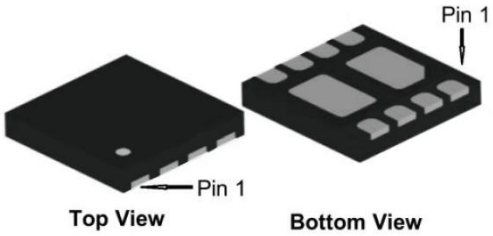
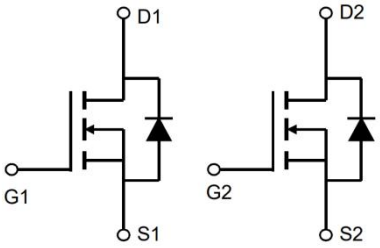
Dual N-Channel Enhancement Mode MOSFET

Features

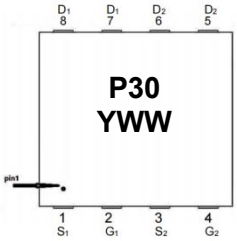
- Advanced SGT MOS technology
- Low Thermal Resistance
- Low Gate Charge
- Fast Switching Speed





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.

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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

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Electrical Characteristics Curves

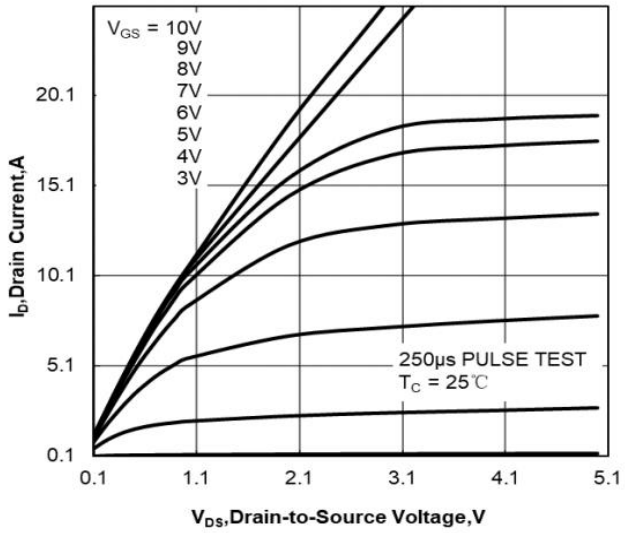

Figure 1. Output Characteristics

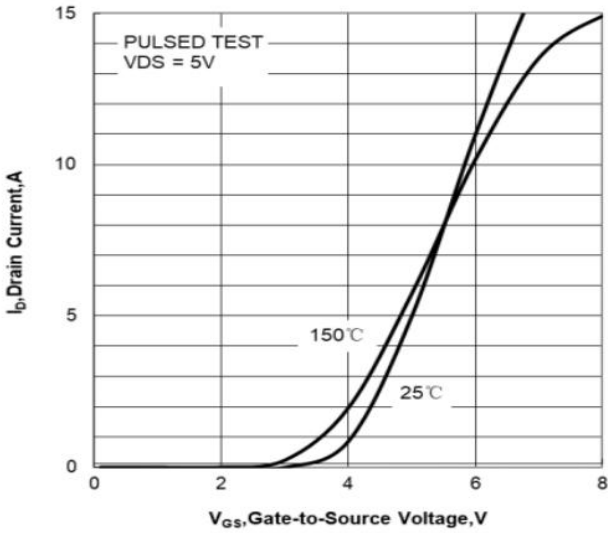

Figure 2. Transfer Characteristics

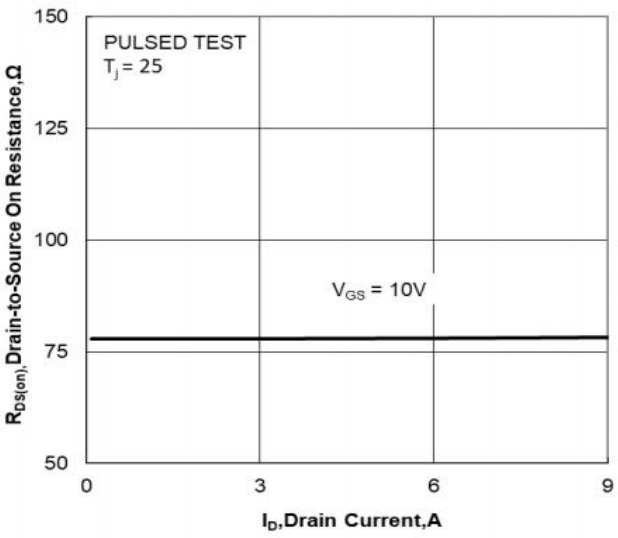

Figure 3. Drain-to-Source On Resistance vs Drain Current

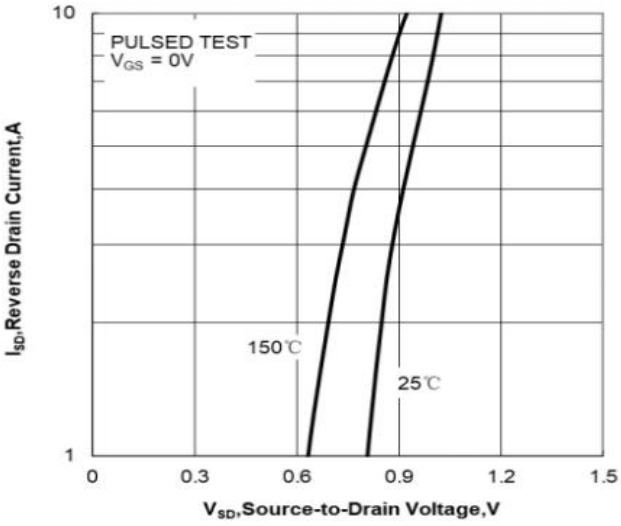

Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

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Electrical Characteristics Curves

