# JSMICRO SEMICONDUCTOR

JSM125N04D

Description：

This N-Channel MOSFET uses advanced trench technology and

design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.
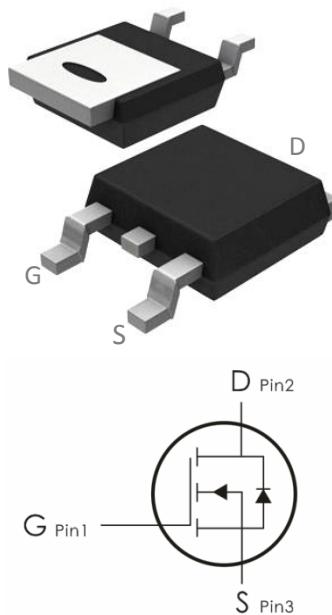
Features：

1) V_{DS}=40V, I_D=120A, $R_{DS(ON)}$<4mΩ @V_{GS}=10V

2) Low gate charge.

3) Green device available.

4) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.

5) Excellent package for good heat dissipation.

Absolute Maximum Ratings： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-T_C=25℃	120	A
	Continuous Drain Current-T_C=100℃	85	
	Pulsed Drain Current[1]	330	
E_{AS}	Single Pulse Avalanche Energy	1080	mJ
P_D	Power Dissipation,T_C=25℃	120	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	1.25	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	---	

## Electrical Characteristics： (T_C=25℃　unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	40	45	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=40V, V_{DS}=20V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1.2	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=10V,I_D=20A	---	3.6	4	mΩ
		V_{GS}=4.5V,I_D=10A	---	5.8	7	
G_{FS}	Forward Transconductance	V_{DS}=10V, I_D=20A	26	---	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance		---	5400	---	pF
C_{oss}	Output Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	970	---	
C_{rss}	Reverse Transfer Capacitance		---	380	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time[3]		---	15	---	ns
t_r	Rise Time[2,3]	V_{DD}=20V, I_D=20A,	---	18	---	ns
$t_{d(off)}$	Turn-Off Delay Time	V_{GS}=10V,R_{GEN}=3Ω	---	52	---	ns
t_f	Fall Time[2,3]		---	23	---	ns
Q_g	Total Gate Charge[3]		---	75	---	nC
Q_{gs}	Gate-Source　Charge	V_{GS}=10V, V_{DS}=20V,	---	10.5	---	nC
Q_{gd}	Gate-Drain "Miller" Charge	I_D=20A	---	17	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=40A	---	---	1.2	V

Ls	Diode Forward Current(Note 2)		---	---	120	A
Qrr	Reverse Recovery Time	TJ = 25°C, IF = 40A	---	42	---	Ns
trr	Reverse Recovery Charge	di/dt = 100A/ s(Note3)	---	45	---	nc

