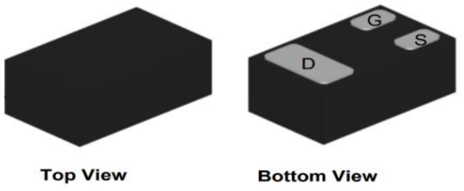
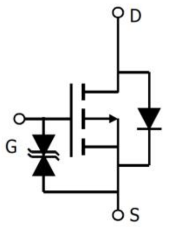
P-Channel Enhancement Mode MOSFET

Features

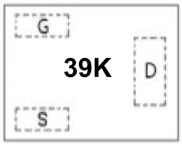
- Advanced Trench Process Technology
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free





Application

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



DFN1006-3L
Marking: 39K

Absolute Maximum Ratings (at T_a = 25°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	-0.98	A
Peak Drain Current, Pulsed [1]	I_{DM}	-1.2	A
Power Dissipation [2]	P_{tot}	0.71	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]	$R_{\theta JA}$	175	℃/W

Note:

1) Pulse width ≤100us, duty cycle ≤1%, limited by Tjmax.

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

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}	-20			V
Drain-Source Leakage Current at V_{DS} = -20 V	I_{DSS}			-1.0	μA
Gate Leakage Current at V_{GS} = ± 12V	I_{GSS}			±10	μA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, I_D = - 250 μA	$V_{GS(th)}$	-0.35	-0.7	-1.1	V
Drain-Source On-State Resistance at V_{GS} = -4.5 V, I_D = -0.5 A at V_{GS} = -2.5 V, I_D = -0.3A	$R_{DS(on)}$		370 500	530 775	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = -10 V, I_D = -0.54 A	g_{fs}		1.2		S
Input Capacitance at V_{GS} = 0 V, V_{DS} = -16V, f = 1 MHz	C_{iss}		113		pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = -16 V, f = 1 MHz	C_{oss}		15		pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} =- 16V, f = 1 MHz	C_{rss}		9		pF
Gate charge total at V_{DS} = - 10 V, I_D = - 0.65 A, V_{GS} = - 4.5 V	Q_g		1.24		nC
Gate to Source Charge at V_{DS} = - 10 V, I_D = - 0.65 A, V_{GS} = - 4.5 V	Q_{gs}		0.37		nC
Gate to Drain Charge at V_{DS} = - 10 V, I_D = - 0.65 A, V_{GS} = - 4.5 V	Q_{gd}		0.27		nC
Turn-On Delay Time at V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -0.2 A, R_{GEN}= 10Ω	$t_{d(on)}$		9		ns
Turn-On Rise Time at V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -0.2 A, R_{GEN}= 10Ω	t_r		32.6		ns
Turn-Off Delay Time at V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -0.2 A, R_{GEN}= 10Ω	$t_{d(off)}$		5.7		ns
Turn-Off Fall Time at V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -0.2 A, R_{GEN}= 10Ω	t_f		20.3		ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = -0.5 A, V_{GS} = 0 V	V_{SD}			-1.2	V
Body Diode Reverse Recovery Time at I_F = -1.25 A, di/dt = 100 A / μs	t_{rr}			10.2	ns
Body Diode Reverse Recovery Charge at I_F = -1.25A, di/dt = 100 A / μs	Q_{rr}			3.5	nC

