



Micro Commercial Components



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# MCU05N20

## N-Channel Enhancement Mode Field Effect Transistor

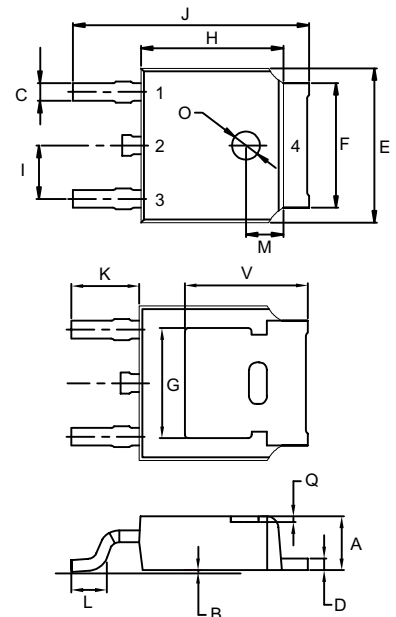
### Features

- Fast switching
- Improved dv/dt capability
- Halogen free available upon request by adding suffix "-HF"
- Excellent package for good heat dissipation
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

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

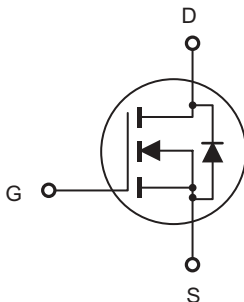
Symbol	Parameter	Rating	Unit
V <sub>DS</sub>	Drain-source Voltage	200	V
I <sub>D</sub>	Drain Current-Continuous	T <sub>C</sub> =25°C	5
		T <sub>C</sub> =100°C	3.24
E <sub>AS</sub>	Single Pulsed Avalanche Energy(note2)	125	mJ
V <sub>GS</sub>	Gate-source Voltage	±30	V
I <sub>DM</sub>	Pulsed Drain Current(note1)	20	A
R <sub>θJC</sub>	Thermal Resistance Junction to Case	1.6	°C/W
P <sub>D</sub>	Power Dissipation Linear Derating Factor	T <sub>C</sub> =25°C	78
		T <sub>C</sub> >25°C	0.625
dV/dt	Peak Diode Recovery Energy(note3)	5	V/ns
T <sub>J</sub>	Operating Junction Temperature	-55 to +150	°C
T <sub>STG</sub>	Storage Temperature	-55 to +150	°C

### DPAK



- 1.GATE
- 2.DRAIN
- 3.SOURCE

### Internal Block Diagram



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.087	0.094	2.20	2.40	
B	0.000	0.005	0.00	0.13	
C	0.026	0.034	0.66	0.86	
D	0.018	0.023	0.46	0.58	
E	0.256	0.264	6.50	6.70	
F	0.201	0.215	5.10	5.46	
G	0.190		4.83		
H	0.236	0.244	6.00	6.20	
I	0.086	0.094	2.18	2.39	
J	0.386	0.409	9.80	10.40	
K	0.114		2.90		
L	0.055	0.067	1.40	1.70	
M	0.063		1.60		
O	0.043	0.051	1.10	1.30	
Q	0.000	0.012	0.00	0.30	
	0.211		5.35		

## Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	200	-	-	V
$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D = 250\mu A$	-	0.25	-	$V/^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 200V, V_{GS} = 0V$	-	-	1	$\mu A$
		$V_{DS} = 160V, T_C = 125^\circ\text{C}$	-	-	10	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage <sup>note4</sup>	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.9	3	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 2.5A$	-	0.49	0.58	$\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 30V, I_D = 2.5A$	-	5.2	-	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	-	255	-	pF
$C_{oss}$	Output Capacitance		-	30.2	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	2.3	-	pF
$Q_g$	Total Gate Charge	$V_{DD} = 160V, I_D = 5A,$ $V_{GS} = 10V$	-	10.8	-	nC
$Q_{gs}$	Gate-Source Charge		-	1.7	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	3.1	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 100V, I_D = 5A,$ $R_G = 10\Omega, V_{GS} = 10V$	-	7.33	-	ns
$t_r$	Turn-On Rise Time		-	10.7	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	18.2	-	ns
$t_f$	Turn-Off Fall Time		-	11.9	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 5A$	-	-	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0V, I_F = 5A,$ $di/dt = 100A/\mu s$	-	125.5	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	357	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $L = 10\text{mH}, I_{AS} = 5A, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 5A, di/dt \leq 200A/\mu s, V_{DD} \leq B_{VDSS}$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

