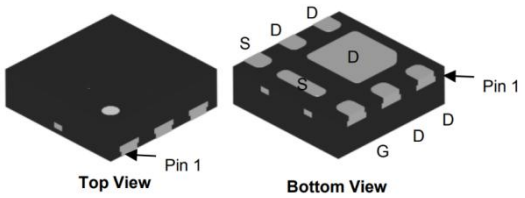
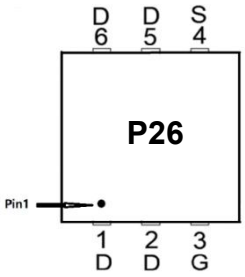
P-Channel Enhancement Mode MOSFET

Features

- Advanced trench cell design
- Low Thermal Resistance
- Low Gate Charge
- Fast Switching Speed
- Halogen-Free & Lead-Free





DFN2020C-6L
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Application

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

Absolute Maximum Ratings (at Ta = 25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±10	V
Continuous Drain Current	I_D	5	A
Peak Drain Current, Pulsed[1)]	I_{DM}	-24	A
Power Dissipation[2)] T_A=25℃	P_{tot}	1.4	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 Ambient[2)]	$R_{\theta JA}$	88	℃/W

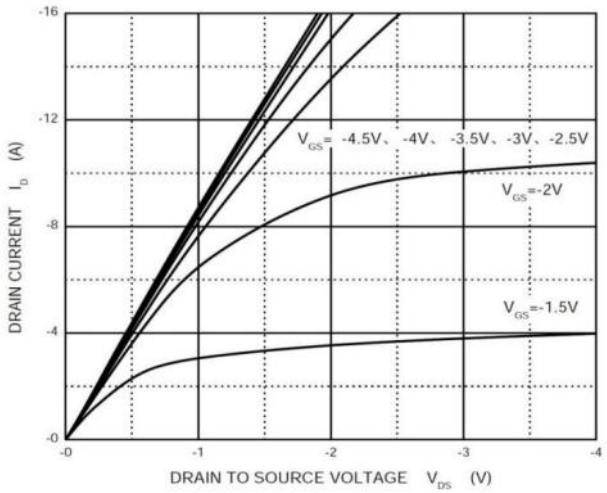
Note：
1) Pulse width ≤100us,duty cycle ≤1%, limite by Tjmax.
2) Device mounted on FR-4 substrate PC board, 2ozcopper, with 1-inch square copper plate in still air.

Characteristics at Ta = 25℃ unless otherwise specified

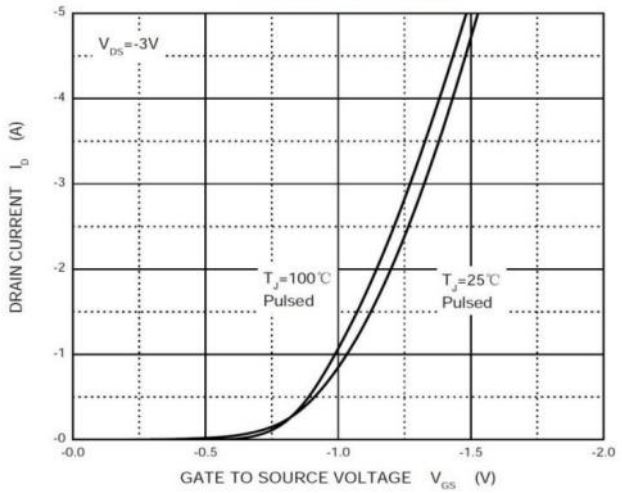
Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = -250 μA	BV_{DSS}	-20			V
Drain-Source Leakage Current at V_{DS} = -20 V	I_{DSS}			-1	μA
Gate Leakage Current at V_{GS} = ± 10 V	I_{GSS}			±100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, I_D = - 250 μA	$V_{GS(th)}$	-0.4	-0.65	-1.0	V
Drain-Source On-State Resistance at V_{GS} = -4.5 V, I_D = -5 A at V_{GS} = -2.5 V, I_D = -3 A	$R_{DS(on)}$		32 42	42 60	mΩ
DYNAMIC PARAMETERS					
Input Capacitance at V_{GS} = 0 V, V_{DS} = -4 V, f = 1 MHz	C_{iss}		740		pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = -4 V, f = 1 MHz	C_{oss}		290		pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = -4 V, f = 1 MHz	C_{rss}		190		pF
Gate charge total at V_{DS} = -2.5 V, I_D = -4.1 A, V_{GS} = -4.5 V	Q_g		4.5		nC
Gate to Source Charge at V_{DS} = -2.5 V, I_D = -4.1 A, V_{GS} = -4.5 V	Q_{gs}		1.2		nC
Gate to Drain Charge at V_{DS} = -2.5 V, I_D = -4.1 A, V_{GS} = -4.5 V	Q_{gd}		1.6		nC
Turn-On Delay Time at V_{GS} = -4.5 V, V_{DS} = -4 V, R_L= 1.2 Ω, R_g = 1 Ω	$t_{d(on)}$		13		nS
Turn-On Rise Time at V_{GS} = -4.5 V, V_{DS} = -4 V, R_L= 1.2 Ω, R_g = 1 Ω	t_r		35		nS
Turn-Off Delay Time at V_{GS} = -4.5 V, V_{DS} = -4 V, R_L= 1.2 Ω, R_g = 1 Ω	$t_{d(off)}$		32		ns
Turn-Off Fall Time at V_{GS} = -4.5 V, V_{DS} = -4 V, R_L= 1.2 Ω, R_g = 1 Ω	t_f		10		nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = -1 A, V_{GS} = 0 V	V_{SD}			-1.2	V

