



Micro Commercial Components



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# MCMN2012

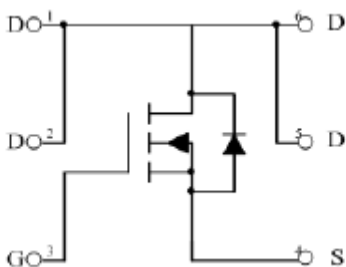
## Features

- TrenchFET Power MOSFET
- Small package
- Halogen free available upon request by adding suffix "-HF"
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking: N2012

## Maximum Ratings @ 25°C Unless Otherwise Specified

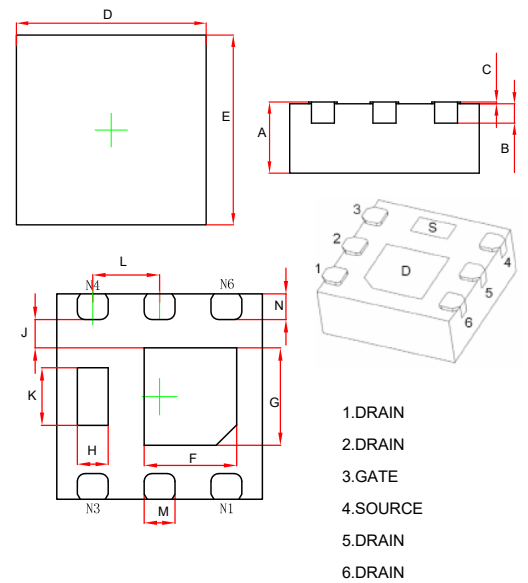
Symbol	Parameter	Rating	Unit
$V_{DS}$	Drain-source Voltage	20	V
$I_D$	Drain Current-Continuous	12	A
$I_{DM}$	Pulsed Drain Current (note1)	40	A
$V_{GS}$	Gate-source Voltage	$\pm 10$	V
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	167	$^{\circ}C/W$
$T_J$	Operating Junction Temperature	-55 to +150	$^{\circ}C$
$T_{STG}$	Storage Temperature	-55 to +150	$^{\circ}C$

## Equivalent Circuit



## N-Channel Enhancement Mode Field Effect Transistor

## DFN2020-6J



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.028	.032	0.700	0.800	
B	0.008REF.		0.203REF.		
C	0.000	0.002	0.000	0.050	
D	0.076	0.082	1.924	2.076	
E	0.076	0.082	1.924	2.076	
F	0.031	0.039	0.800	1.000	
G	0.033	0.041	0.850	1.050	
H	0.008	0.016	0.200	0.400	
J	0.008	---	0.200	---	
K	0.018	0.026	0.460	0.660	
L	0.026TYP.		0.650TYP.		
M	0.010	0.014	0.250	0.350	
N	0.007	0.013	0.174	0.326	

**ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise specified)**

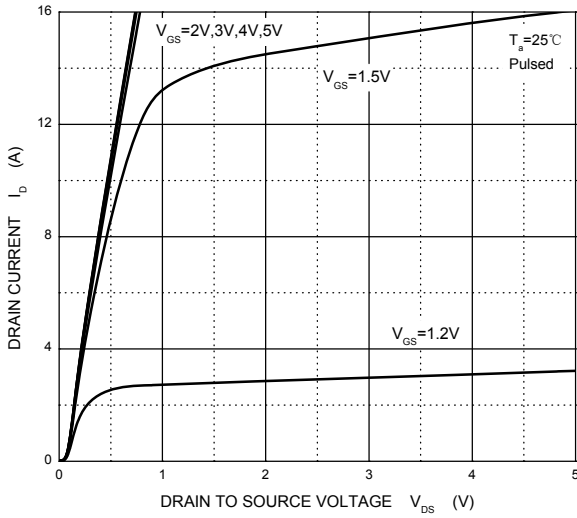
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	20			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage (note 3)	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.35	0.7	1	V
Drain-source on-resistance(note 3)	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =9.7A		9	11	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =9A		12	13	mΩ
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =8.1A		15.5	16	mΩ
		V <sub>GS</sub> =1.5V, I <sub>D</sub> =4.5A		21	22	mΩ
		V <sub>GS</sub> =1.2V, I <sub>D</sub> =2.4A			41	mΩ
Forward tranconductance(note 3)	g <sub>FS</sub>	V <sub>DS</sub> =4V, I <sub>D</sub> =9.7A	20			S
Diode forward voltage (note 3)	V <sub>SD</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> = 0V			1.2	V
<b>DYNAMIC PARAMETERS (note 4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =4V, V <sub>GS</sub> =0V, f =1MHz		1800		pF
Output Capacitance	C <sub>oss</sub>			650		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			450		pF
Gate Resistance	R <sub>g</sub>	f=1MHz		2.5		Ω
<b>SWITCHING PARAMETERS (note 4)</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>GEN</sub> =4.5V, V <sub>DD</sub> =4V, I <sub>D</sub> =10A, R <sub>g</sub> =1Ω R <sub>L</sub> =0.4 Ω		12	20	ns
Turn-on rise time	t <sub>r</sub>			10	15	ns
Turn-off delay time	t <sub>d(off)</sub>			65	100	ns
Turn-off fall time	t <sub>f</sub>			20	30	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =4V, V <sub>GS</sub> =5V I <sub>D</sub> =10A			32	nC
Gate-Source Chage	Q <sub>gs</sub>			2.5		nC
Gage-Drain Charge	Q <sub>gd</sub>			6.5		nC

