

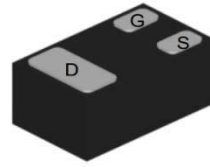
N-Channel Enhancement Mode MOSFET

Features

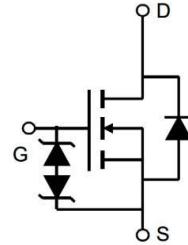
- ESD Protected up to 2KV (HBM)
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free
- Advanced Trench Process Technology



Top View

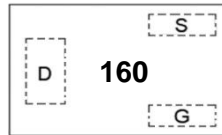


Bottom View



Application

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



DFN1006-3L
Marking:160

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	0.95	A
Pulsed Drain Current ²⁾	I_{DM}	3.8	A
Power Dissipation ¹⁾	P_{tot}	0.83	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 ¹⁾	$R_{\theta JA}$	150	$^\circ\text{C}/\text{W}$

Notes:

1).Surface Mounted on 1 in² pad area.

2).Pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

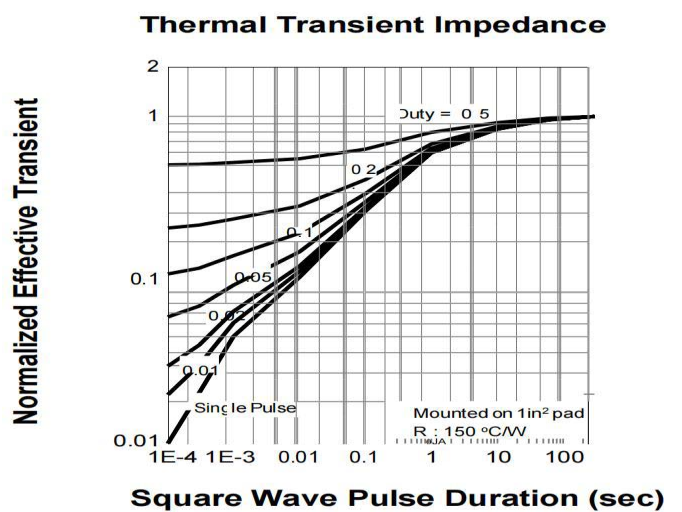
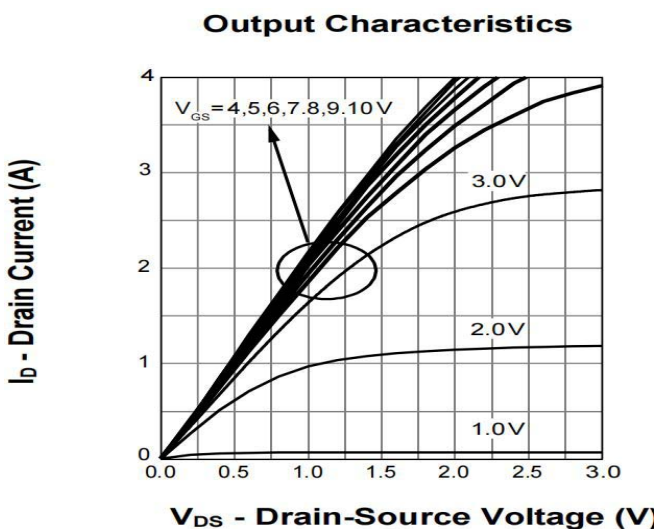
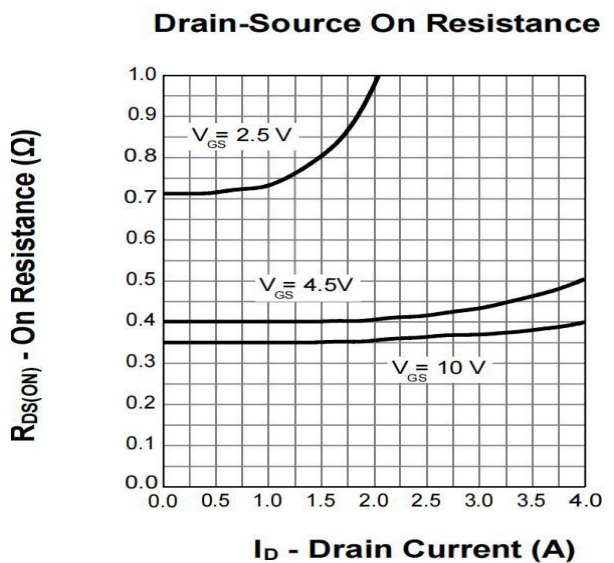
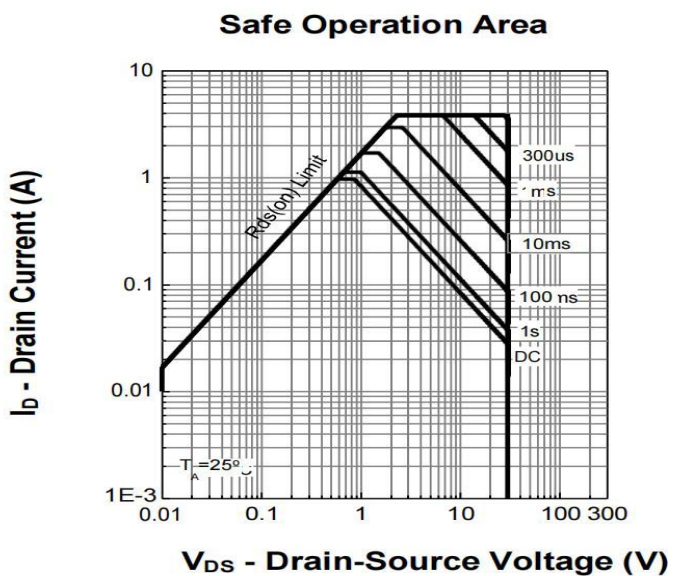
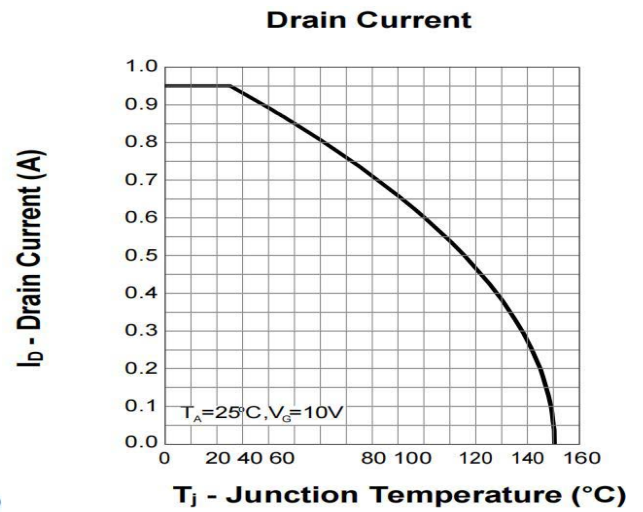
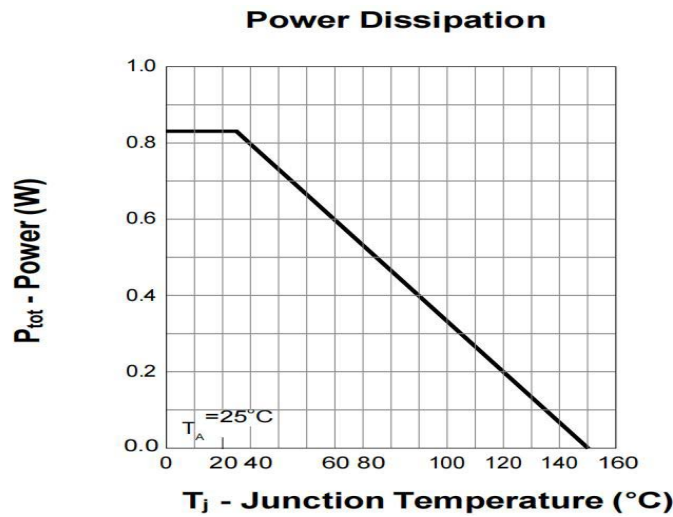