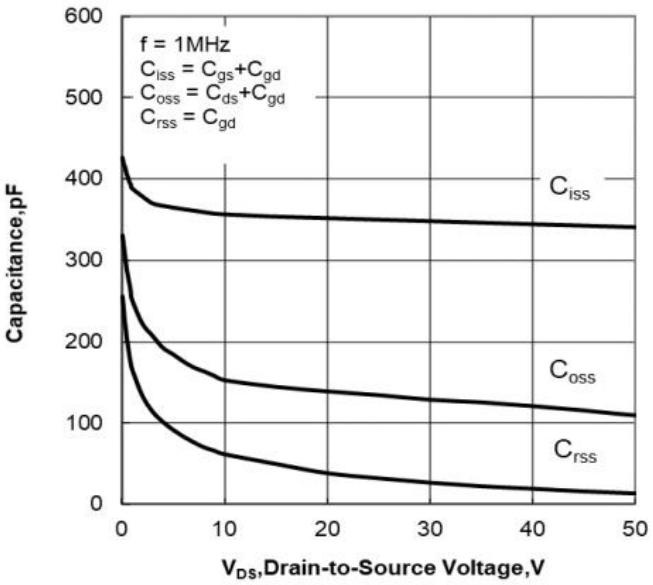

Figure 5. Capacitance Characteristics

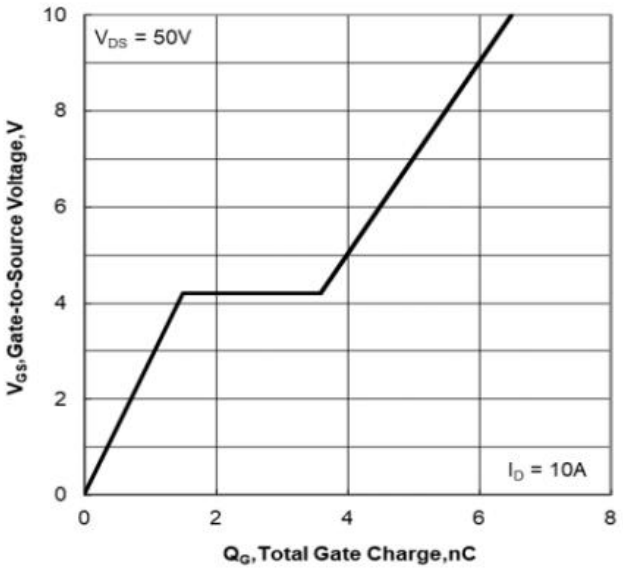

Figure 6. Gate Charge Characteristics

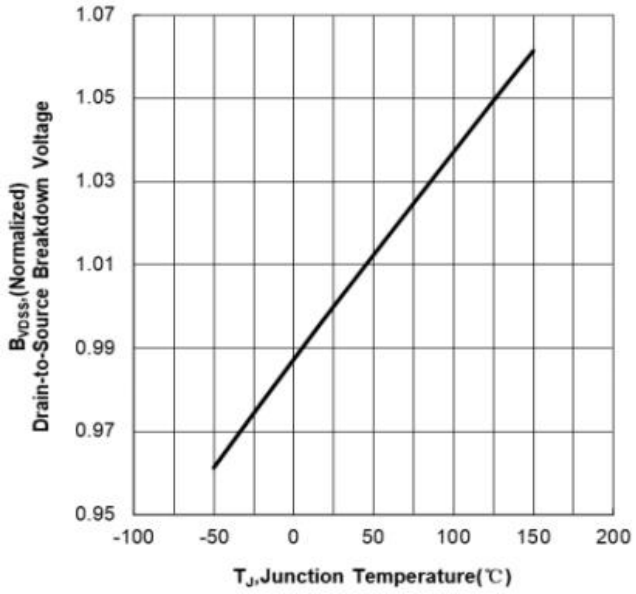

Figure 7. Normalized Breakdown Voltag vs Junction Temperature

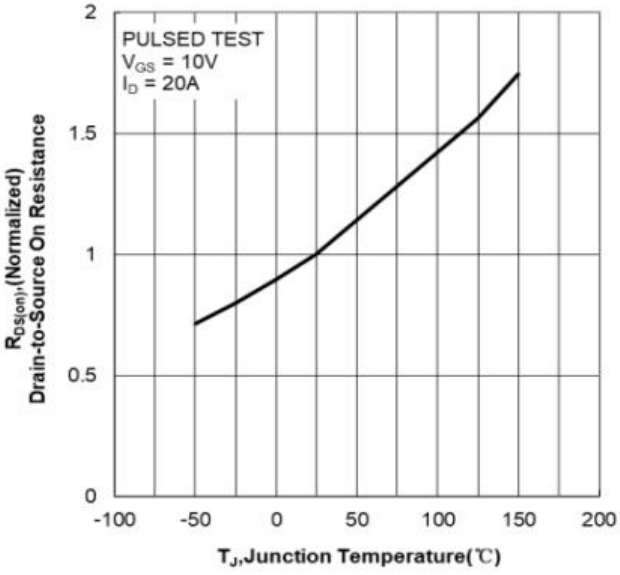

Figure 8. Normalized On Resistance vs Junction Temperature

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Electrical Characteristics Curves

