



Micro Commercial Components



Micro Commercial Components  
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## MCG30N03

### N-Channel Power MOSFET

## Features

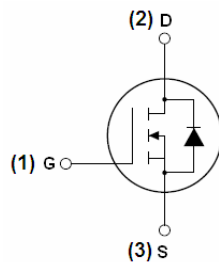
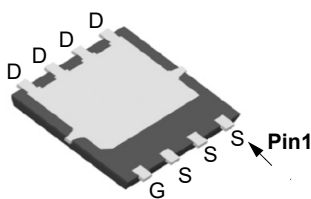
- High density cell design for ultra low  $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Halogen free available upon request by adding suffix "-HF"
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

### Maximum Ratings @ 25°C Unless Otherwise Specified

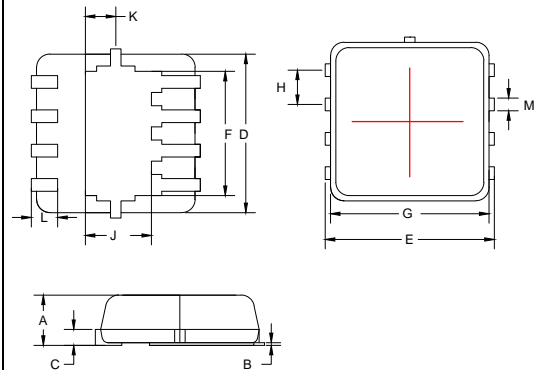
Symbol	Parameter	Rating	Unit
$V_{DS}$	Drain-source Voltage	30	V
$I_D$	Drain Current-Continuous $T_C = 25^\circ\text{C}$	30	A
		21	
$I_{DM}$	Pulsed Drain Current (Note 1)	60	A
$V_{GS}$	Gate-source Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	25	W
$R_{thJC}$	Thermal Resistance, Junction-to-Case (Note 2)	5	$^\circ\text{C/W}$
$E_{AS}$	Single pulse avalanche energy (Note 5)	70	mJ
$T_J$	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-55 to +150	$^\circ\text{C}$

### EQUIVALENT CIRCUIT

Bottom View



## DFN3030



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.028	0.035	0.70	0.90	
B	0.000	0.002	0.00	0.05	
C	0.004	0.010	0.10	0.25	
D	0.118 BSC		3.00 BSC		
E	0.126 BSC		3.20 BSC		
F	0.093 BSC		2.35 BSC		
G	0.118 BSC		3.00 BSC		
H	0.026 BSC		0.65 BSC		
J	0.069 BSC		1.75 BSC		
K	0.023 BSC		0.575 BSC		
L	0.012	0.020	0.30	0.50	
M	0.009	0.014	0.24	0.35	

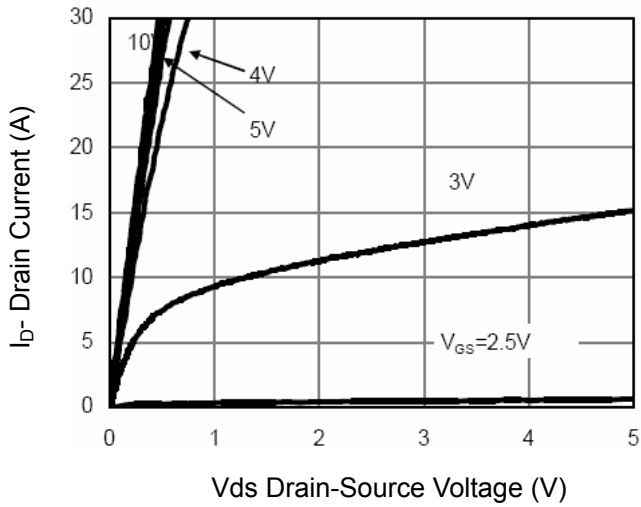
**ELECTRICAL CHARACTERISTICS**( $T_a=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	30	33	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
On Characteristics <sup>(Note 3)</sup>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.5	2.3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A	-	6.3	9	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	9.2	13	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	15	-	-	S
Dynamic Characteristics <sup>(Note4)</sup>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1.0MHz	-	1490	-	PF
Output Capacitance	C <sub>OSS</sub>		-	220	-	PF
Reverse Transfer Capacitance	C <sub>rSS</sub>		-	135	-	PF
Switching Characteristics <sup>(Note 4)</sup>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =10A V <sub>GS</sub> =10V, R <sub>GEN</sub> =1.8Ω	-	10	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	8	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	30	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	5	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =9A, V <sub>GS</sub> =10V	-	15	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	3	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	4.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage <sup>(Note 3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A	-	0.85	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	I <sub>S</sub>		-	-	25	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 10A di/dt = 100A/μs(Note3)	-	22	35	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	12	20	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