FTK3160P3

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

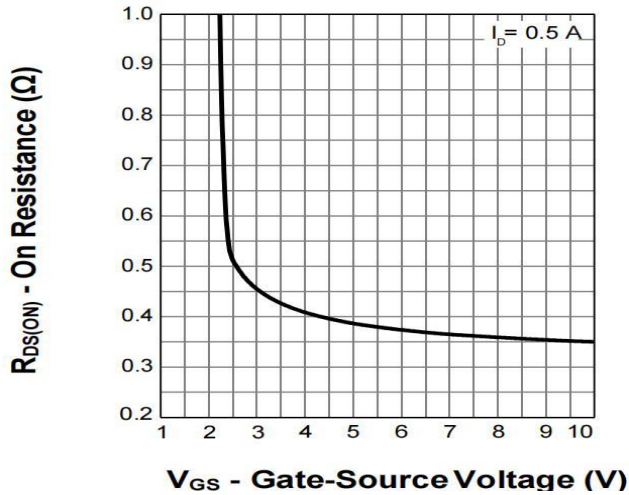
Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$, $V_{GS} = 0\ \text{V}$	BV_{DSS}	30			V
Drain-Source Leakage Current at $V_{DS} = 24\ \text{V}$, $V_{GS} = 0\ \text{V}$	I_{DSS}			100	nA
Gate Leakage Current at $V_{GS} = \pm 12\ \text{V}$, $V_{DS} = 0\ \text{V}$	I_{GSS}			± 10	μA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	0.5		1.5	V
Drain-Source On-State Resistance at $V_{GS} = 10\ \text{V}$, $I_D = 500\ \text{mA}$ at $V_{GS} = 4.5\ \text{V}$, $I_D = 400\ \text{mA}$ at $V_{GS} = 2.5\ \text{V}$, $I_D = 300\ \text{mA}$	$R_{DS(on)}$		0.35 0.45 0.7	0.6 0.65 1.2	Ω
DYNAMIC PARAMETERS					
Gate resistance at $V_{DS} = 0\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g		70		Ω
Forward Transconductance at $V_{DS} = 3\ \text{V}$, $I_D = 10\ \text{mA}$	g_{fs}	40			mS
Input Capacitance at $V_{DS} = 10\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}		30		pF
Output Capacitance at $V_{DS} = 10\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}		3		pF
Reverse Transfer Capacitance at $V_{DS} = 10\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}		1		pF
Gate charge total at $V_{DS} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_g		0.6		pC
Gate to Source Charge at $V_{DS} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_{gs}		0.26		pC
Gate to Drain Charge at $V_{DS} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_{gd}		0.17		pC
Turn-On Delay Time at $V_{DS} = 30\ \text{V}$, $R_G = 25\ \Omega$, $R_L = 60\ \Omega$, $V_{GEN} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$	$t_{d(on)}$		3.6		nS
Turn-On Rise Time at $V_{DS} = 30\ \text{V}$, $R_G = 25\ \Omega$, $R_L = 60\ \Omega$, $V_{GEN} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$	t_r		3.3		nS
Turn-Off Delay Time at $V_{DS} = 30\ \text{V}$, $R_G = 25\ \Omega$, $R_L = 60\ \Omega$, $V_{GEN} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$	$t_{d(off)}$		20		nS
Turn-Off Fall Time at $V_{DS} = 30\ \text{V}$, $R_G = 25\ \Omega$, $R_L = 60\ \Omega$, $V_{GEN} = 10\ \text{V}$, $I_{DS} = 0.95\ \text{A}$	t_f		11		nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_{SD} = 0.5\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}			1.2	V
Body Diode Reverse Recovery Time at $I_{SD} = 0.5\ \text{A}$, $di_{SD} / dt = 100\ \text{A} / \mu\text{s}$	t_{rr}		40		nS
Body Diode Reverse Recovery Charge at $I_{SD} = 0.5\ \text{A}$, $di_{SD} / dt = 100\ \text{A} / \mu\text{s}$	Q_{rr}		39		nC