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production

5. E_{AS} condition : Tj=25℃,V_{DD}=20V,V_G=10V,L=1mH,Rg=25Ω，I_{AS}=46.5A

Typical Characteristics： (T_C=25℃ unless otherwise noted)
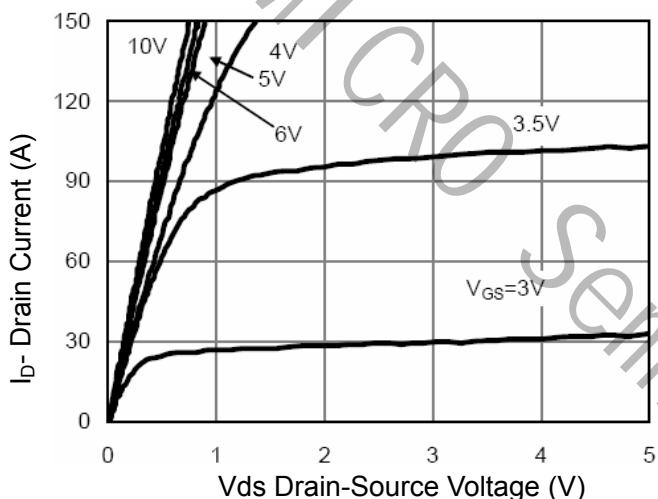
Figure 1 Output Characteristics
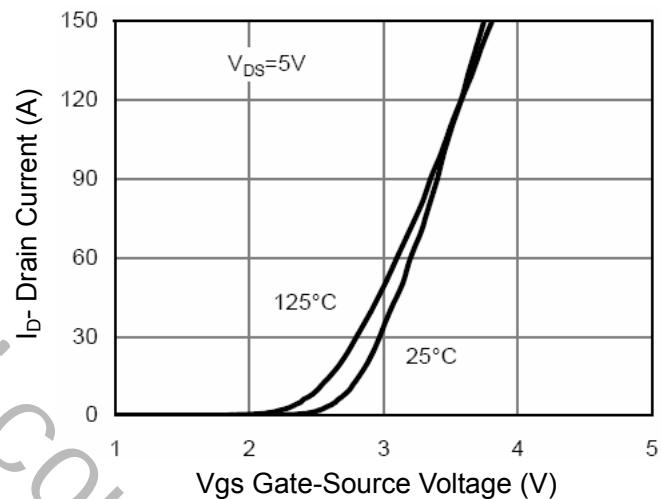
Figure 2 Transfer Characteristics
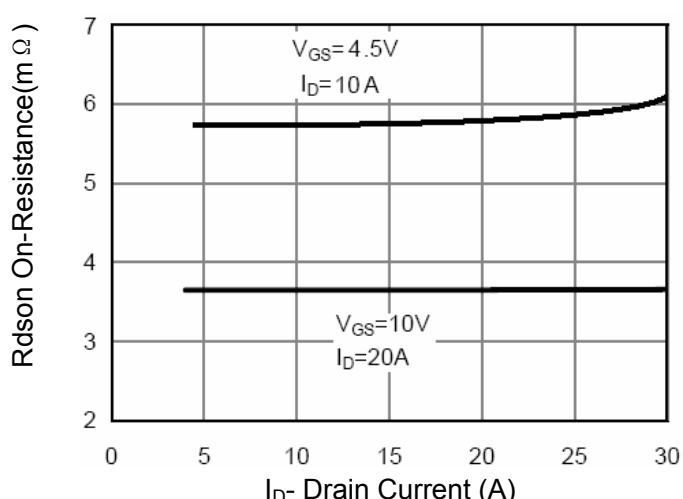
Figure 3 Rdson- Drain Current
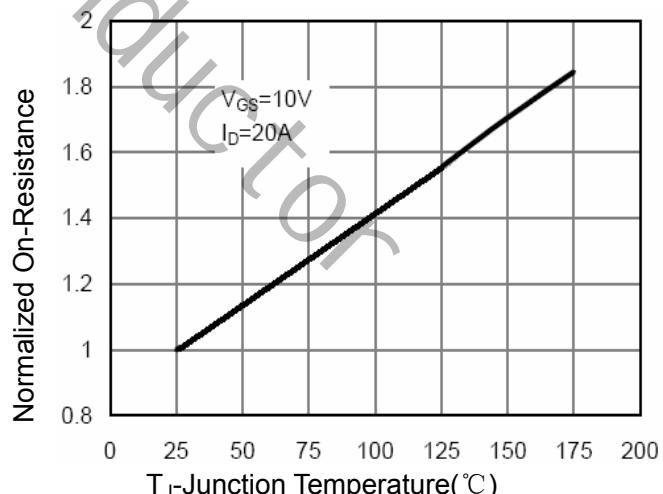
Figure 4 Rdson-JunctionTemperature
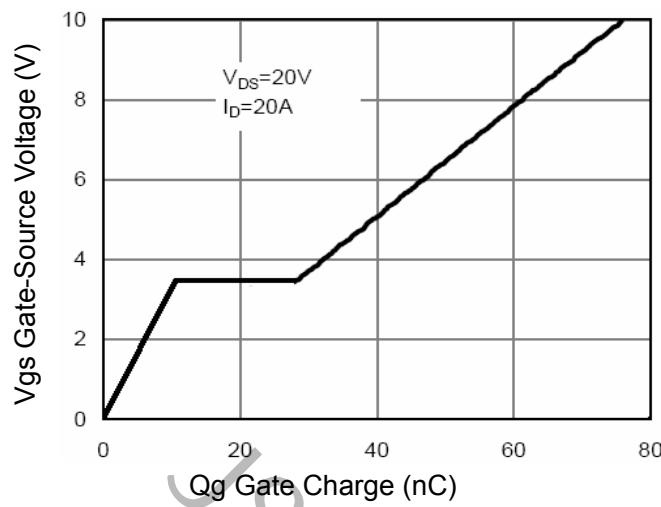
Figure 5 Gate Charge
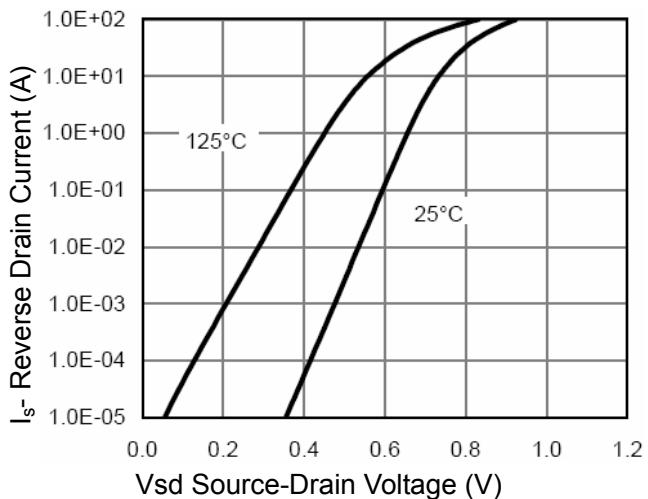