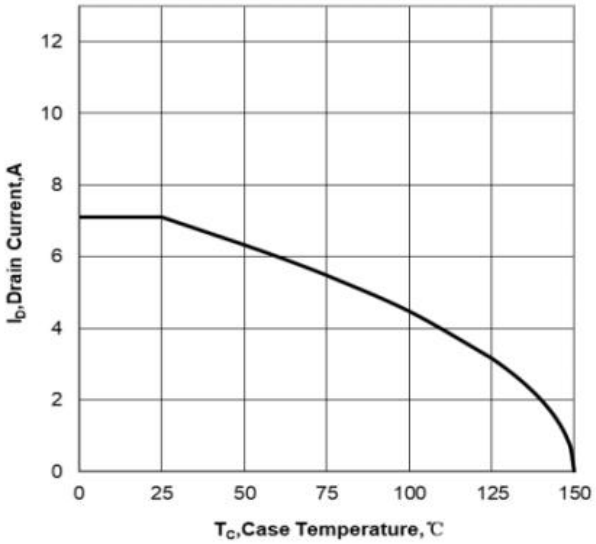

Figure 9. Maximum Continuous Drain Current vs Case Temperature

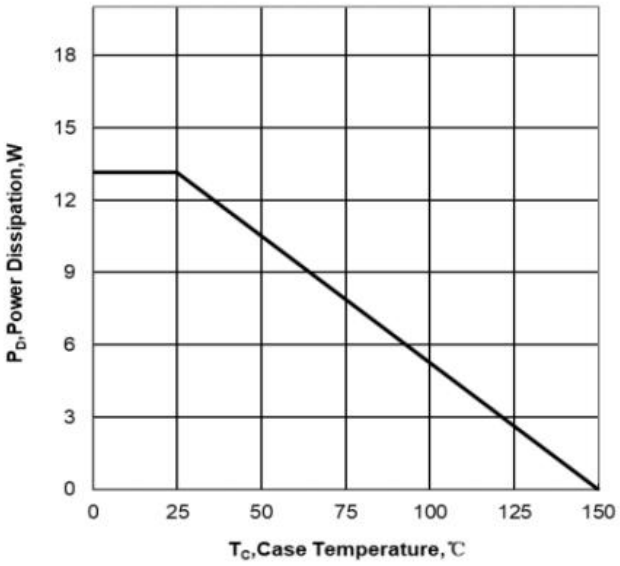

Figure 10. Maximum Power Dissipation vs Case Temperature

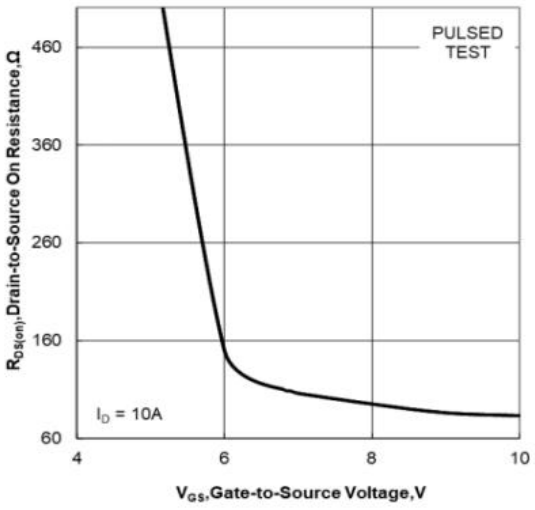

Figure11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

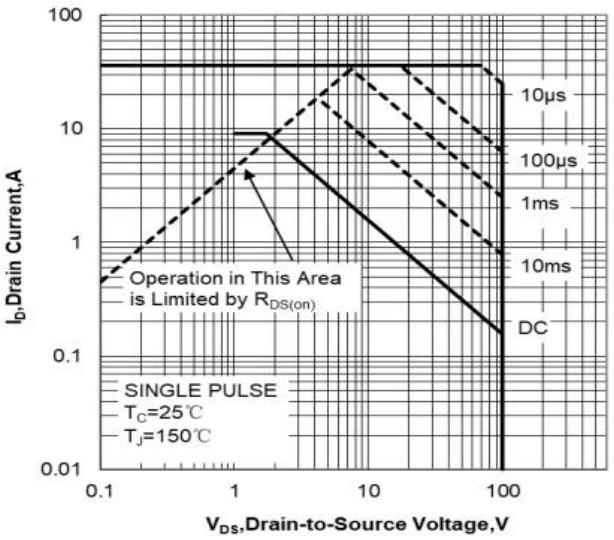

Figure 12. Maximum Safe Operating Area

