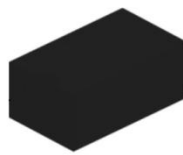


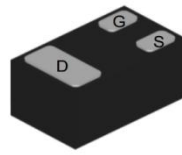
### N-Channel Enhancement Mode MOSFET

#### Features

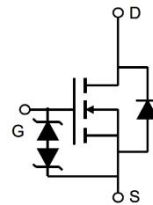
- Advanced Trench Process Technology
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free
- ESD Protected up to 2KV (HBM)



Top View

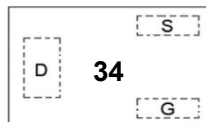


Bottom View



#### Application

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



DFN1006-3L  
Marking: 34

#### 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	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	0.75	A
Peak Drain Current, Pulsed <sup>1)</sup>	$I_{DM}$	1.8	A
Power Dissipation <sup>2)</sup>	$P_{tot}$	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 <sup>2)</sup>	$R_{\theta JA}$	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
<b>STATIC PARAMETERS</b>					
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	$\mu\text{A}$
Gate Leakage Current at $V_{GS} = \pm 10 \text{ V}$	$I_{GSS}$			$\pm 10$	$\mu\text{A}$
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	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>					
Forward Transconductance at $V_{DS} = 5 \text{ V}$ , $I_D = 0.15 \text{ A}$	$g_{fs}$	15			$\text{mS}$
Input Capacitance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 16 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{iss}$		79		$\text{pF}$
Output Capacitance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 16 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{oss}$		13		$\text{pF}$
Reverse Transfer Capacitance at $V_{GS} = 0 \text{ V}$ , $V_{DS} = 16 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{rss}$		9		$\text{pF}$
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		$\text{nC}$
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		$\text{nC}$
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		$\text{nC}$
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		$\text{ns}$
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		$\text{ns}$
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		$\text{ns}$
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		$\text{ns}$
<b>Body-Diode PARAMETERS</b>					
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		$\text{ns}$
Body Diode Reverse Recovery Charge at $I_F = 5.6 \text{ A}$ , $di/dt = 100 \text{ A} / \mu\text{s}$	$Q_{rr}$		0.4		$\text{nC}$

