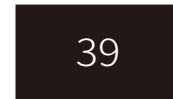


## FEATURES

- | Surface-mounted package
- | Advanced trench cell design
- | Extremely low threshold voltage
- | ESD protected



DFN1006-3L



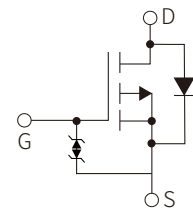
Marking

## APPLICATION

- | Portable appliances

## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003



Schematic Symbol

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage $T_A=25^\circ\text{C}$	$V_{DS}$	-20	V
Pulsed Drain Current $T_A=25^\circ\text{C}$ $V_{GS}=-4.5\text{V}$	$I_{DM}^{**}$	-2.6	A
Drain Current $T_A=25^\circ\text{C}$ $V_{GS}=-4.5\text{V}$	$I_D^*$	-0.67	A
Gate-Source Voltage $T_A=25^\circ\text{C}$	$V_{GS}$	$\pm 10$	V
Total Power Dissipation	$P_{tot}^*$	$T_A=25^\circ\text{C}$	0.83
		$T_A=100^\circ\text{C}$	0.33
Diode Forward Current $T_A=25^\circ\text{C}$	$I_S^*$	-2.6	A
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ\text{C}$
Thermal Resistance- Junction to Ambient	$R_{\theta JA}^*$	150	$^\circ\text{C}/\text{W}$

Notes:

\* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10$  sec

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

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA	-20			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA	-0.3	-0.65	-1.0	V
Drain Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V			-1	μA
		V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>J</sub> =85 °C			-30	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±10	μA
On-State Resistance	R <sub>DS(on)</sub> <sup>a</sup>	V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-0.5A		0.35	0.55	Ω
		V <sub>GS</sub> =-2.5V, I <sub>DS</sub> =-0.2A		0.95	1.2	
		V <sub>GS</sub> =-1.8V, I <sub>DS</sub> =-0.04A		1.15	1.4	
		V <sub>GS</sub> =-1.5V, I <sub>DS</sub> =-0.01A		2		
<b>Diode Characteristics</b>						
Diode Forward Voltage	V <sub>SD</sub> <sup>a</sup>	I <sub>SD</sub> =-0.5A, V <sub>GS</sub> =0V			1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>SD</sub> =-0.5A dI <sub>SD</sub> /dt = 100 A / μs		70		ns
Reverse Recovery Charge	Q <sub>rr</sub>			68		nC
<b>Dynamic Characteristics<sup>b</sup></b>						
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, Frequency = 1 MHz		87		pF
Output capacitance	C <sub>oss</sub>			15		pF
Reverse transfer capacitance	C <sub>rss</sub>			8.2		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DS</sub> =-30V, V <sub>GEN</sub> =-10V R <sub>G</sub> =25Ω, R <sub>L</sub> =60Ω, I <sub>DS</sub> =-0.67A		5.6		nS
Turn-on Rise Time	t <sub>r</sub>			5.3		nS
Turn-Off Delay Time	t <sub>d(off)</sub>			30		nS
Turn-Off Fall Time	t <sub>f</sub>			21		nS
<b>Gate Charge Characteristics<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-0.67A		1.8		pC
Gate-Source Charge	Q <sub>gs</sub>			0.82		pC
Gate-Drain Charge	Q <sub>gd</sub>			0.59		pC

