

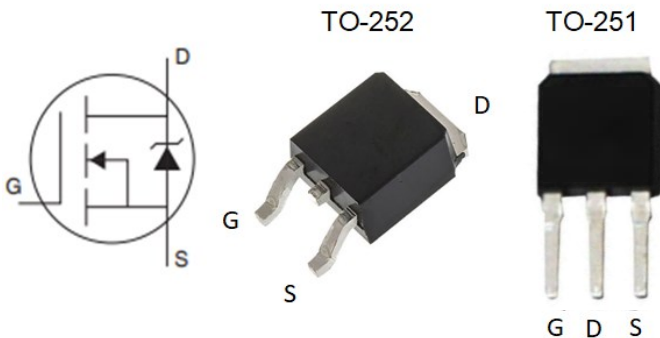
### Description

The CM05N20U/D is the N-Channel enhancement mode power field effect transistors with high cell density, high voltage planar technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance.

### Features

- $V_{DS}$ : 200V
- $I_D$  (@ $V_{GS}=10V$ ): 5A
- $R_{DS(ON)}$  (@ $V_{GS}=10V$ ): < 708m $\Omega$
- High density cell design for extremely low  $R_{DS(ON)}$
- Excellent on-resistance and DC current capability

### Equivalent Circuit and Pin Configuration



### Applications

- AC/DC load switch
- SMPS
- Notebooks and Handhelds adapter
- UPS Power

### Marking Information



X=Package type  
 XXXX = Marking Code

### Ordering Information

P/N	Package Type	Packaging	Remark
CM05N20U	TO-252	Tape and reel	ROHS
CM05N20D	TO-251	Tube	ROHS

### Absolute Maximum Ratings (Tc=25 °C unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-source Voltage	$V_{DS}$	200	V
Gate-source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	$T_c=25^\circ C$	5
		$T_c=100^\circ C$	3
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	20	A
Total Power Dissipation <sup>(3)</sup>	$P_D @ T_c=25^\circ C$	42	W
	Derating Factor above 25°C	0.33	W/°C
Thermal Resistance Junction-to-Case <sup>(3)</sup>	$R_{\theta JC}$	3	°C/W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**Electrical Characteristics (T<sub>c</sub>=25 °C unless otherwise noted)**

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	B <sub>V</sub> D <sub>SS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	200			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C			5	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source on-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A		590	708	mΩ
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =5A, V <sub>GS</sub> =0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				5	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		316		pF
Output Capacitance	C <sub>oss</sub>			42		
Reverse Transfer Capacitance	C <sub>rss</sub>			2		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V		6		nC
Gate Source Charge	Q <sub>gs</sub>			1.8		
Gate Drain Charge	Q <sub>gd</sub>			2.1		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =40V, I <sub>D</sub> =3A, R <sub>GEN</sub> =20Ω		30		ns
Turn-on Rise Time	t <sub>r</sub>			21		
Turn-off Delay Time	t <sub>D(off)</sub>			54		
Turn-off Fall Time	t <sub>f</sub>			23		

Noted: (1) Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

(2) Pulse width limited by maximum junction temperature

(3) Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. With 2oz Copper, t ≤ 10s