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Test Circuits

Fig.1-1 Switching times test circuit

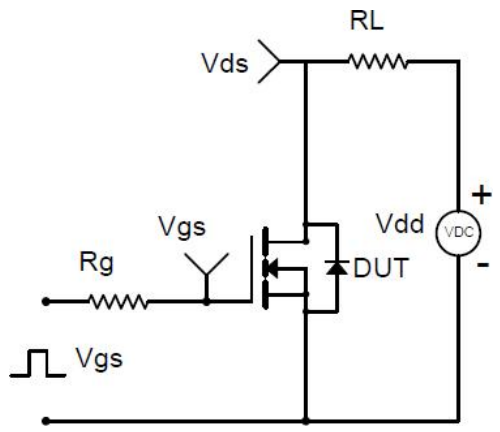


Fig.1-2 Switching Waveform

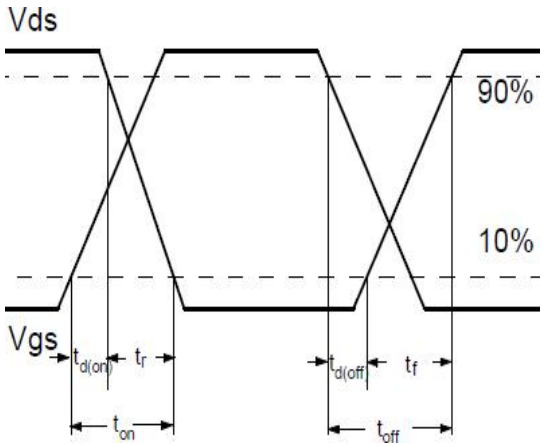


Fig.2-1 Gate charge test circuit

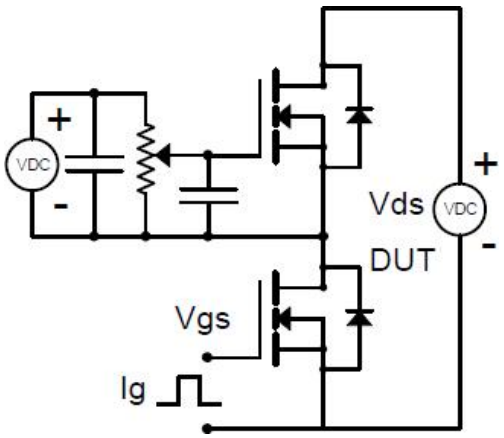


Fig.2-2 Gate charge waveform

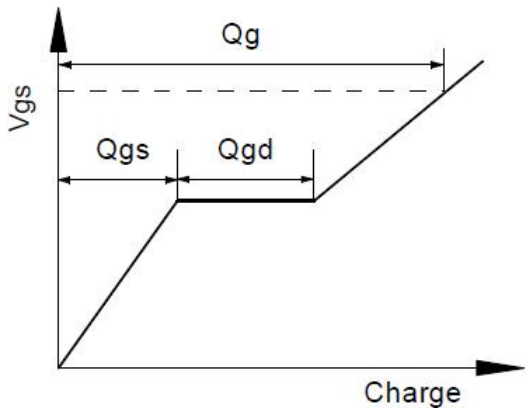


Fig.3-1 Avalanche test circuit