Electrical Characteristics Curves

Fig. 1 - Output Charact eristics

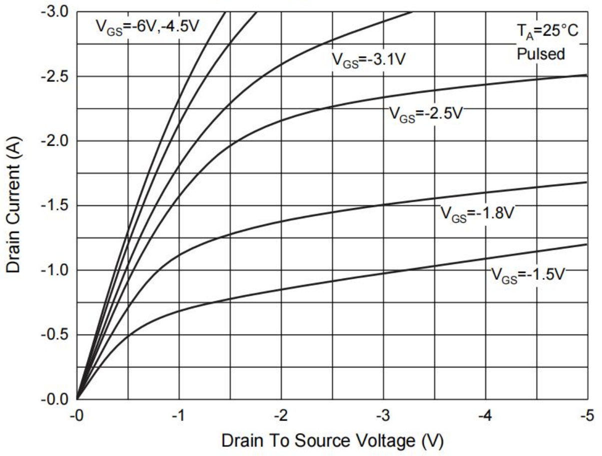


Fig. 2 - Transfer Characteristics

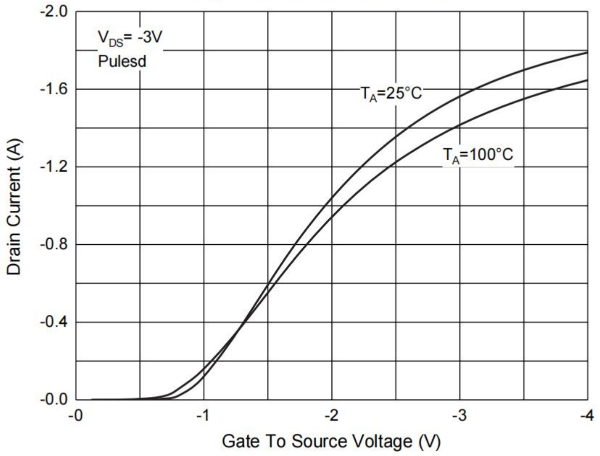


Fig. 3 - $R_{DS(ON)}$—I_D

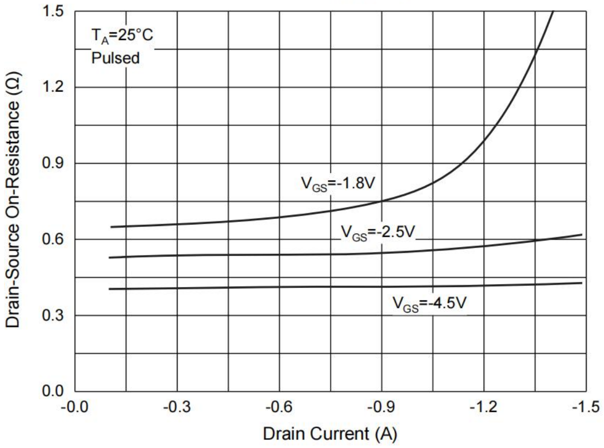


Fig. 4 - $R_{DS(ON)}$—V_{GS}

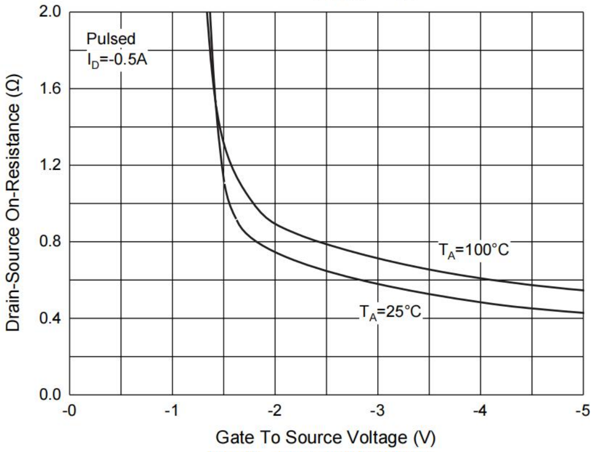


Fig. 5 - I_S—V_{SD}

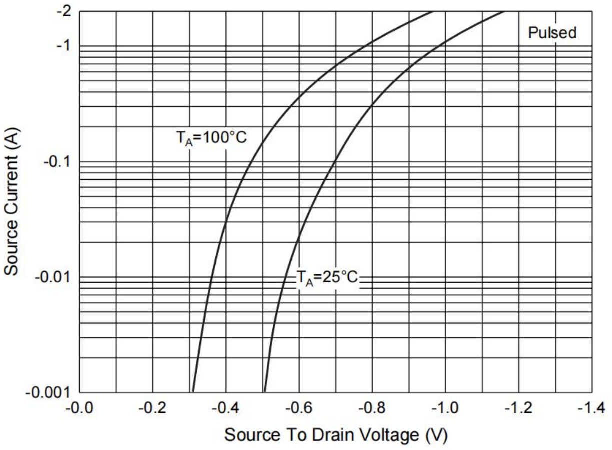
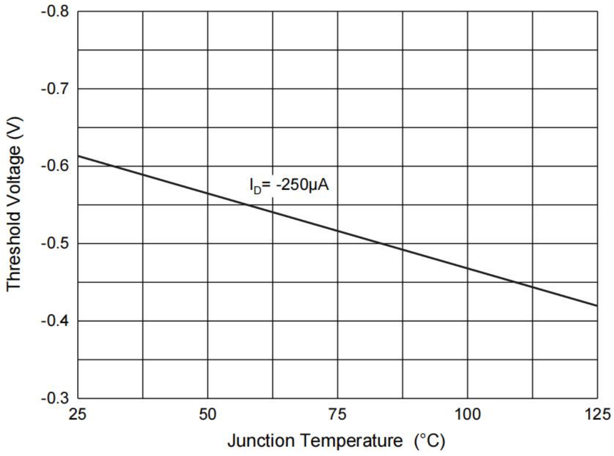