Electrical Characteristics Curves

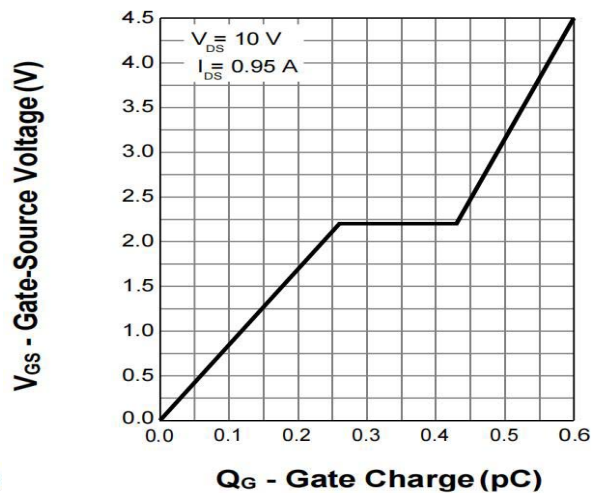


Electrical Characteristics Curves

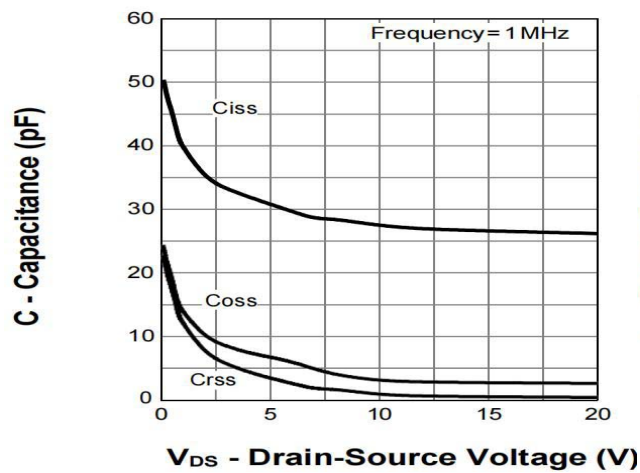
Transfer Characteristics



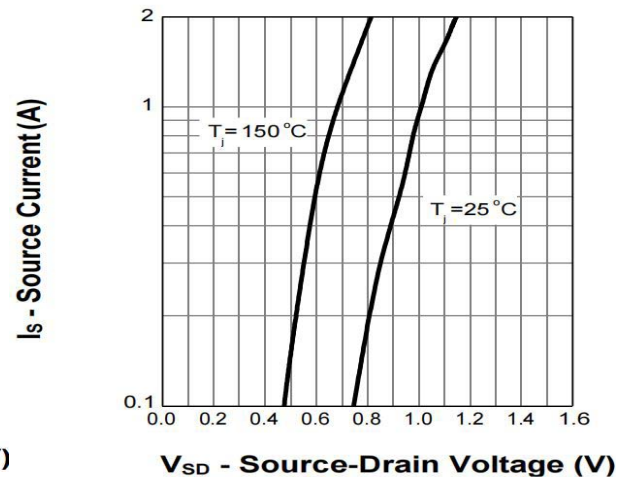
Gate Charge



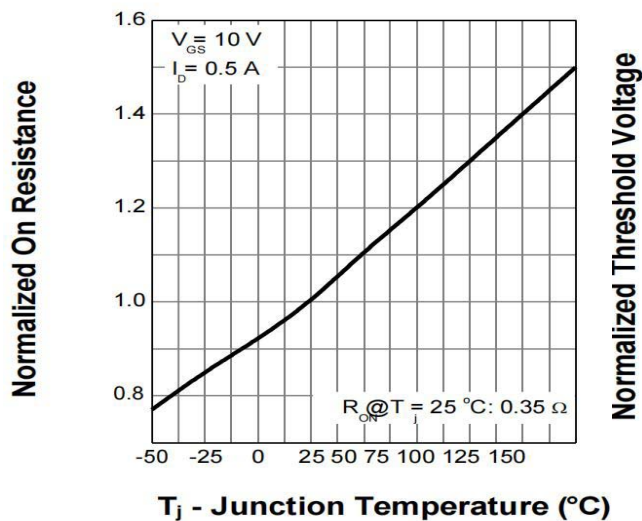
Capacitance



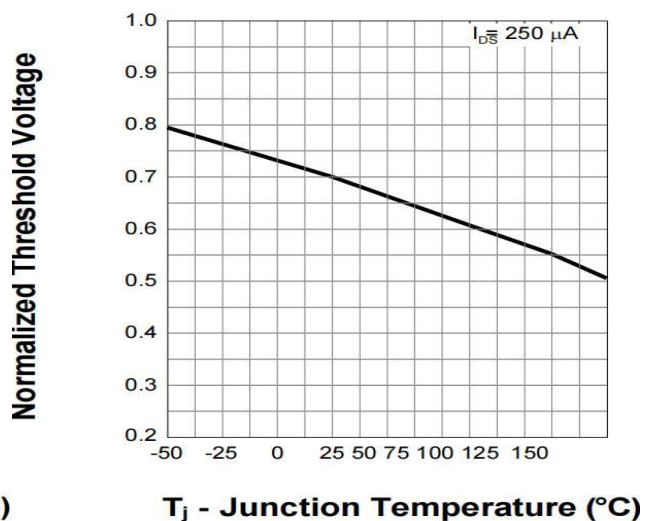
Source-Drain Diode Forward



Drain-Source On Resistance



Gate Threshold Voltage



Test Circuits

Fig.1-1 Switching times test circuit

