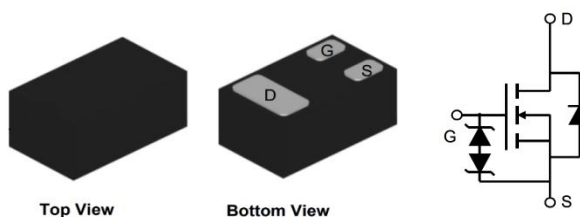


N-Channel Enhancement Mode MOSFET

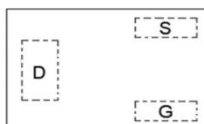
Features

- Advanced Trench Process Technology
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free
- ESD Protected up to 2KV (HBM)



Application

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



DFN1006-3L

Absolute Maximum Ratings (at $T_a = 25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	0.75	A
Peak Drain Current, Pulsed ¹⁾	I_{DM}	1.8	A
Power Dissipation ²⁾	P_{tot}	0.7	W
Operating Junction	T_J	-55~150	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	175	$^{\circ}\text{C/W}$

Note:

¹⁾ Pulse width $\leq 100\mu\text{s}$, duty cycle $\leq 1\%$, limited by T_{jmax} .

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

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$	BV_{DSS}	20			V
Drain-Source Leakage Current at $V_{DS} = 20\ \text{V}$, $V_{GS} = 0\ \text{V}$	I_{DSS}			1.0	μA
Gate Leakage Current at $V_{GS} = \pm 10\ \text{V}$	I_{GSS}			± 10	μA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	0.35	0.7	1.1	V
Drain-Source On-State Resistance at $V_{GS} = 4.5\ \text{V}$, $I_D = 0.65\ \text{A}$ at $V_{GS} = 2.5\ \text{V}$, $I_D = 0.45\ \text{A}$	$R_{DS(on)}$		250 300	500 700	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5\ \text{V}$, $I_D = 0.15\ \text{A}$	g_{fs}	15			mS
Input Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 16\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}		79		pF
Output Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 16\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}		13		pF
Reverse Transfer Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 16\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}		9		pF
Gate charge total at $V_{DS} = 10\ \text{V}$, $I_D = 0.65\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_g		1.24		nC
Gate to Source Charge at $V_{DS} = 10\ \text{V}$, $I_D = 0.65\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_{gs}		0.37		nC
Gate to Drain Charge at $V_{DS} = 10\ \text{V}$, $I_D = 0.65\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_{gd}		0.27		nC
Turn-On Delay Time at $V_{GS} = 4.5\ \text{V}$, $V_{DS} = 10\ \text{V}$, $I_D = 0.5\ \text{A}$, $R_g = 10\ \Omega$	$t_{d(on)}$		6.7		ns
Turn-On Rise Time at $V_{GS} = 4.5\ \text{V}$, $V_{DS} = 10\ \text{V}$, $I_D = 0.5\ \text{A}$, $R_g = 10\ \Omega$	t_r		4.8		ns
Turn-Off Delay Time at $V_{GS} = 4.5\ \text{V}$, $V_{DS} = 10\ \text{V}$, $I_D = 0.5\ \text{A}$, $R_g = 10\ \Omega$	$t_{d(off)}$		17.3		ns
Turn-Off Fall Time at $V_{GS} = 4.5\ \text{V}$, $V_{DS} = 10\ \text{V}$, $I_D = 0.5\ \text{A}$, $R_g = 10\ \Omega$	t_f		7.4		ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = 0.15\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}			1.2	V
Body Diode Reverse Recovery Time at $I_F = 5.6\ \text{A}$, $di/dt = 100\ \text{A} / \mu\text{s}$	t_{rr}		14		ns
Body Diode Reverse Recovery Charge at $I_F = 5.6\ \text{A}$, $di/dt = 100\ \text{A} / \mu\text{s}$	Q_{rr}		0.4		nC