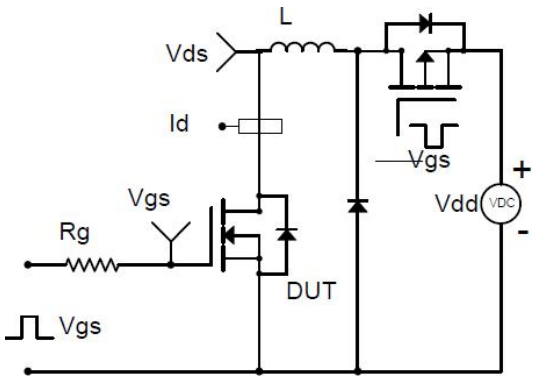
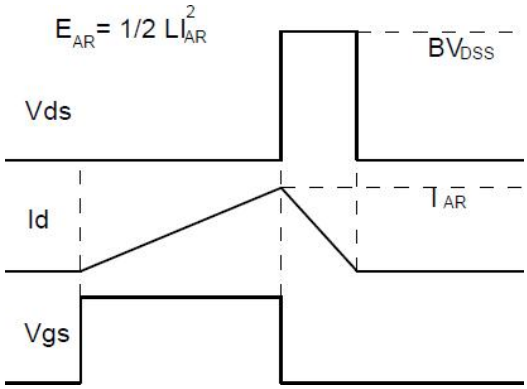


Fig.3-2 Avalanche waveform



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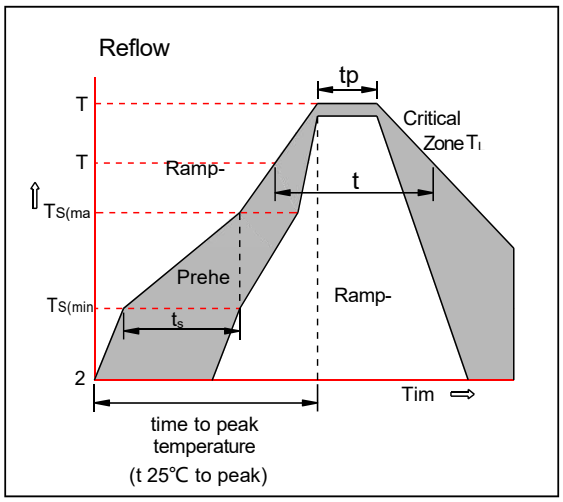
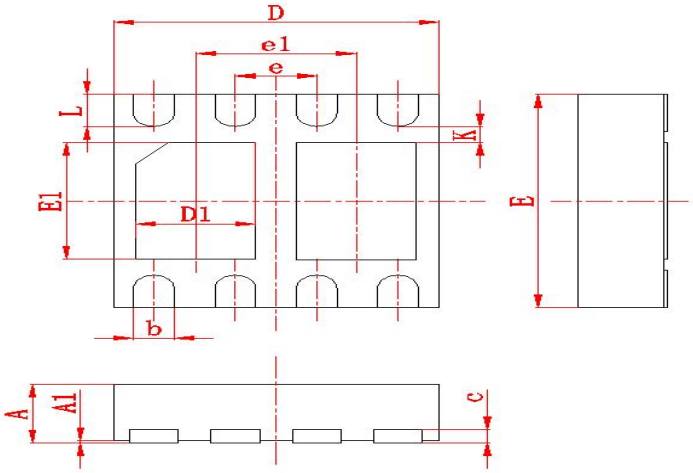
Soldering parameters

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

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