**Notes:**

a : Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

# PARAMETER CHARACTERISTIC CURVE

Figure1: Power Dissipation

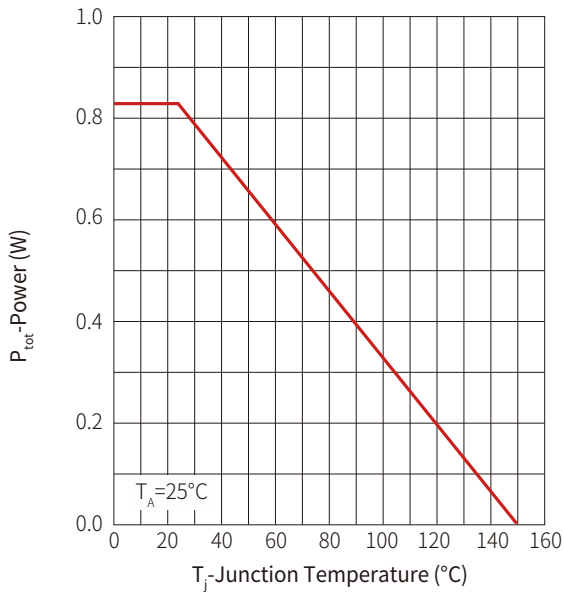


Figure2: Drain Current

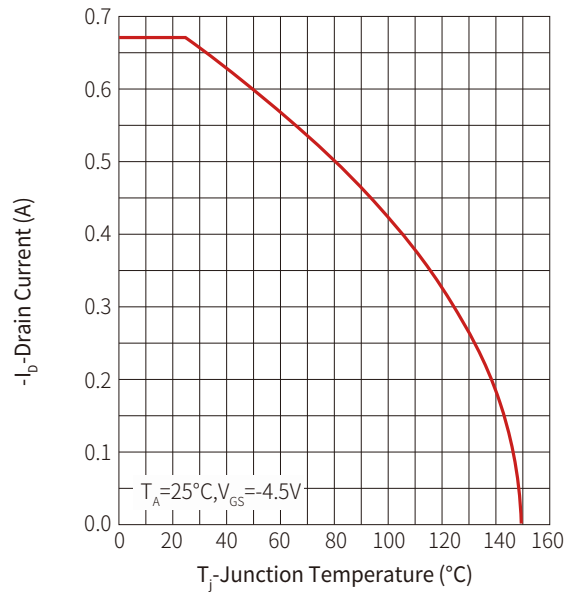


Figure3: Safe Operating Area

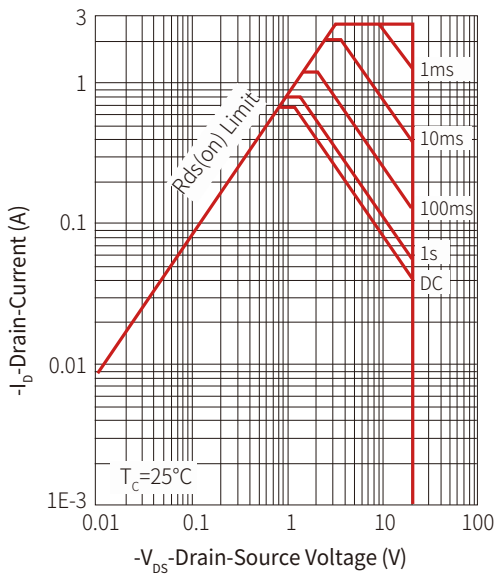
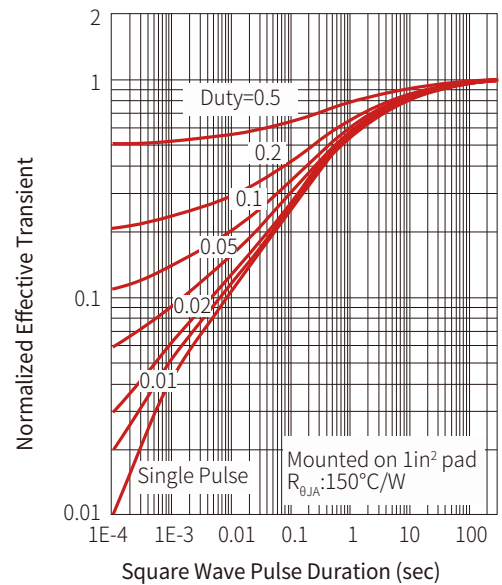
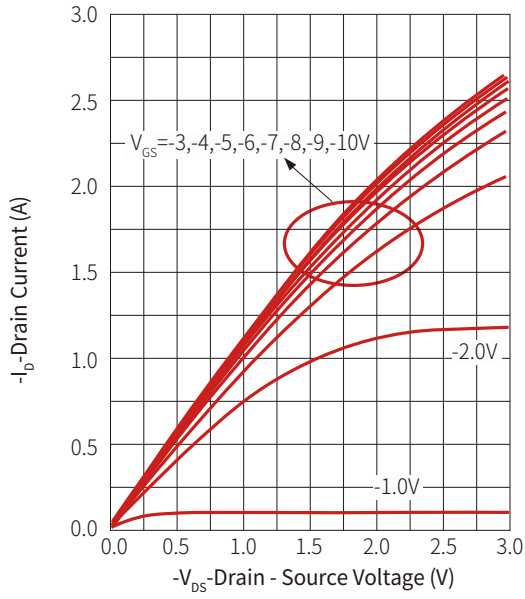