Electrical Characteristics Curves

Fig. 1 - Output Characteristics

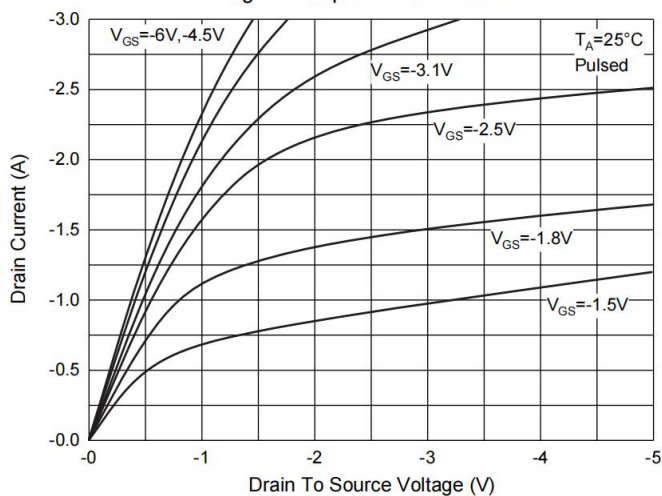


Fig. 2 - Transfer Characteristics

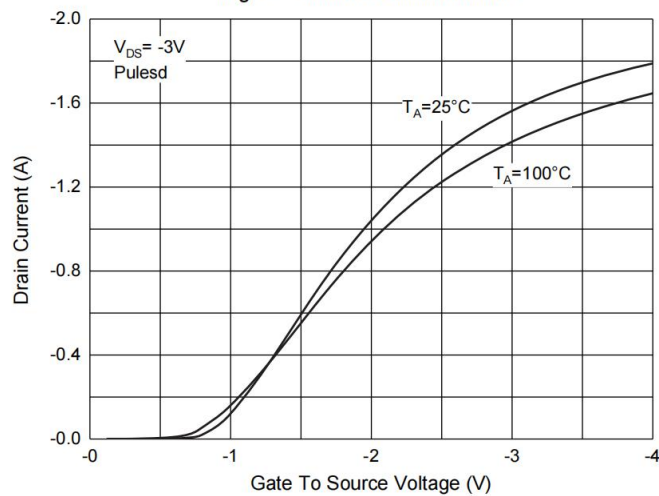


Fig. 3 - $R_{DS(ON)} - I_D$