Electrical Characteristics Curves

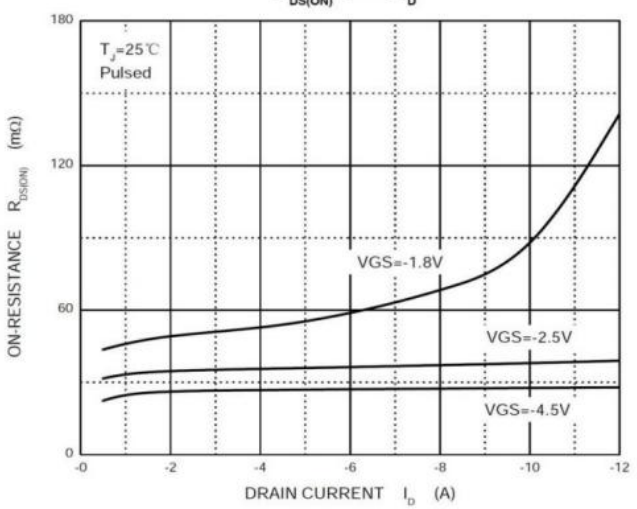
Output Characteristics



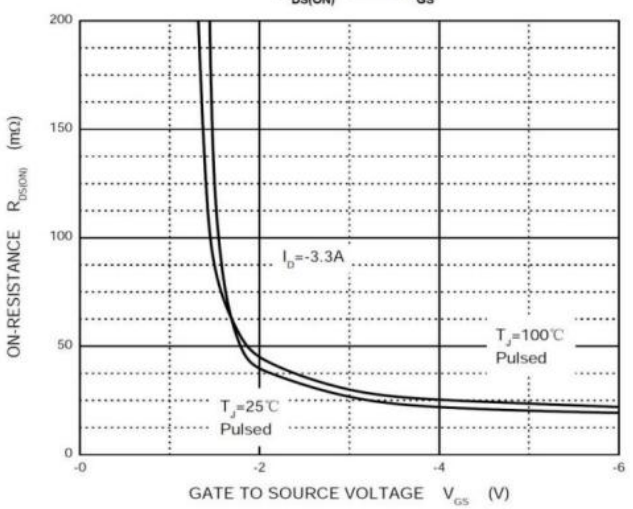
Transfer Characteristics



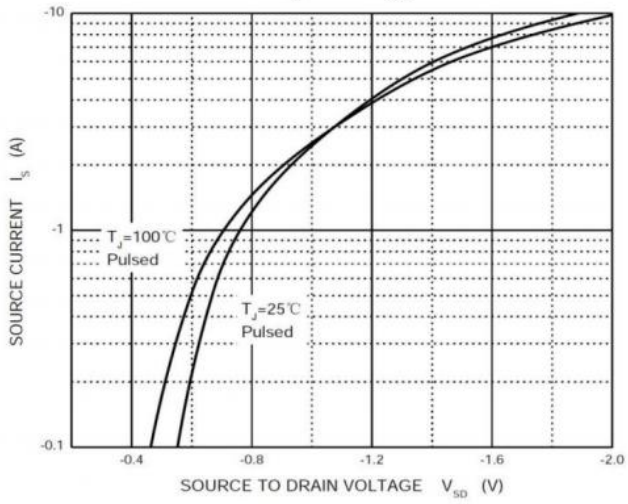
$R_{DS(ON)}$ —— I_D



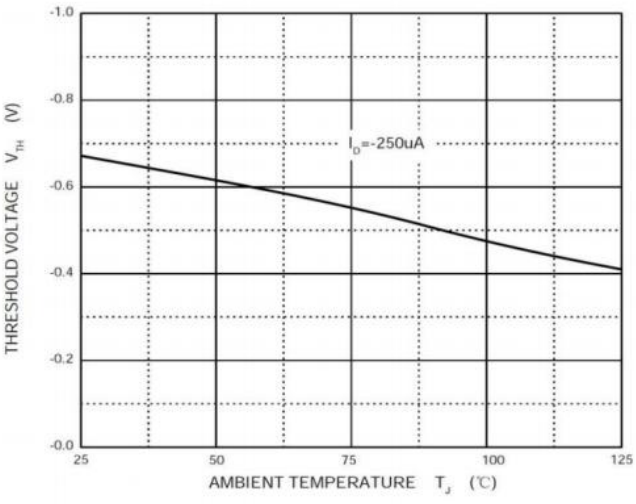
$R_{DS(ON)}$ —— V_{GS}



I_S —— V_{SD}



Threshold Voltage



Test Circuits

Fig.1-1 Switching times test circuit

