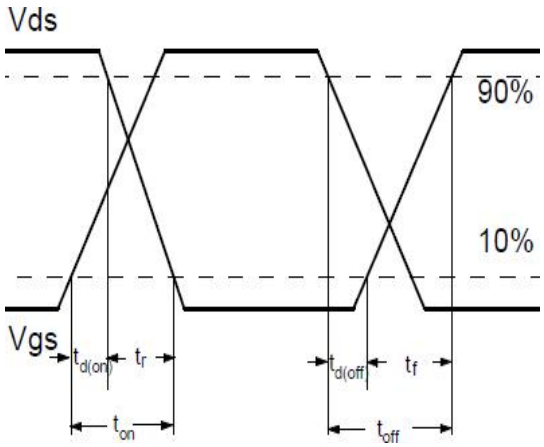


Fig.2-1 Gate charge test circuit

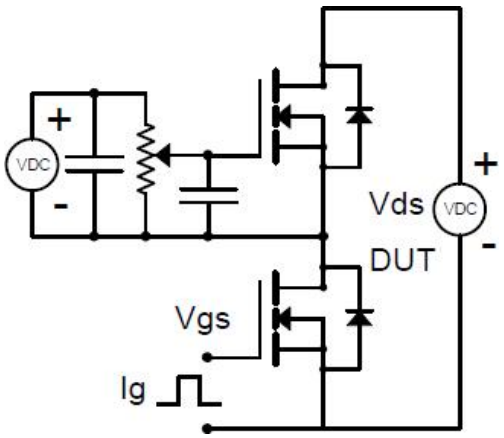


Fig.2-2 Gate charge waveform

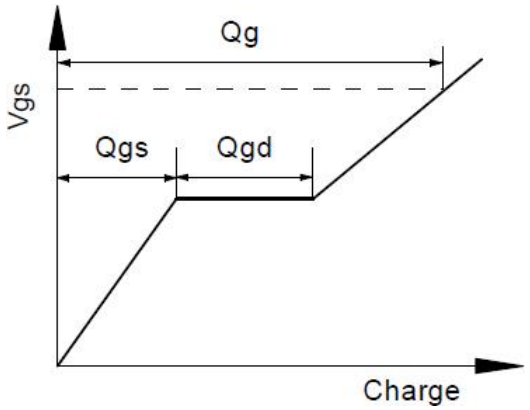


Fig.3-1 Avalanche test circuit

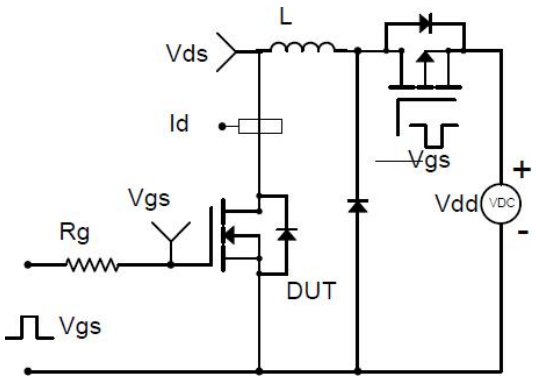
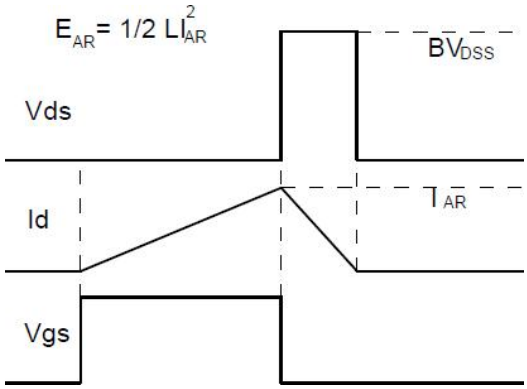
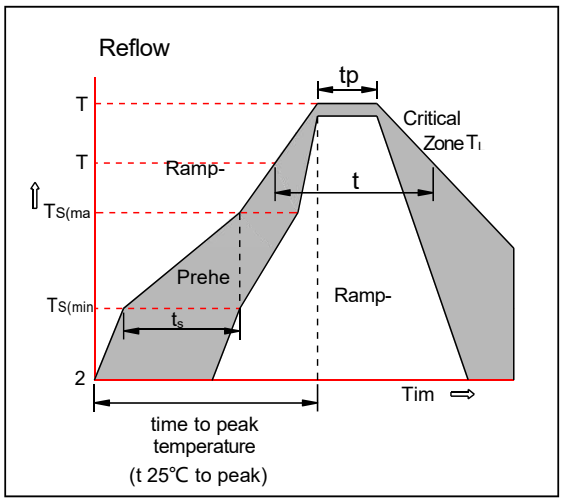


Fig.3-2 Avalanche waveform

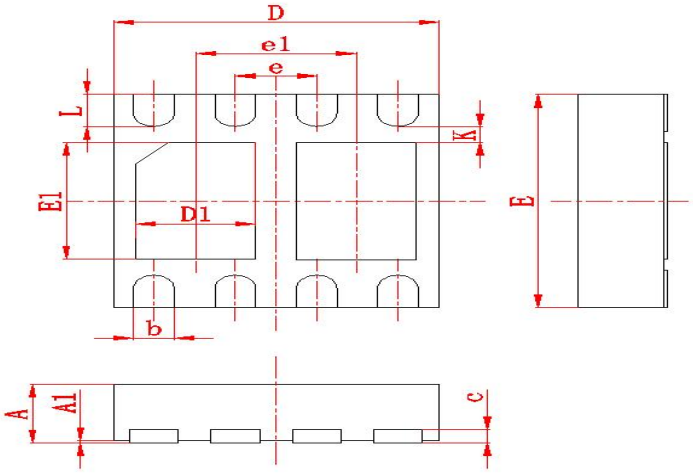


Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃



Package Outline Dimensions (Units: mm) DFN2020B-8L



符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max
A	0.5	0.6	E	1.9	2.1	e1	(0.99)	
A1	0	0.05	E1	1.0	1.2	b	0.2	0.3
D	1.9	2.1	K	(0.15)		c	(0.127)	
D1	0.69	0.79	e	(0.5)		L	0.25	0.35