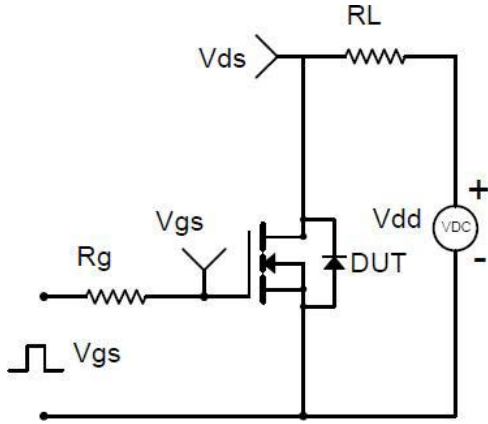


Fig.1-2 Switching Waveform

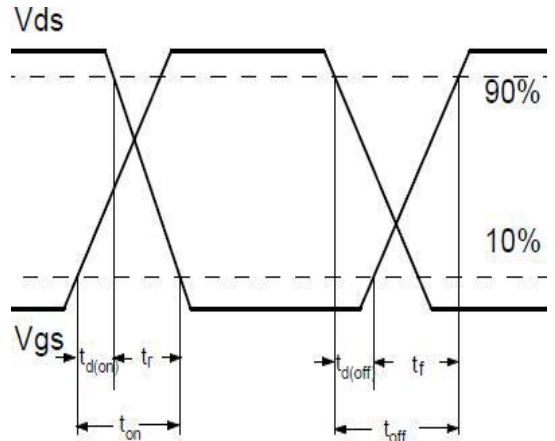


Fig.2-1 Gate charge test circuit

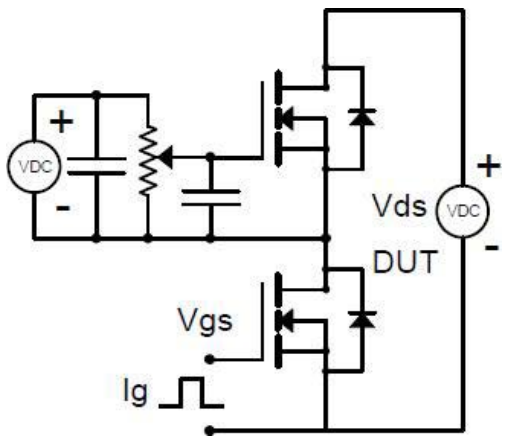


Fig.2-2 Gate charge waveform

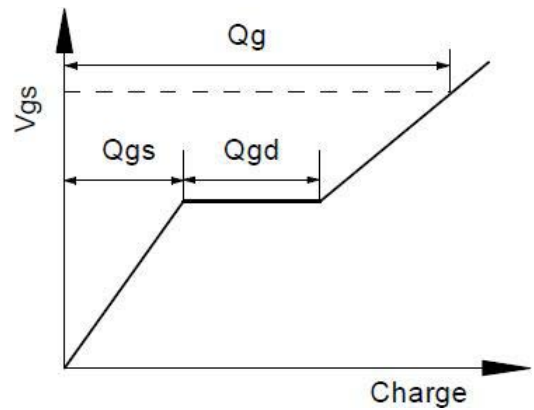


Fig.3-1 Avalanche test circuit

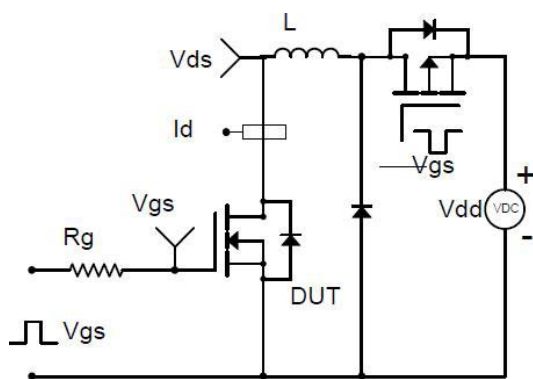
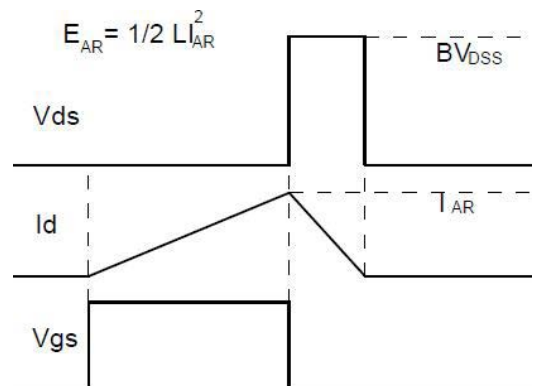
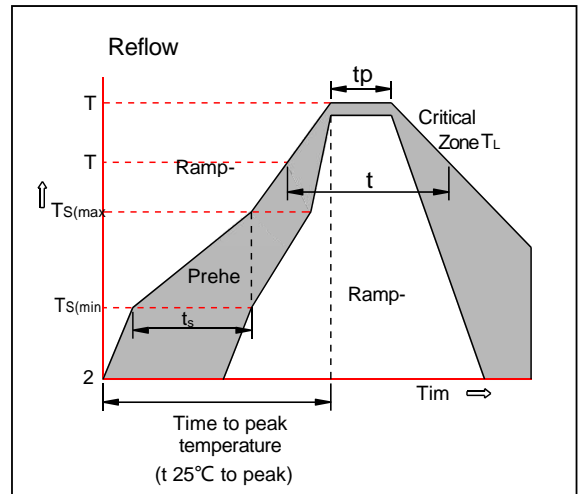


Fig.3-2 Avalanche waveform