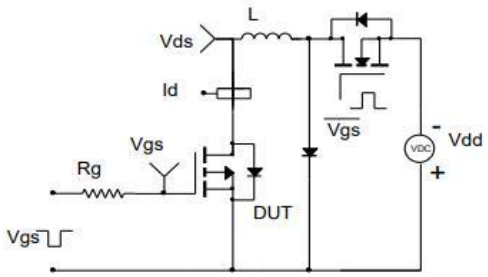


Fig.1-2 Switching Waveform

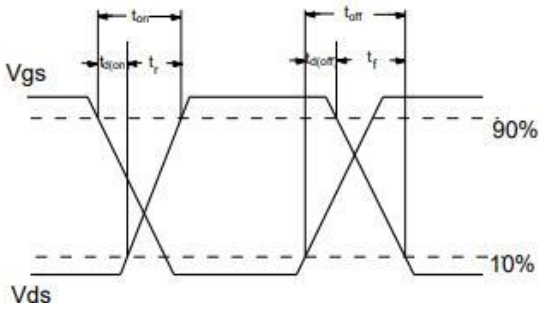


Fig.2-1 Gate charge test circuit

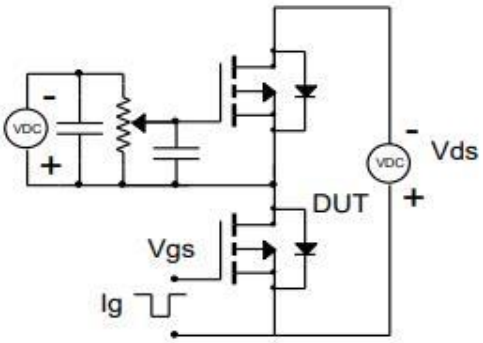


Fig.2-2 Gate charge waveform

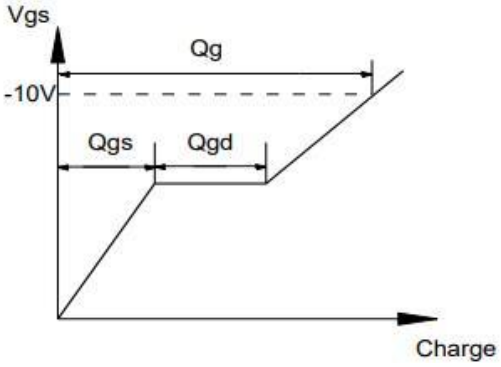


Fig.3-1 Avalanche test circuit

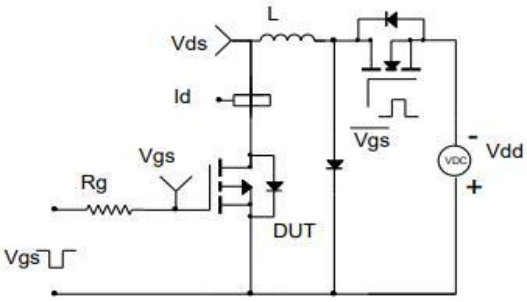
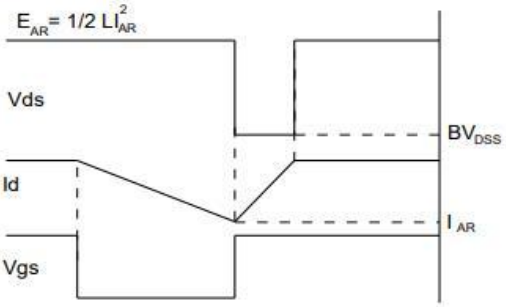