**Notes :**

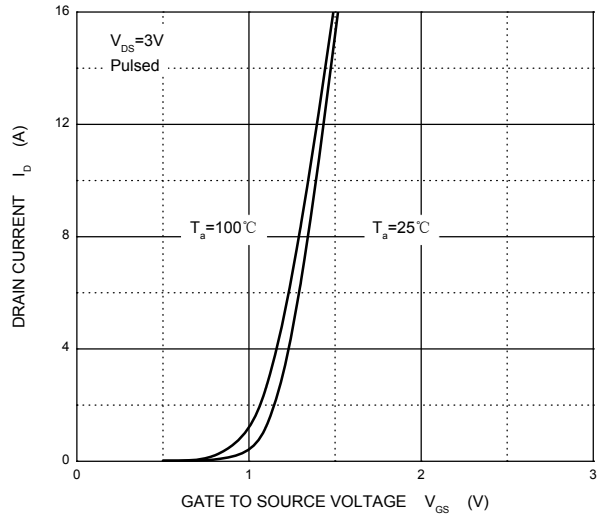
- 1.Surface mounted on FR4 board using 1 square inch pad size,1oz copper.
- 2.Surface mounted on FR4 board using the minimum pad size,1oz copper.
3. Pulse test : Pulse width=300μs, duty cycle≤2%.
4. These parameters have no way to verify.

## Typical Characteristics

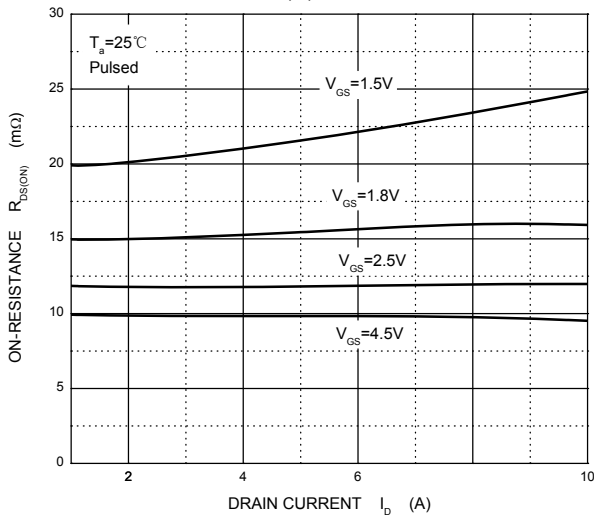
**Output Characteristics**



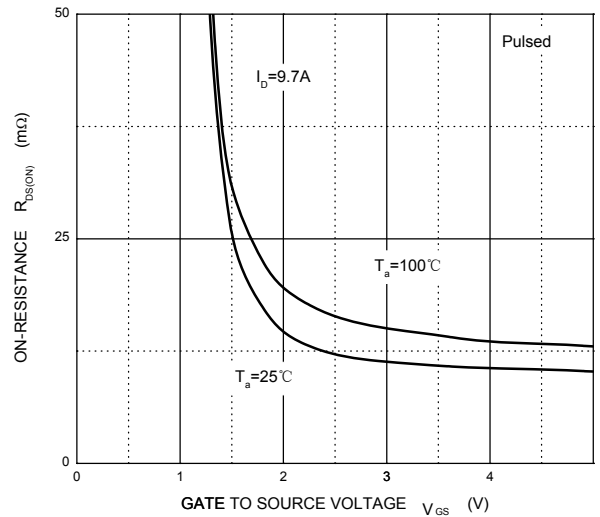
**Transfer Characteristics**



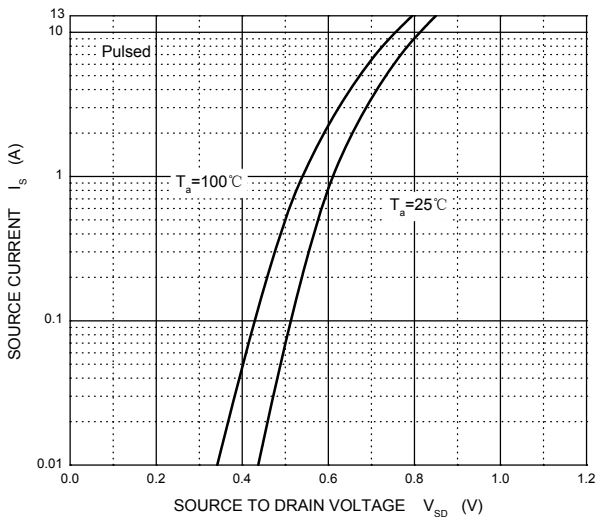
**$R_{DS(ON)}$  —  $I_D$**



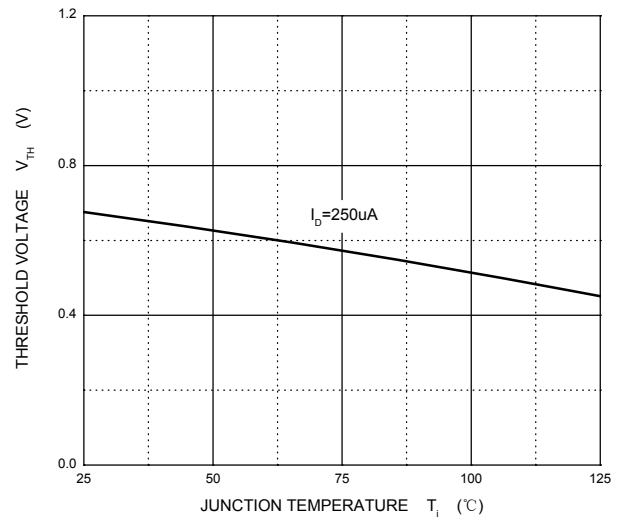
**$R_{DS(ON)}$  —  $V_{GS}$**



**$I_S$  —  $V_{SD}$**



**Threshold Voltage**





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### Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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