Figure 6 Source- Drain Diode Forward
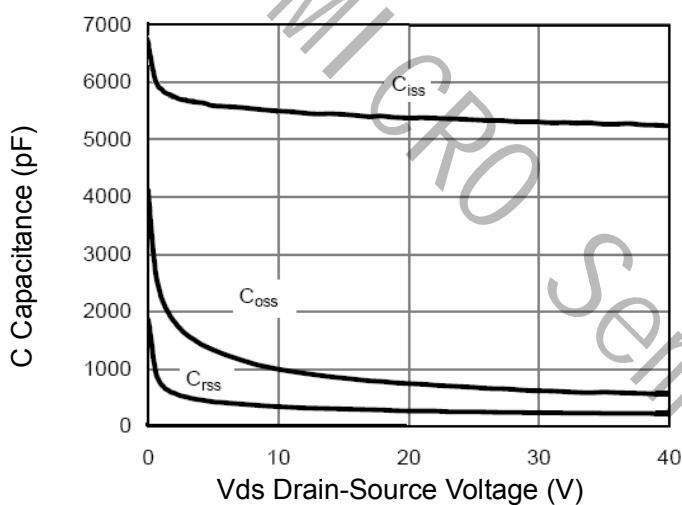
**Figure 7 Capacitance vs Vds**
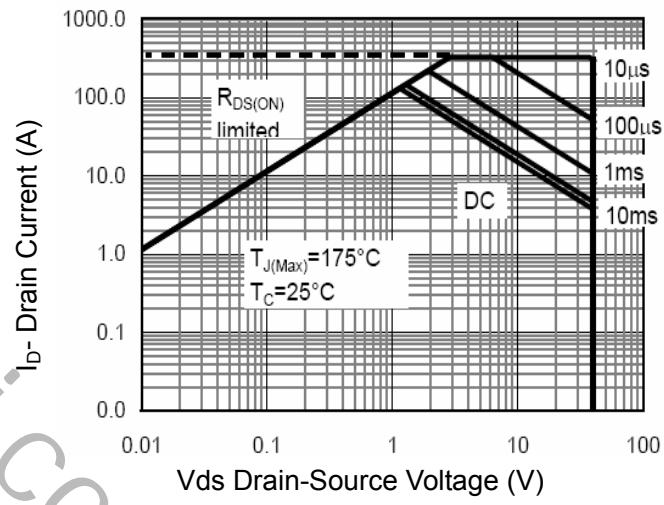
**Figure 8 Safe Operation Area**
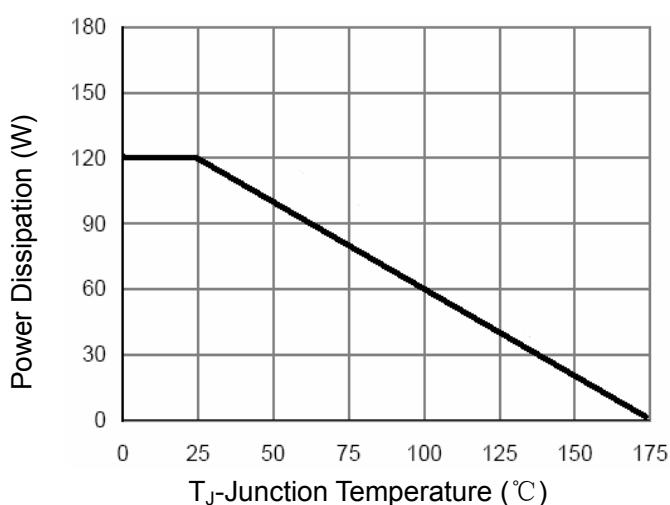