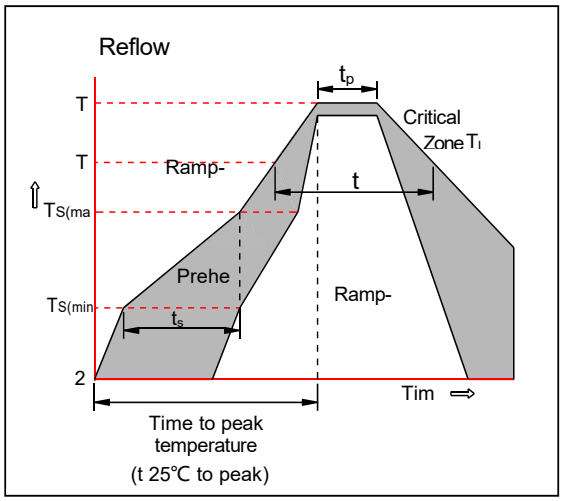


Fig.3-2 Avalanche waveform

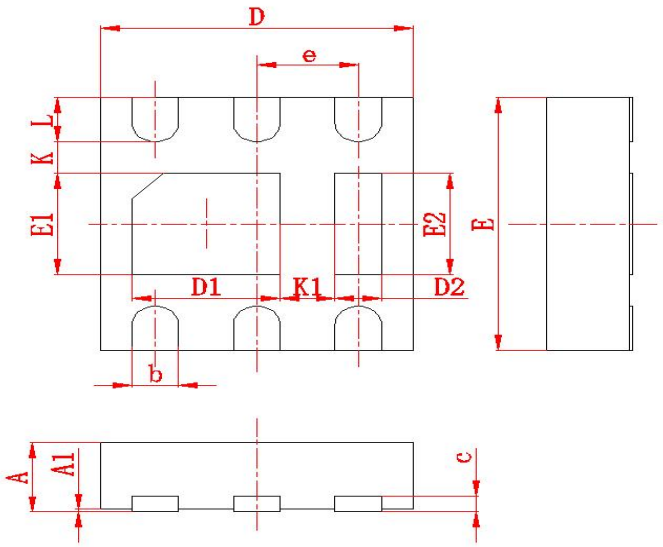


Soldering parameters

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) DFN2020C-6L



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	e	(0.65)	
A1	0	0.05	E1	0.75	0.85	b	0.25	0.35
D	1.9	2.1	E2	0.75	0.85	c	(0.127)	
D1	0.9	1.0	K	(0.25)		L	0.3	0.4
D2	0.25	0.35	K1	(0.35)				