## Typical Characteristics

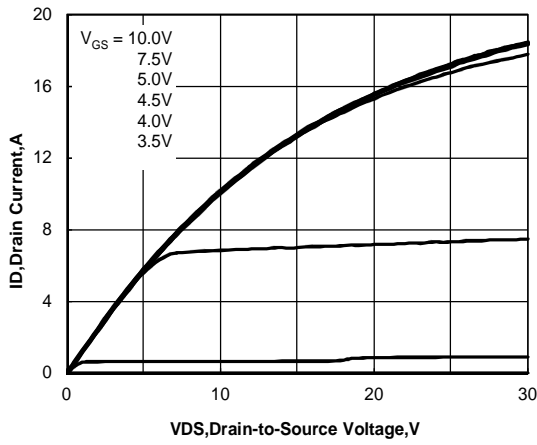


Figure 1. Output Characteristics

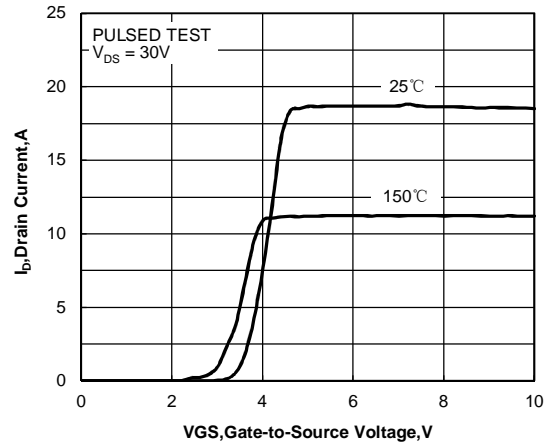


Figure 2. Transfer Characteristics

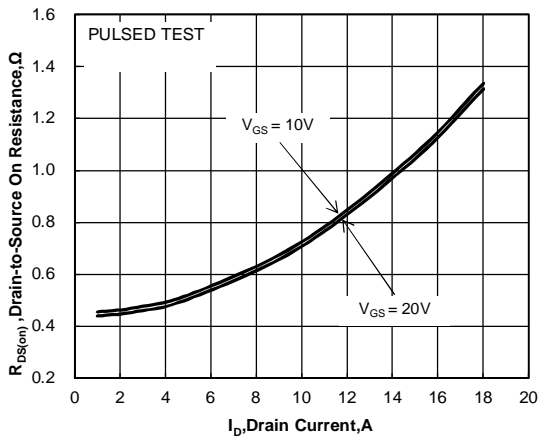


Figure 3. Drain-to-Source On Resistance vs. Drain Current and Gate Voltage

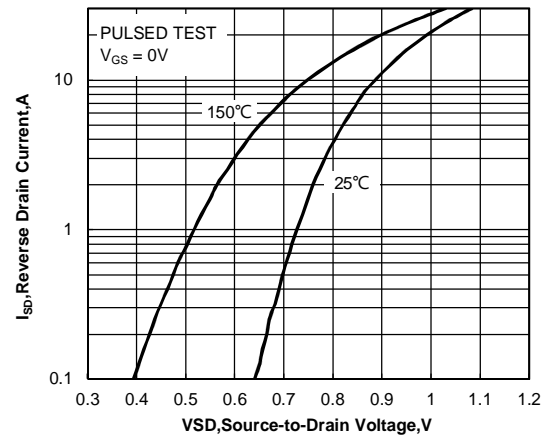
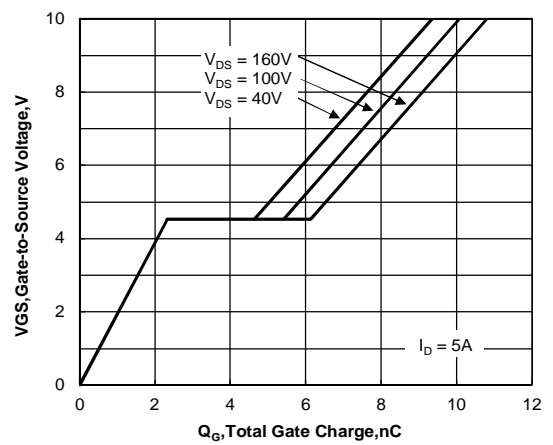
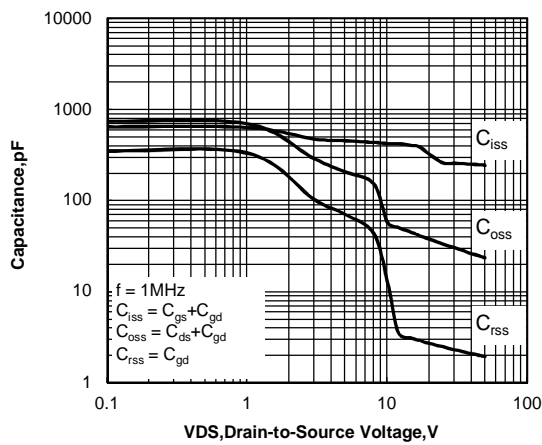


Figure 4. Body Diode Forward Voltage vs. Source Current and Temperature





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### Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel: 2.5Kpcs/Reel

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

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