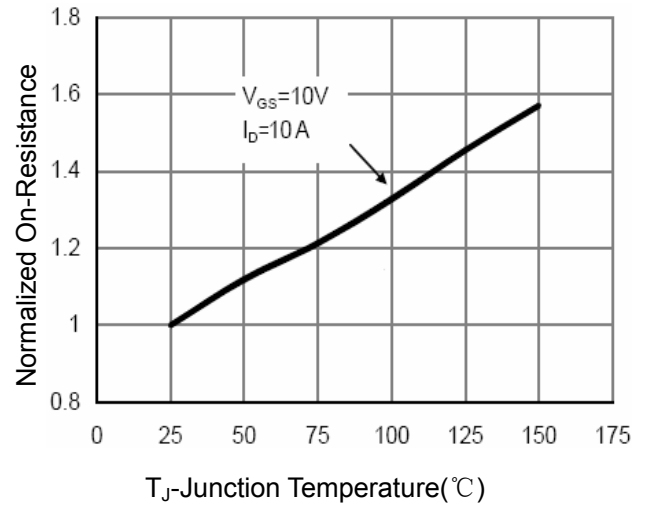
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, L=0.1mH, R_g=25\Omega$

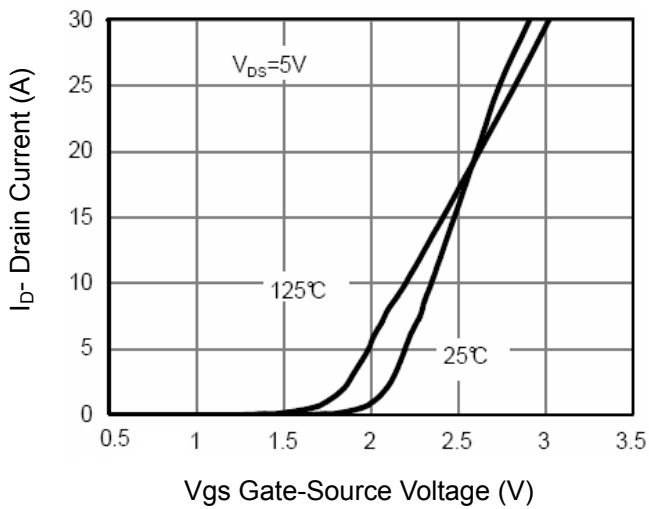
## Typical Electrical and Thermal Characteristics



