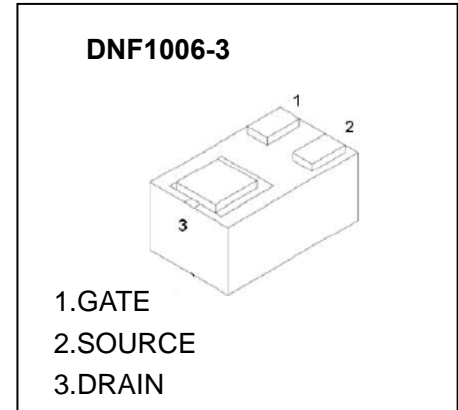


## DFN1006-3 Plastic-Encapsulate MOSFETS

### P-Channel MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-20V	450 mΩ @ -4.5V	-1A
	650 mΩ @ -2.5V	



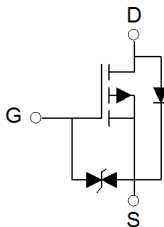
#### FEATURE

- Lead Free Product is Acquired
- Surface Mount Package
- P-Channel Switch with Low  $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive
- ESD Protected Gate

#### APPLICATION

- Load/ Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

#### Equivalent Circuit



#### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Typical Gate-Source Voltage	$V_{GS}$	±8	V
Continuous Drain Current	$I_D$	-1	A
Pulsed Drain Current	$I_{DM}$	-4	A
Power Dissipation	$P_D$	300	mW
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55~ 150	°C
Lead Temperature for Soldering Purposes(1/8" from case for 10 s)	$T_L$	260	°C

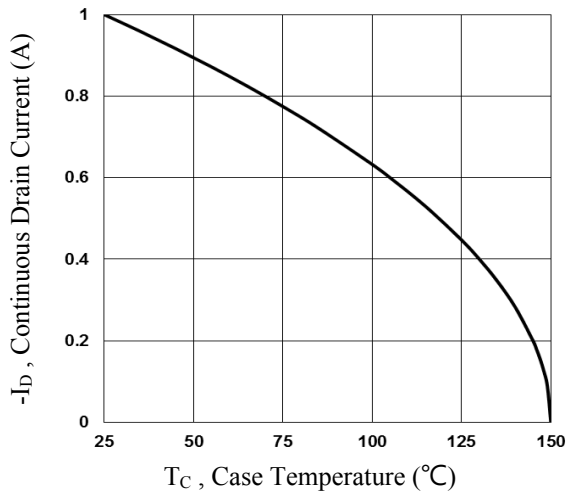
**MOSFET ELECTRICAL CHARACTERISTICS  $T_a=25^\circ\text{C}$  unless otherwise specified**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			-1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 10V, V_{DS} = 0V$			$\pm 20$	$\mu A$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.3	-0.7	-1	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -0.3A$		380	450	m $\Omega$
		$V_{GS} = -2.5V, I_D = -0.2A$		500	650	m $\Omega$
		$V_{GS} = -1.8V, I_D = -0.1A$		700	950	m $\Omega$
Forward transconductance	$g_{FS}$	$V_{DS} = -10V, I_D = -0.54A$		1.2		S
Diode forward voltage	$V_{SD}$	$I_S = -0.5A, V_{GS} = 0V$			-1.2	V
<b>DYNAMIC PARAMETERS (note 4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$		40		pF
Output Capacitance	$C_{oss}$			15		pF
Reverse Transfer Capacitance	$C_{rss}$			6.5		pF
<b>SWITCHING PARAMETERS (note 4)</b>						
Turn-on delay time (note 3)	$t_{d(on)}$	$V_{DD} = -4.5V, V_{GS} = -10V, I_D = -200mA, R_{GEN} = 10\Omega$		8		ns
Turn-on rise time (note 3)	$t_r$			5.2		ns
Turn-off delay time (note 3)	$t_{d(off)}$			30		ns
Turn-off fall time (note 3)	$t_f$			18		ns