**Electrical Characteristics Curves**

Fig. 1 - Output Characteristics

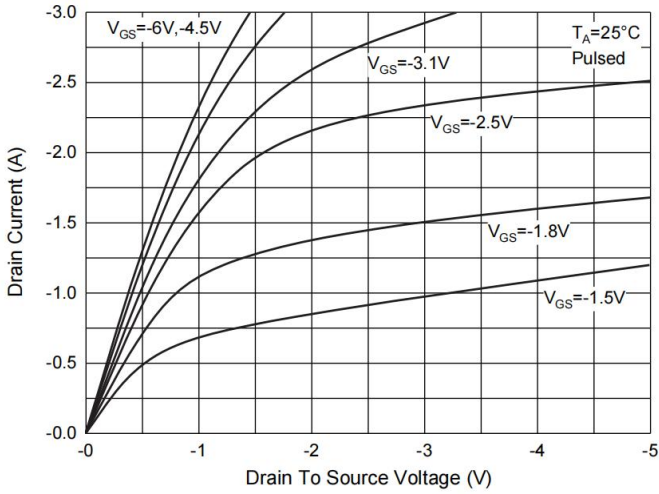


Fig. 2 - Transfer Characteristics

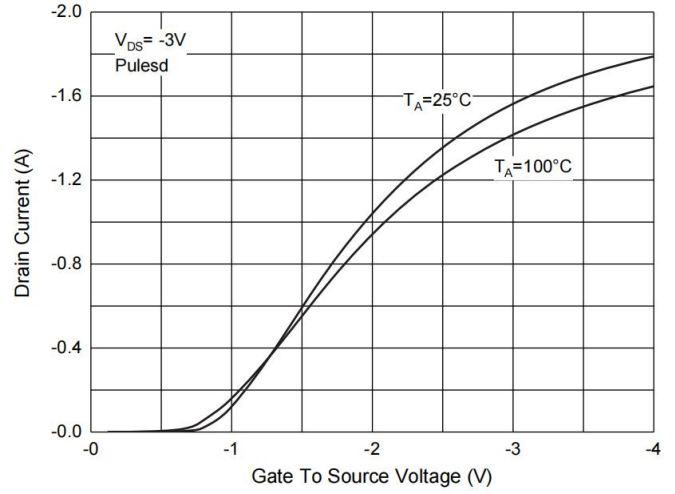


Fig. 3 -  $R_{DS(ON)} - I_D$

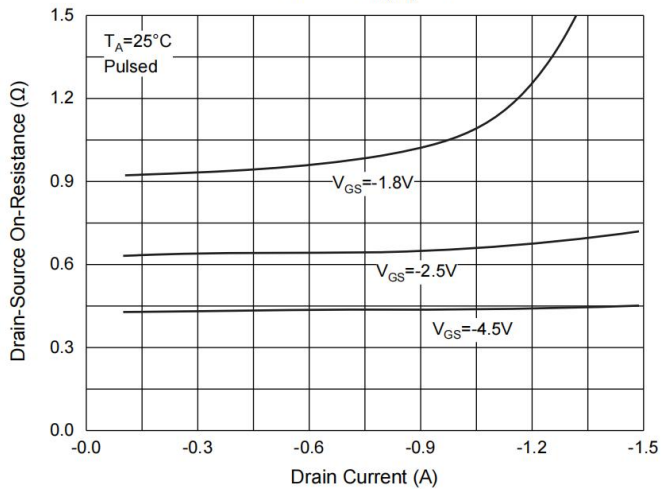


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

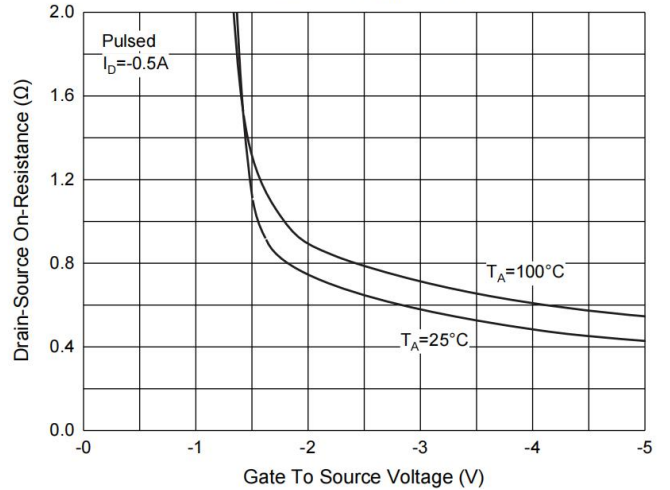


Fig. 5 -  $I_S - V_{SD}$

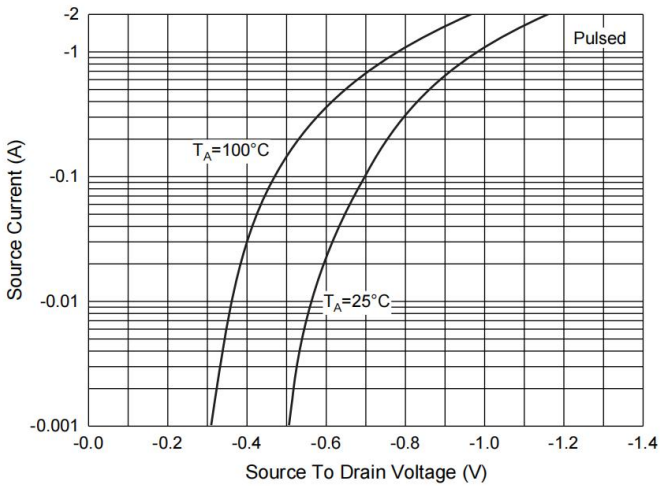
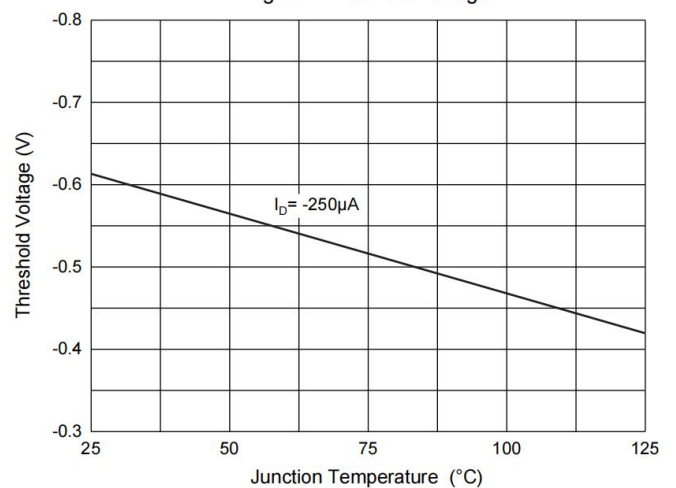