Fig. 6 - Threshold Voltage



Test Circuits

Fig.1-1 Switching times test circuit

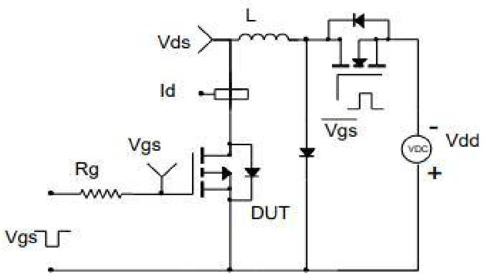


Fig.1-2 Switching Waveform

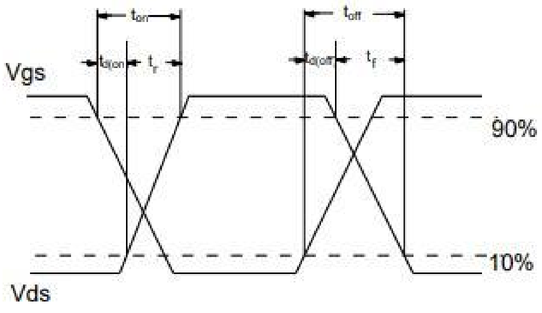


Fig.2-1 Gate charge test circuit

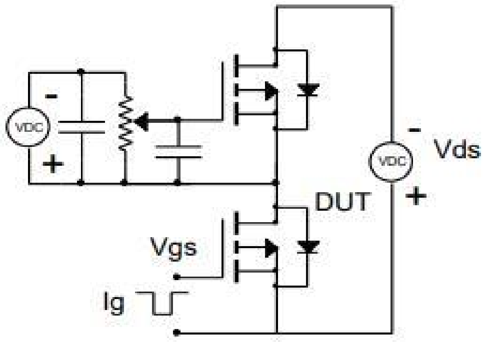


Fig.2-2 Gate charge waveform

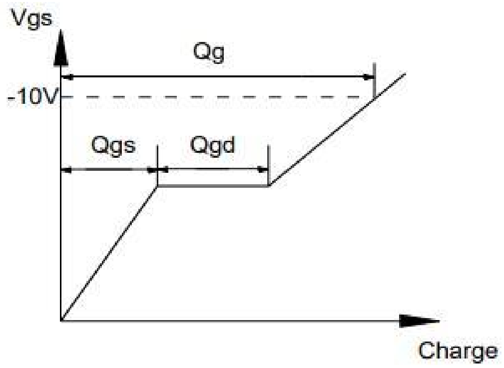


Fig.3-1 Avalanche test circuit

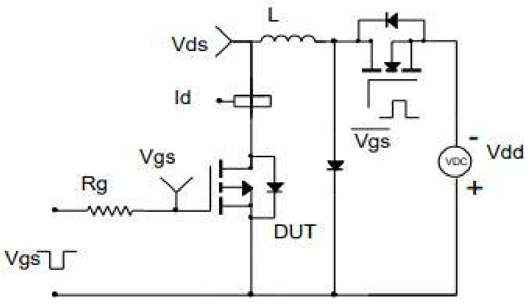
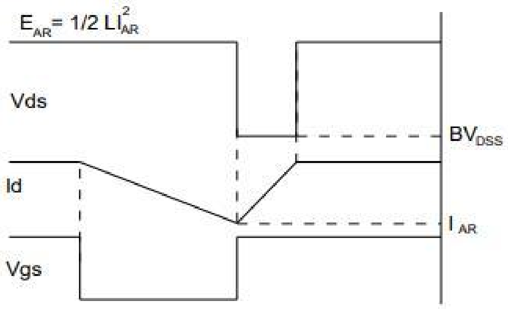
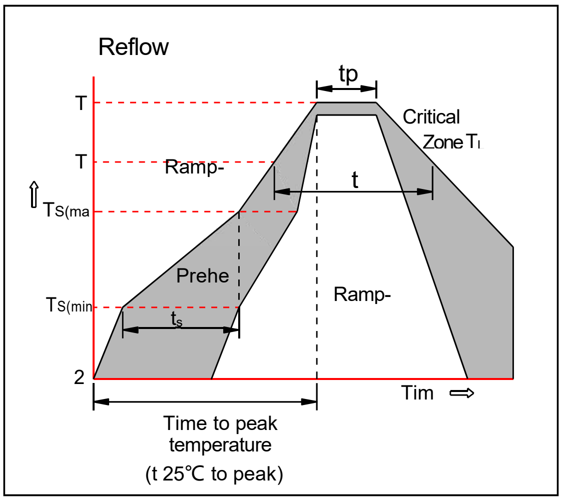


Fig.3-2 Avalanche waveform



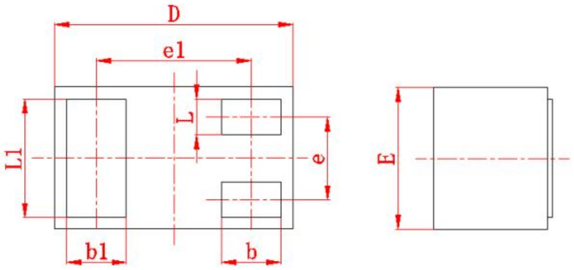
Soldering parameters

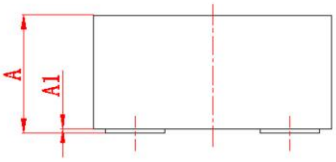
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid 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)

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			