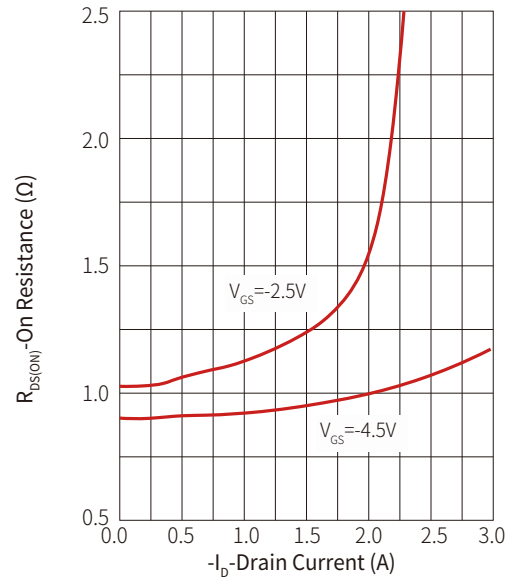
Figure 4: Thermal Transient Impedance



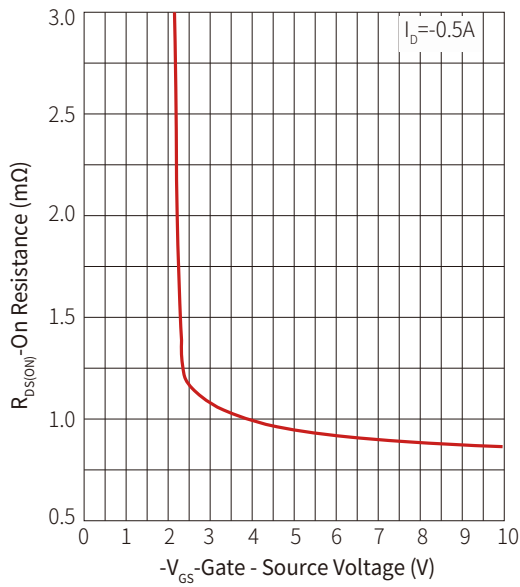
**Figure 5: Output Characteristics**



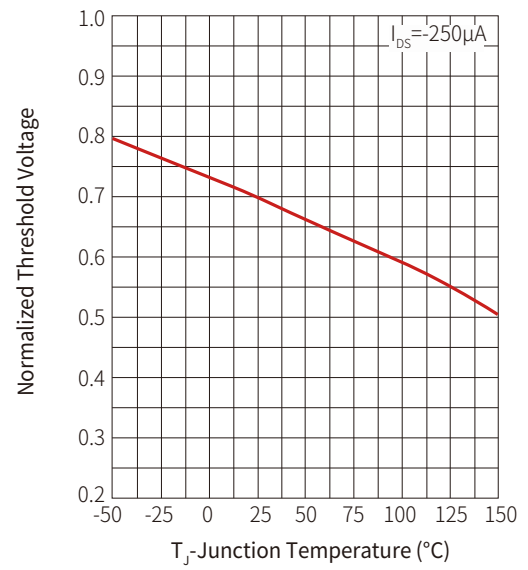
**Figure 6: Drain-Source On Resistance**