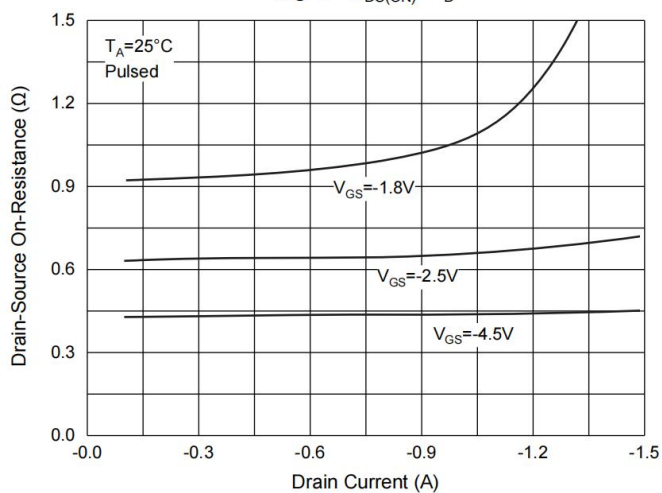


Fig. 4 - $R_{DS(ON)} - V_{GS}$

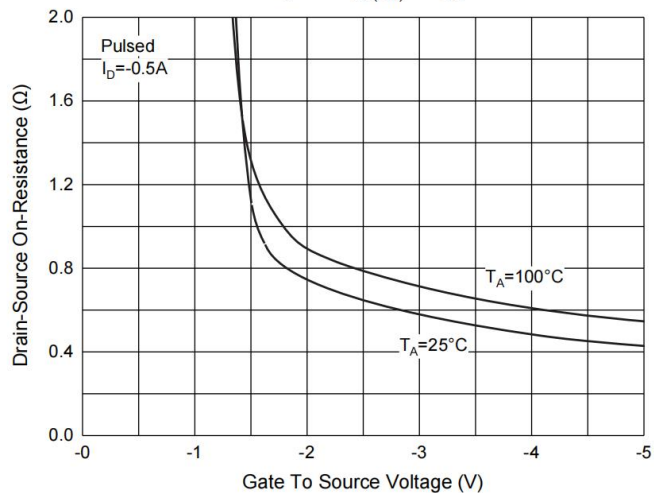


Fig. 5 - $I_S - V_{SD}$

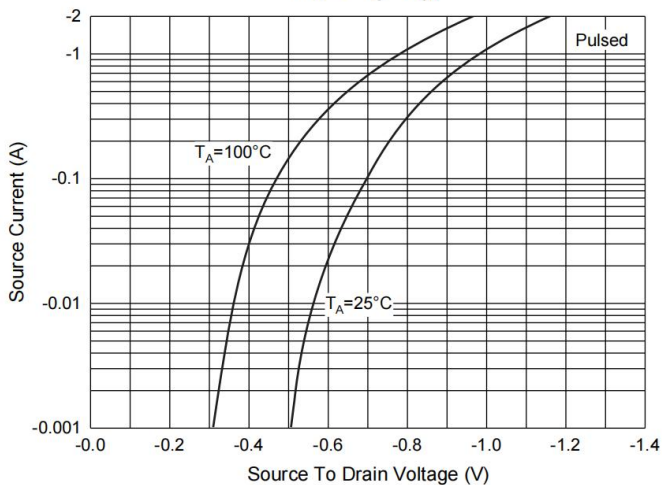
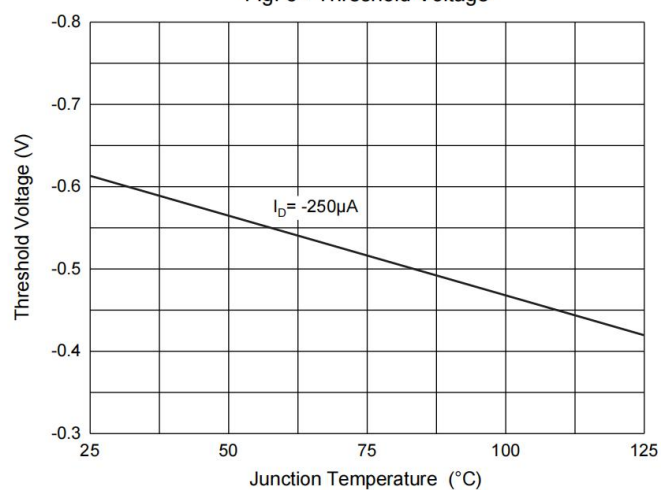