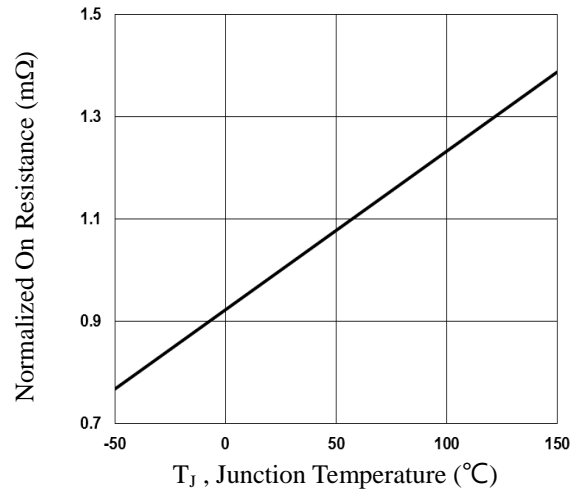
**Notes :**

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

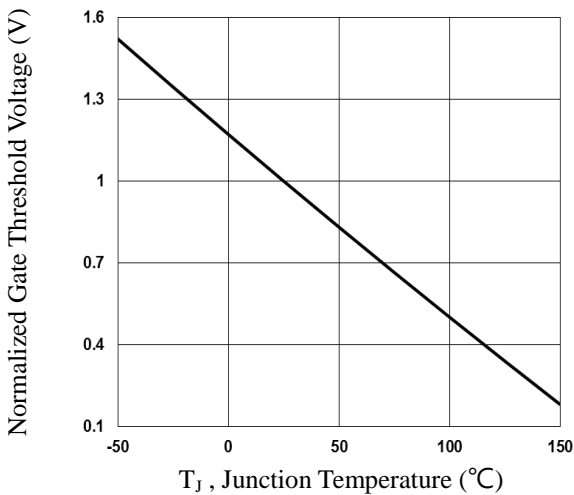
**Typical Characteristics**



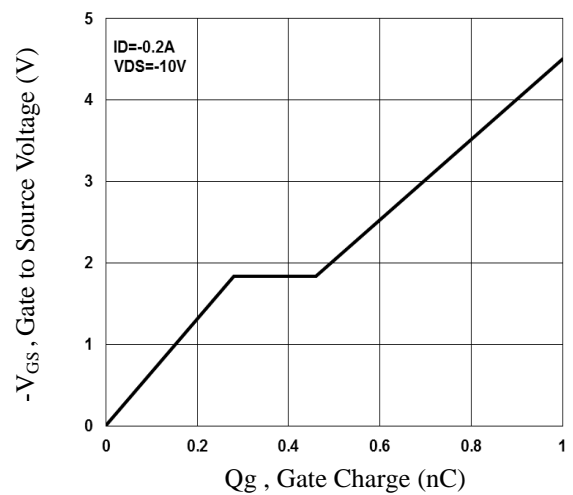
**Fig.1** Continuous Drain Current vs. T<sub>C</sub>



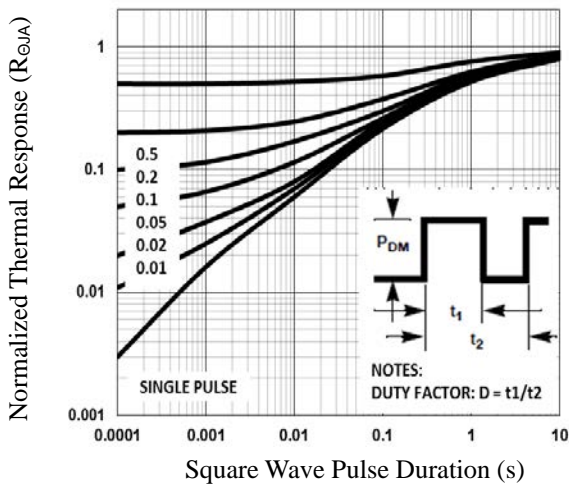
**Fig.2 Normalized RDSON vs. T<sub>J</sub>**



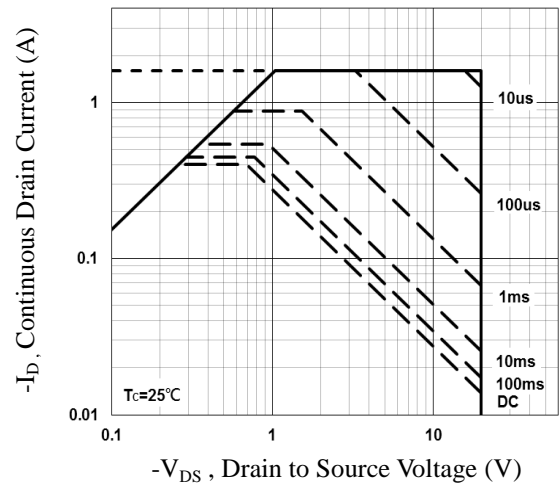
**Fig.3 Normalized V<sub>th</sub> vs. T<sub>J</sub>**