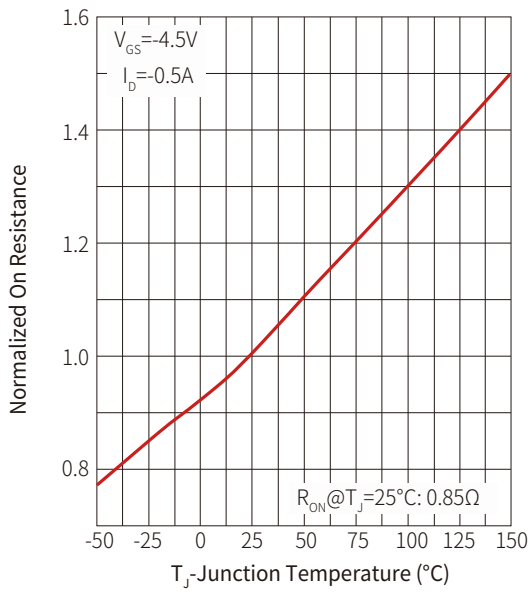
**Figure 7: Transfer Characteristics**



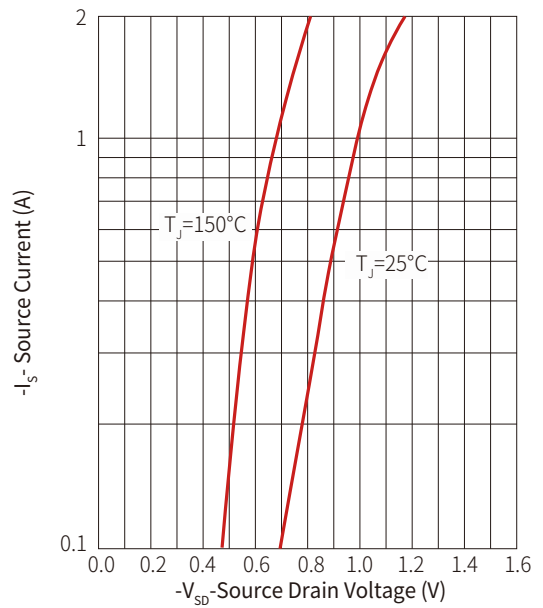
**Figure 8: Gate Threshold Voltage**



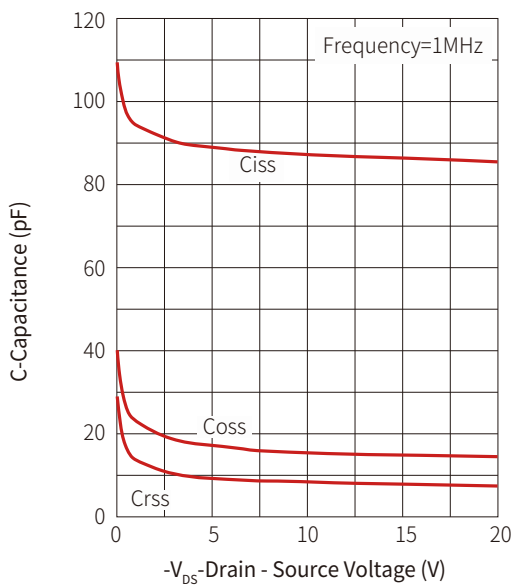
**Figure 9: Drain-Source On Resistance**