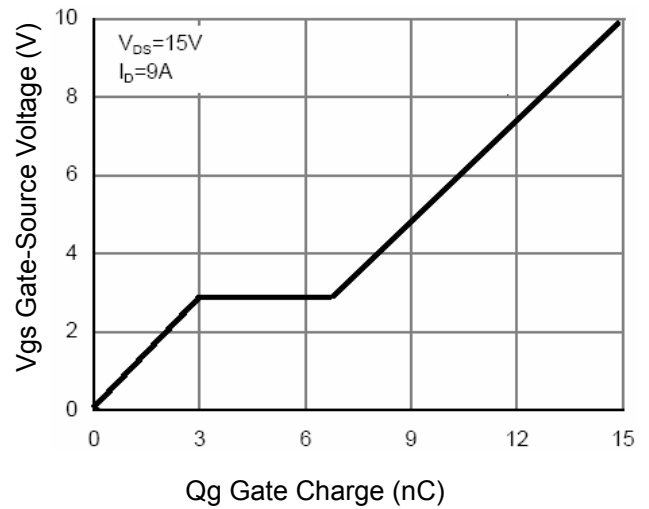
**Figure 1 Output Characteristics**



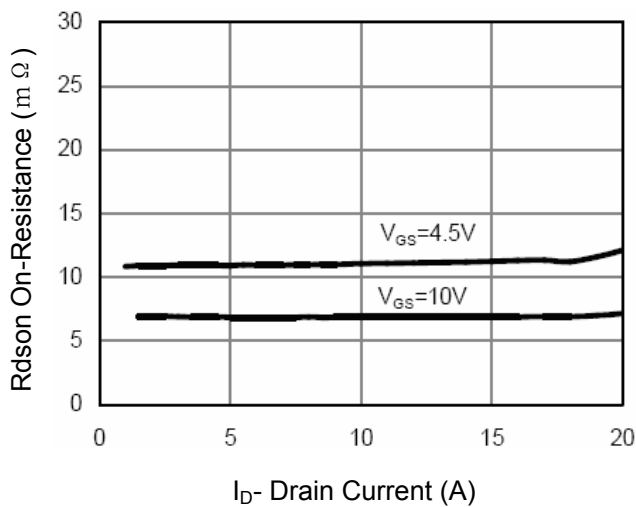
**Figure 4 Rdson-Junction Temperature**



**Figure 2 Transfer Characteristics**

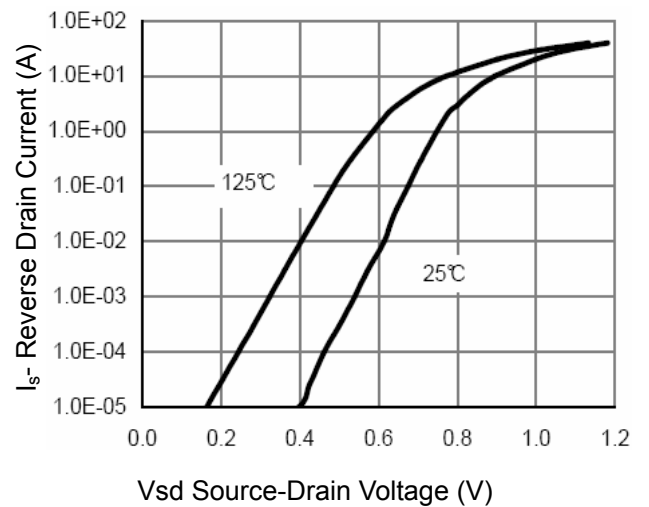


**Figure 5 Gate Charge**



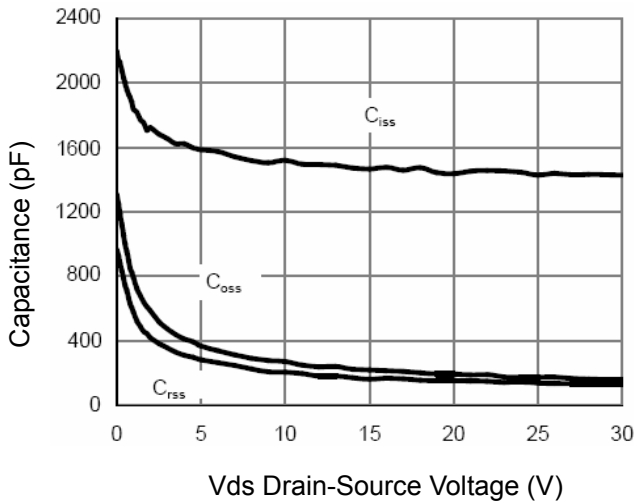
**Figure 3 Rdson- Drain Current**

**Figure 1 Output Characteristics**

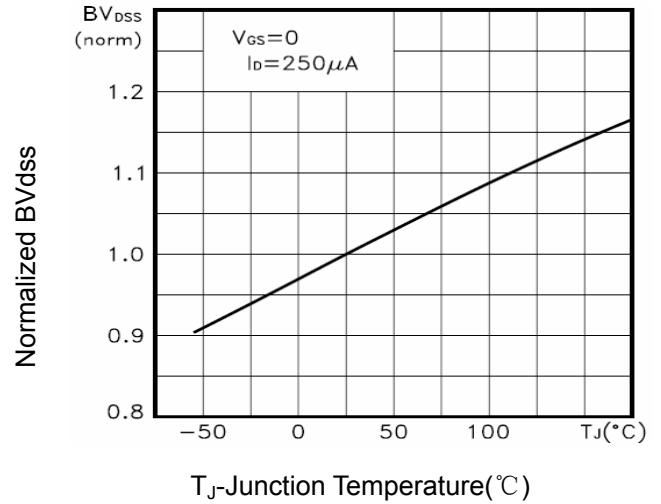


**Figure 6 Source- Drain Diode Forward**

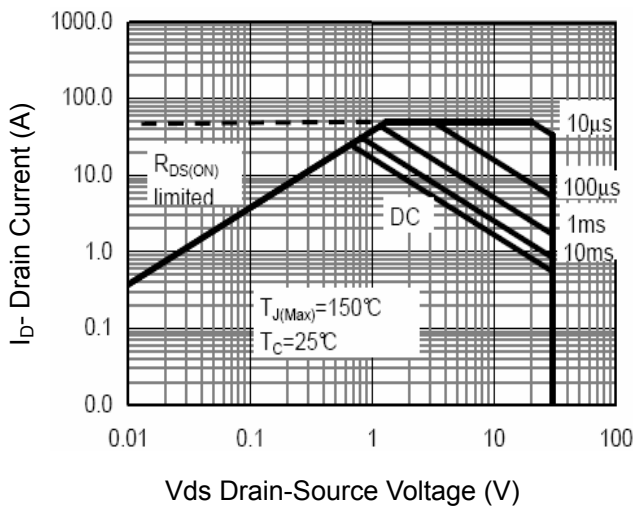