Fig. 6 - Threshold Voltage



**Test Circuits**

Fig.1-1 Switching times test circuit

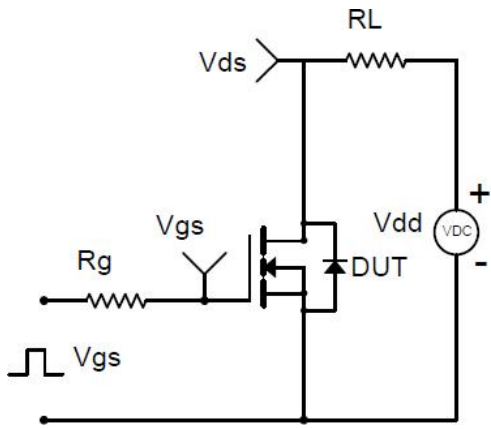


Fig.1-2 Switching Waveform

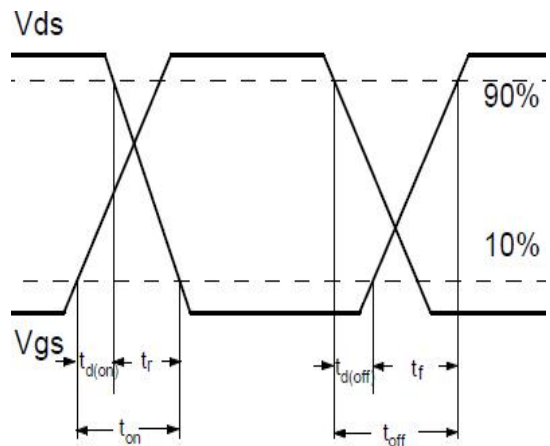


Fig.2-1 Gate charge test circuit

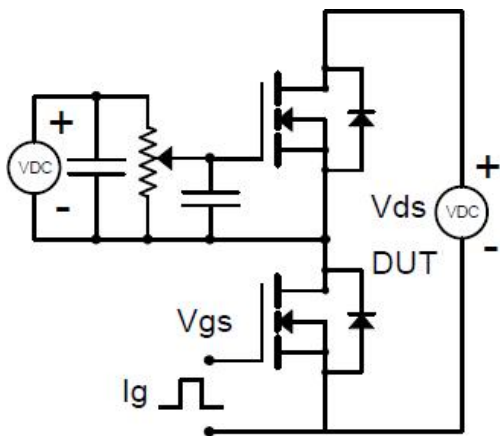


Fig.2-2 Gate charge waveform

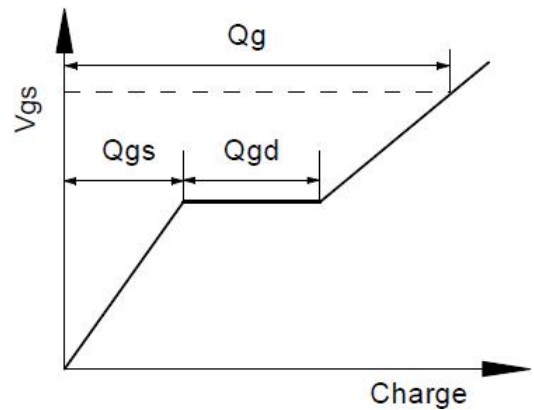


Fig.3-1 Avalanche test circuit

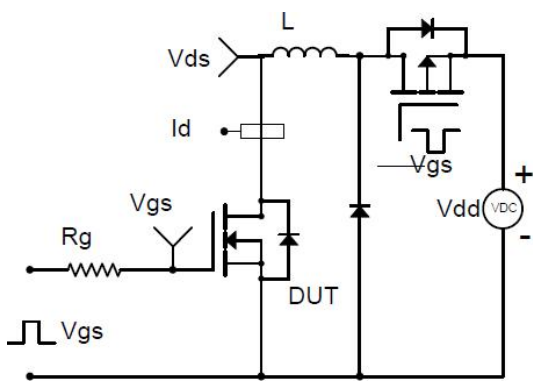
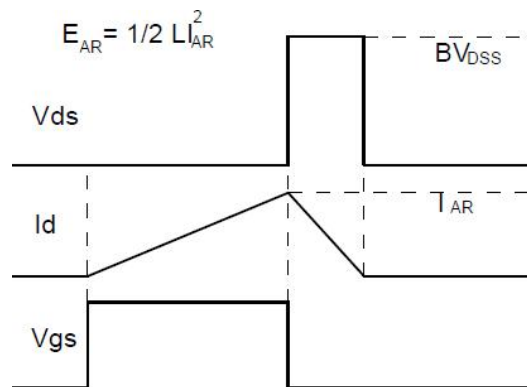