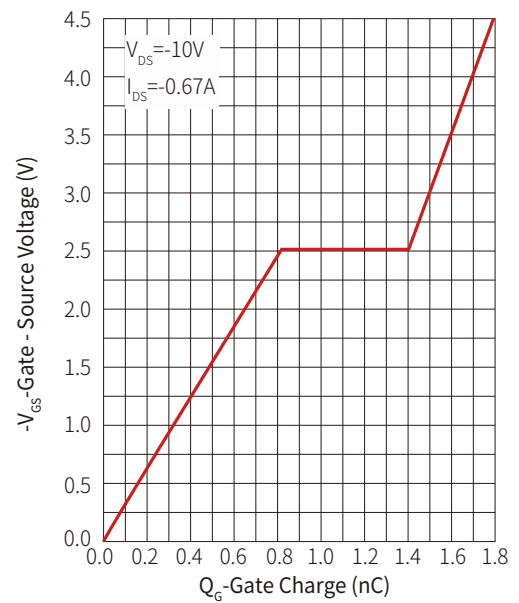
**Figure 10: Source-Drain Diode Forward**



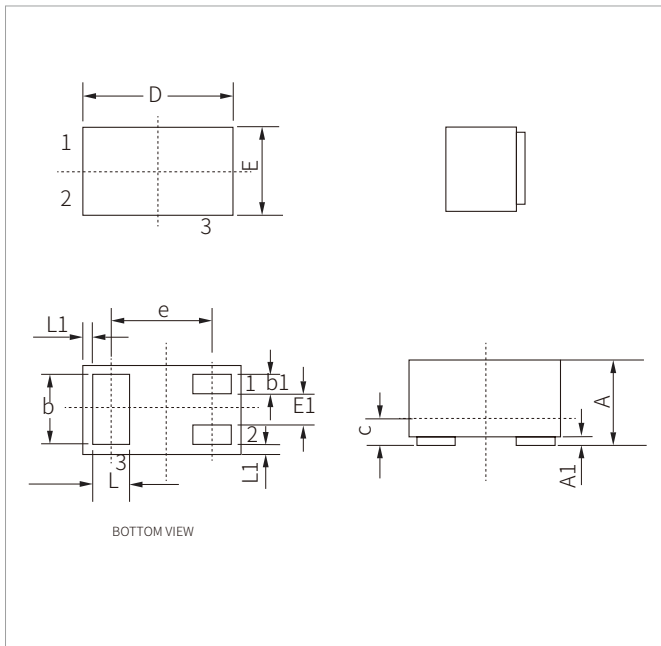
**Figure 11: Capacitance**



**Figure 12: Gate Charge**

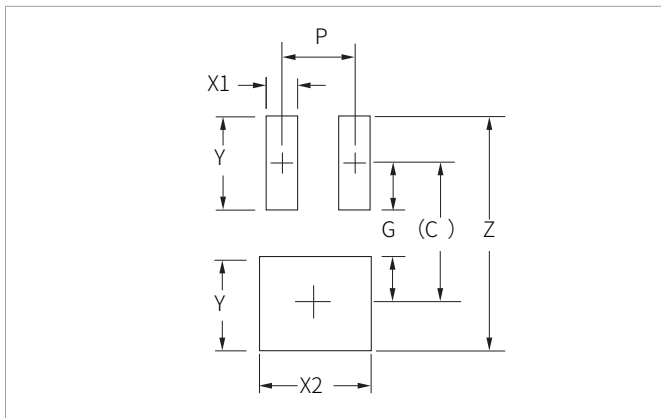


## DFN1006-3L PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.35	0.60	0.014	0.024
A1	0	0.05	0	0.002
b	0.45	0.55	0.018	0.022
b1	0.10	0.20	0.004	0.008
c	0.12	0.18	0.005	0.007
D	0.95	1.05	0.037	0.041
e	0.65BSC		0.026BSC	
E	0.55	0.70	0.022	0.027
E1	0.20	0.30	0.008	0.014
L	0.20	0.30	0.008	0.012
L1	0.05REF		0.002REF	

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters	Inches
C	(0.85)	(0.033)
P	0.40	0.016
G	0.30	0.012
X1	0.20	0.008
X2	0.60	0.024
Y	0.55	0.022
Z	1.40	0.055

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM3139N1	DFN1006-3L	10000PCS	7"

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