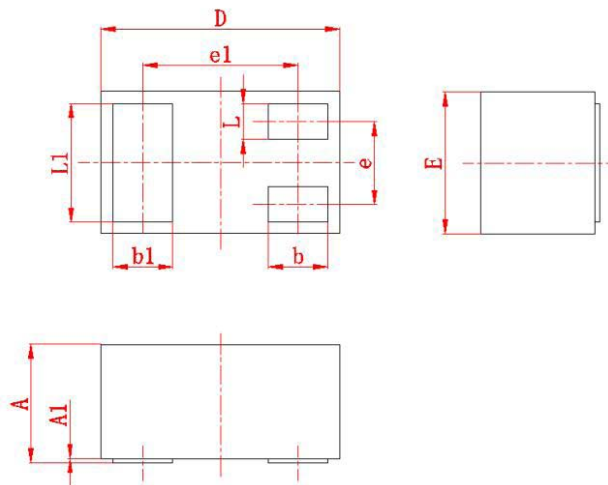
Soldering parameters

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



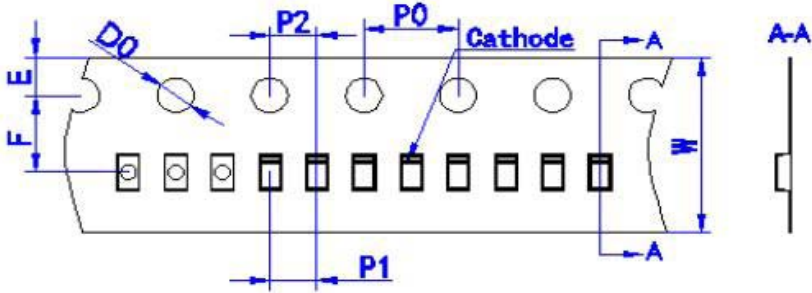
Package Outline Dimensions (Units: mm)

DFN1006-3L

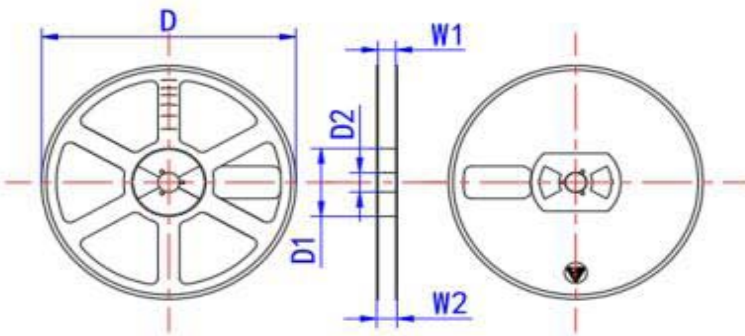


Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max
A	0.4	0.5	e	(0.35)		L	0.1	0.2
A1	0	0.05	e1	(0.65)		L1	0.45	0.55
D	0.9	1.1	b	0.2	0.3			
E	0.55	0.65	b1	0.2	0.3			

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