**Fig.4 Gate Charge Waveform**

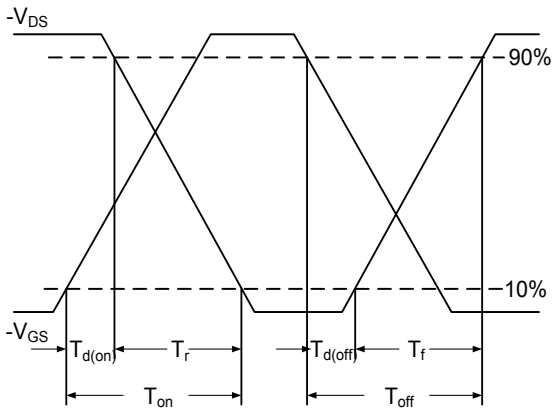


**Fig.5 Normalized Transient Response**

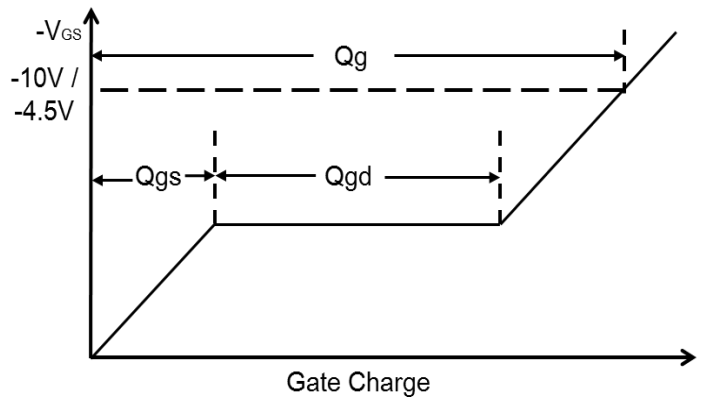


**Fig.6 Maximum Safe Operation Area**

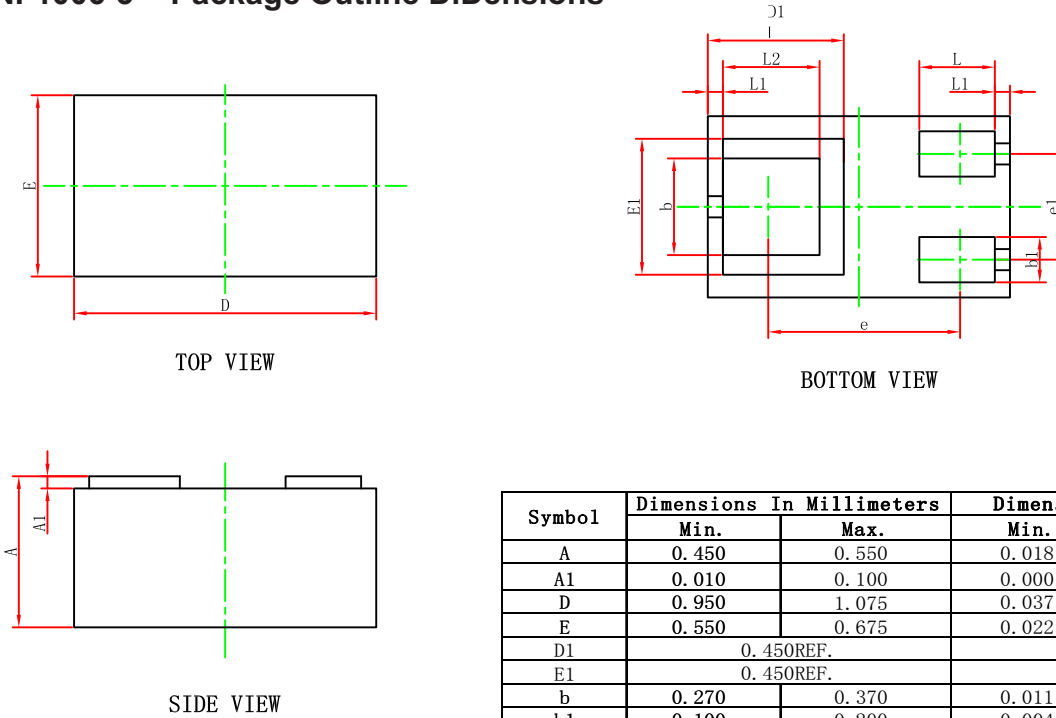
**Typical Characteristics**



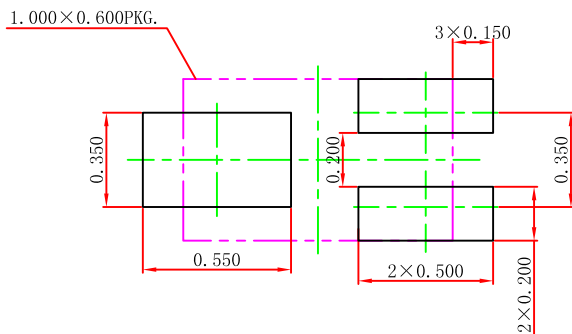
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

**DNF1006-3 Package Outline DiDimensions**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.010	0.100	0.000	0.004
D	0.950	1.075	0.037	0.041
E	0.550	0.675	0.022	0.026
D1	0.450REF.		0.018REF.	
E1	0.450REF.		0.018REF.	
b	0.270	0.370	0.011	0.015
b1	0.100	0.200	0.004	0.008
e	0.635REF.		0.025REF.	
e1	0.300	0.400	0.012	0.016
L	0.200	0.300	0.008	0.012
L1	0.050REF.		0.002REF.	
L2	0.270	0.370	0.011	0.015

**DNF1006-3 Suggested Pad LaLUT**

**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050\text{mm}$ .
3. The pad layout is for reference purposes only.