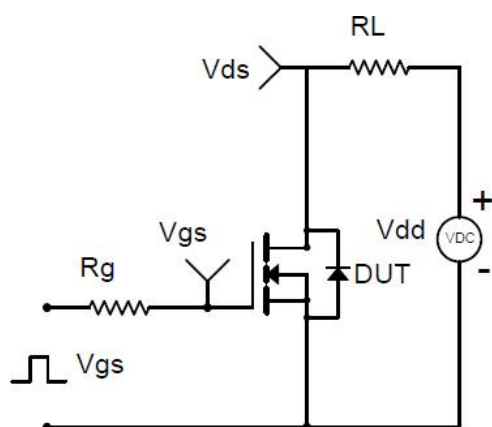
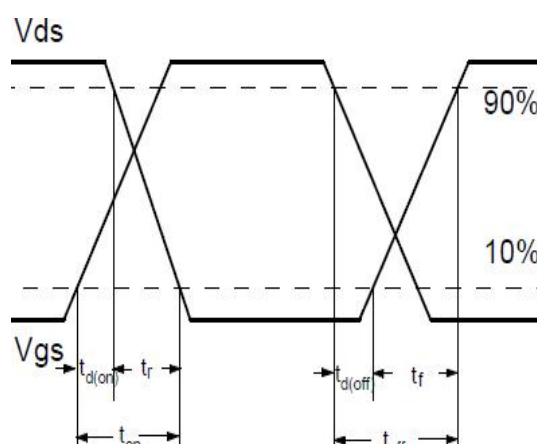
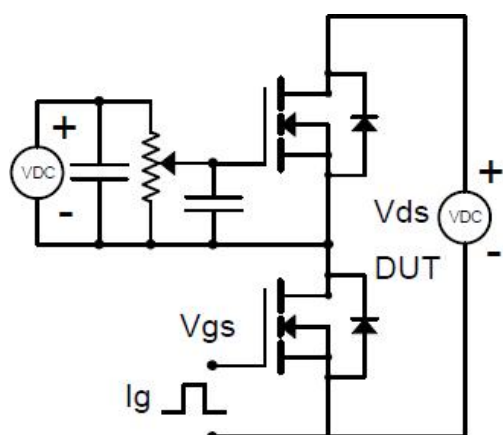
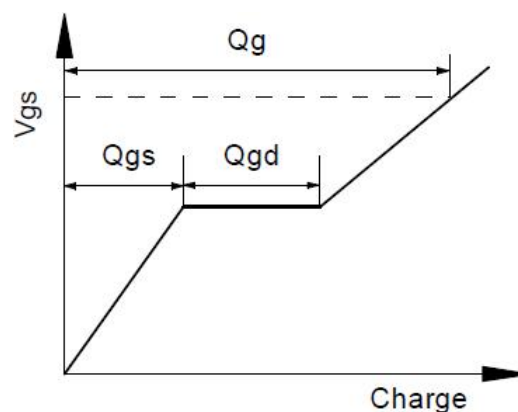
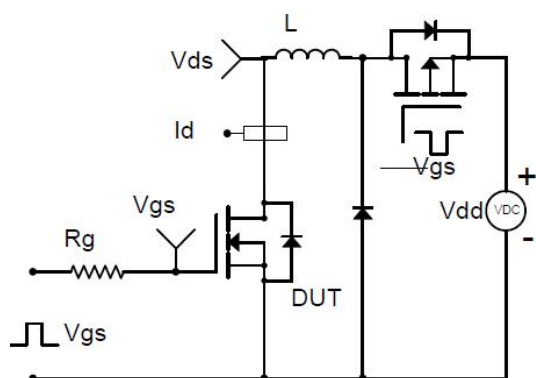
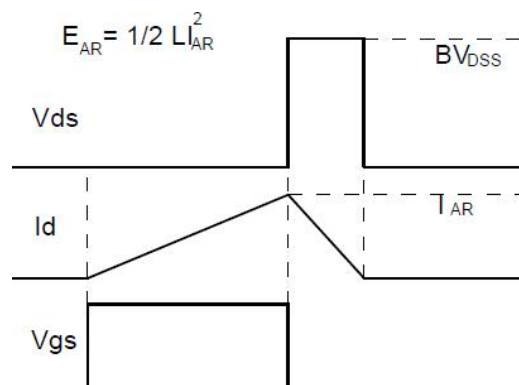