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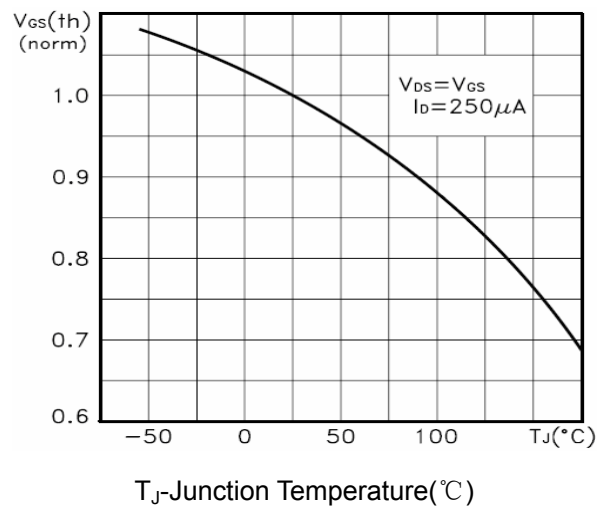
**Figure 7 Capacitance vs Vds**



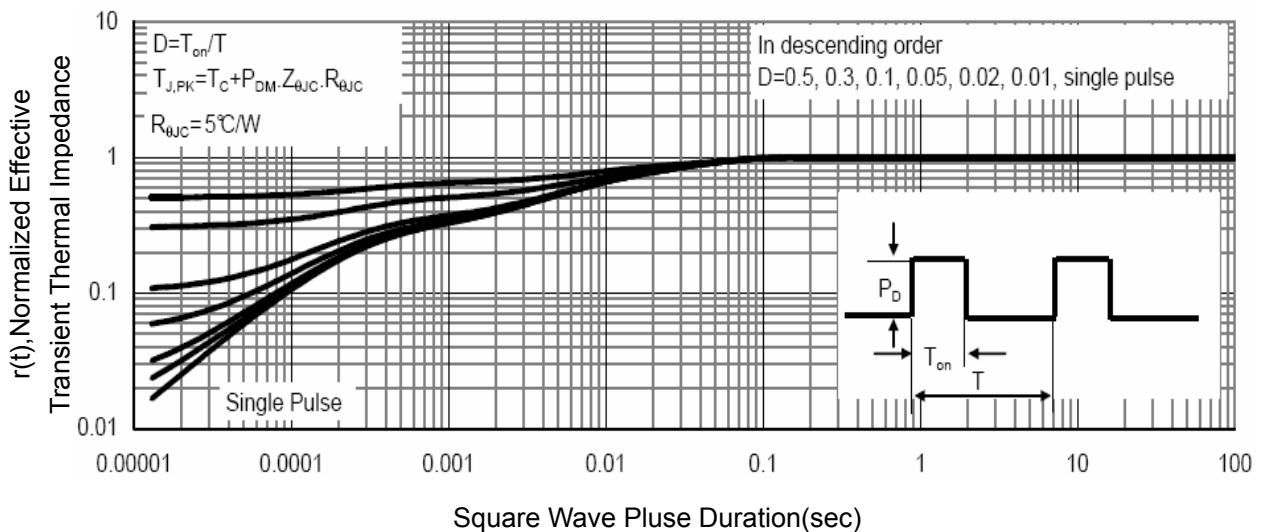
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



**Figure 8 Safe Operation Area**



**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**



## 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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