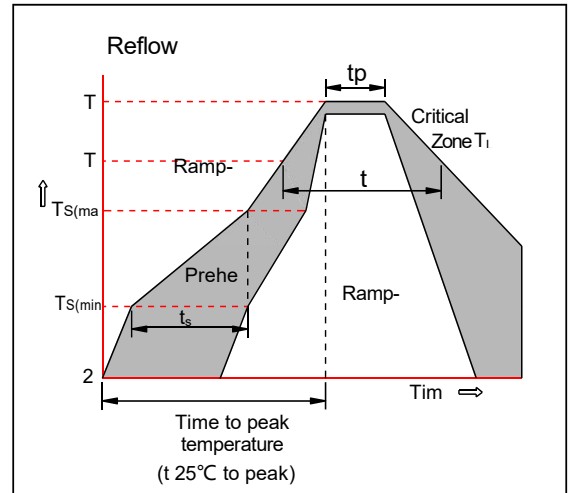


Fig.3-2 Avalanche waveform



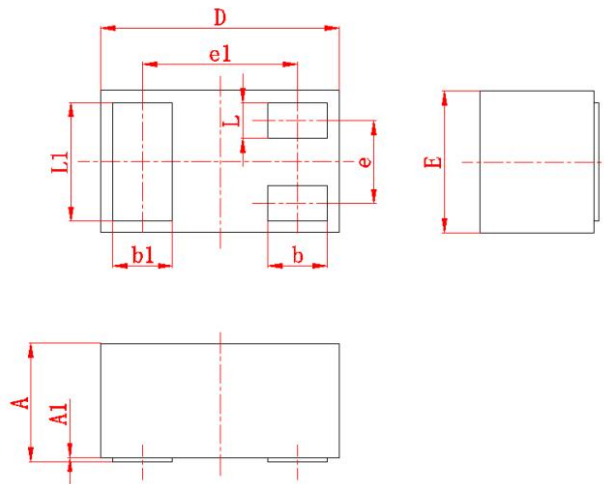
**Soldering parameters**

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			

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[WMJ80N60C4](#) [BXP2N20L](#) [BXP2N65D](#) [BXT1150N10J](#) [BXT1700P06M](#) [TSM60NB380CP ROG](#) [RQ7L055BGTGR](#) [DMNH15H110SK3-13](#)  
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