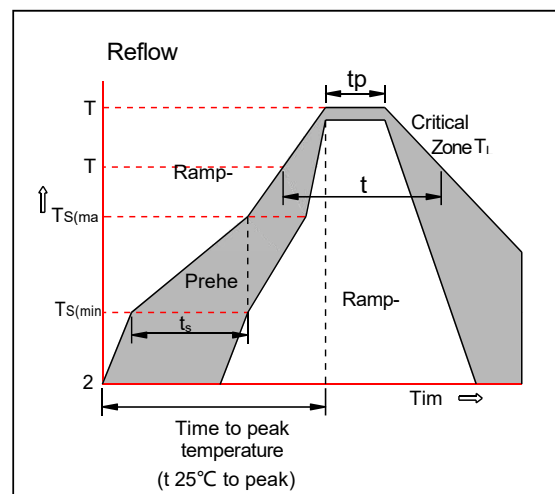
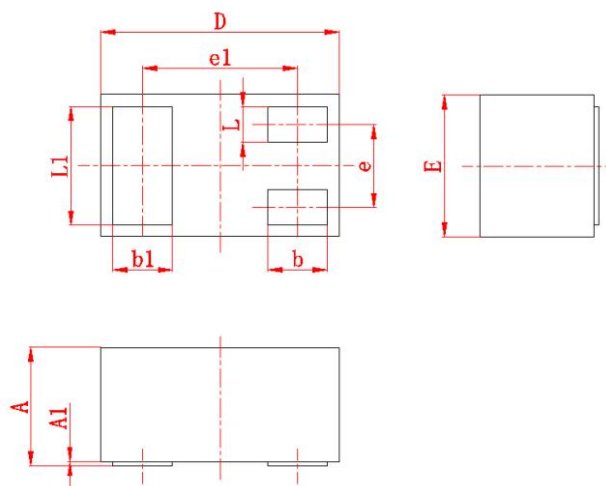
Fig. 6 - Threshold Voltage



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


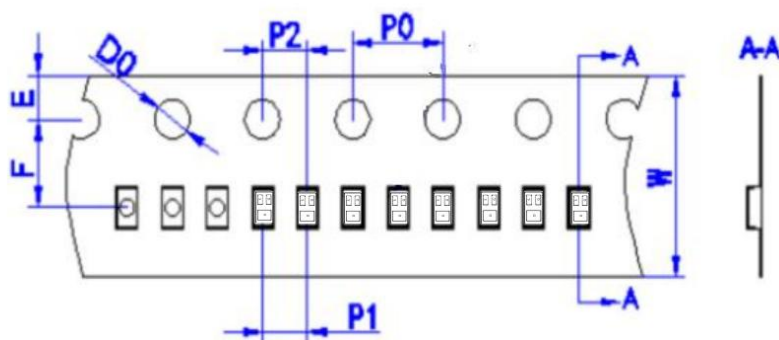
Soldering parameters

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

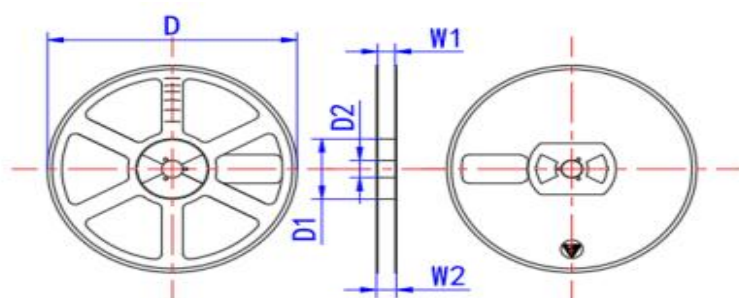

Package Outline Dimensions (Units: mm)
DFN1006-3L


符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max
A	0.4	0.5	e	(0.35)		L	0.1	0.2
A1	0	0.05	e1	(0.65)		L1	0.45	0.55
D	0.9	1.1	b	0.2	0.3			
E	0.55	0.65	b1	0.2	0.3			

Emboss Carrier Tape&Reel



Symbol	Dimension in Millimeters
Tape	
D0	1.50+0.10/-0.00
E	1.75±0.10
F	3.50±0.10
P0	4.00±0.10
P1	2.00±0.10
P2	2.00±0.10
W	8.00+0.3/-0.1



Reel	
D	178.0±2.00
D1	54.40±1.00
D2	13.00±1.00
W1	9.50±1.00
W2	12.30±1.00