**Figure 9 Power De-rating**
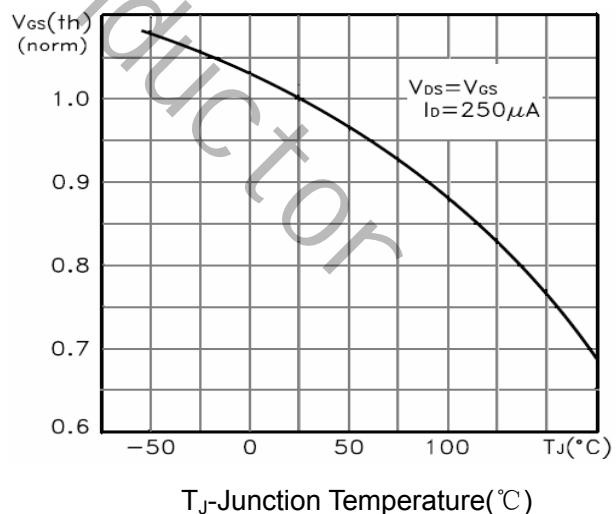
Figure 10 $V_{GS(th)}$ vs Junction Temperature
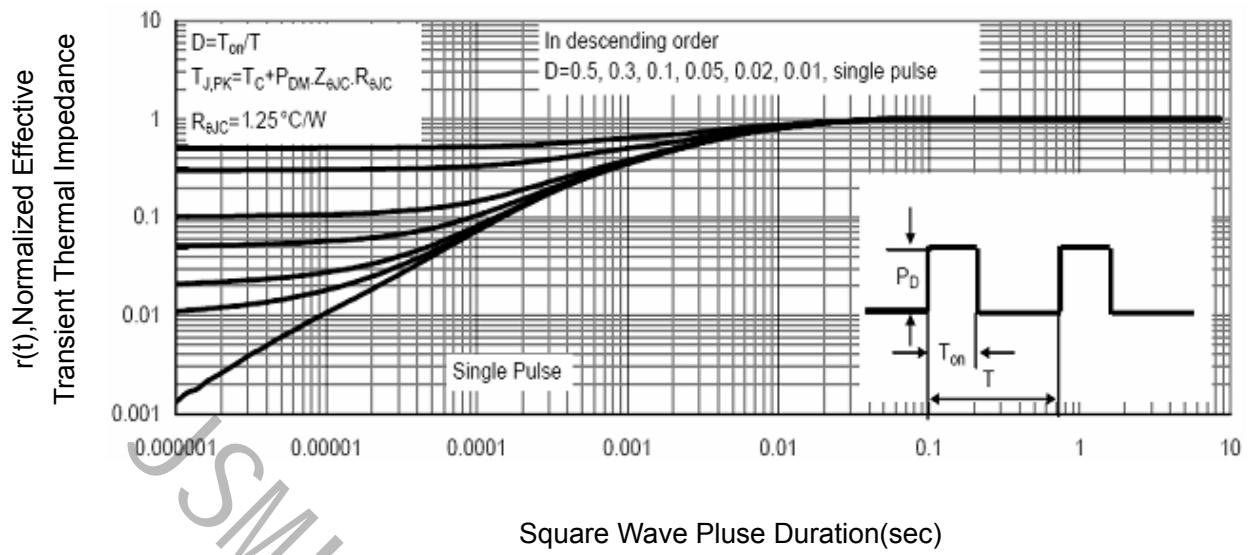
Figure 11 Normalized Maximum Transient Thermal Impedance