**Typical Performance Characteristics**

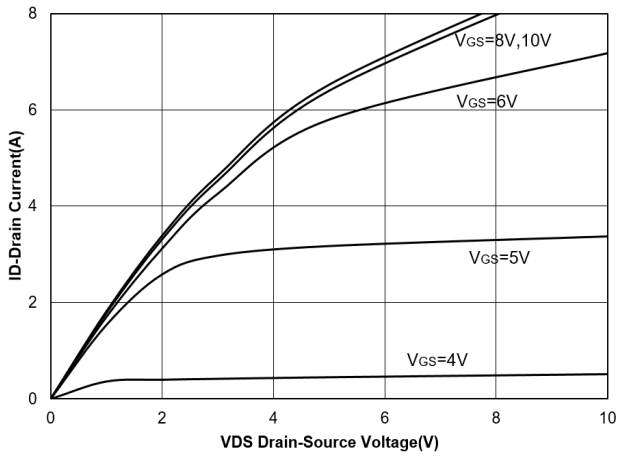


Figure 1. Output Characteristics

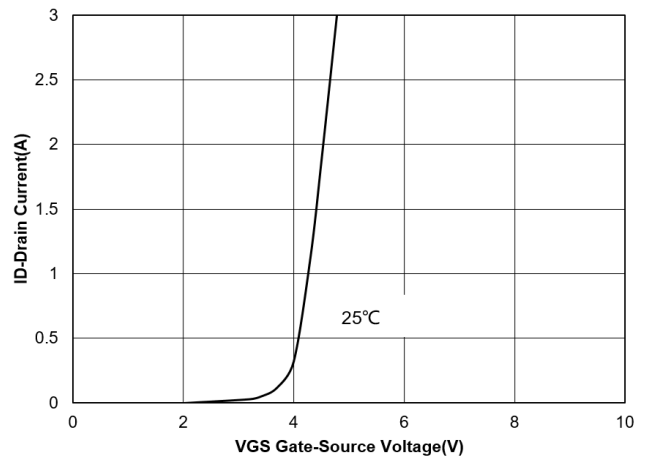


Figure 2. Transfer Characteristics

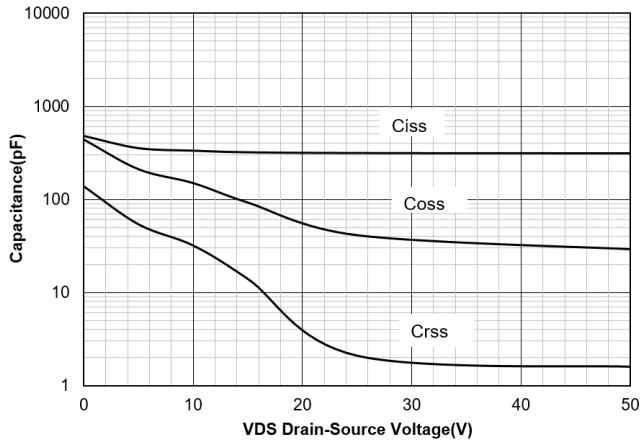


Figure 3. Capacitance Characteristics

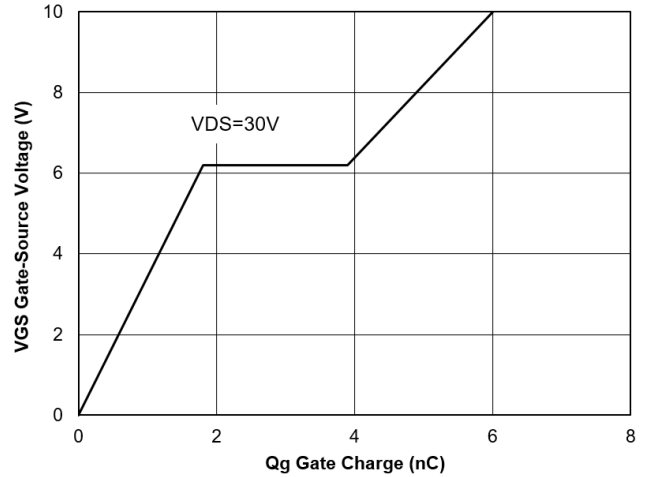


Figure 4. Gate Charge

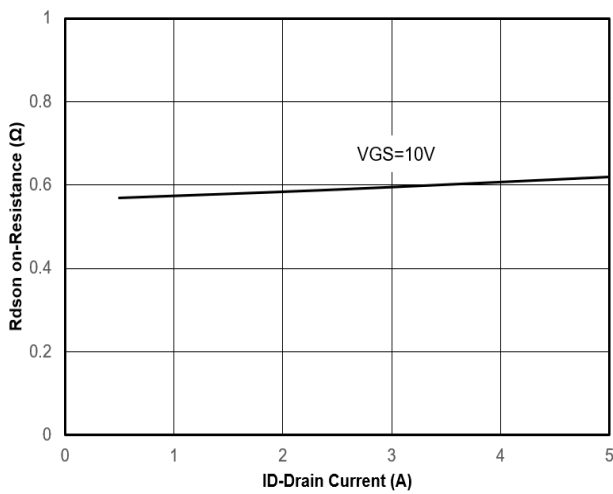


Figure 5. Drain-Source on Resistance

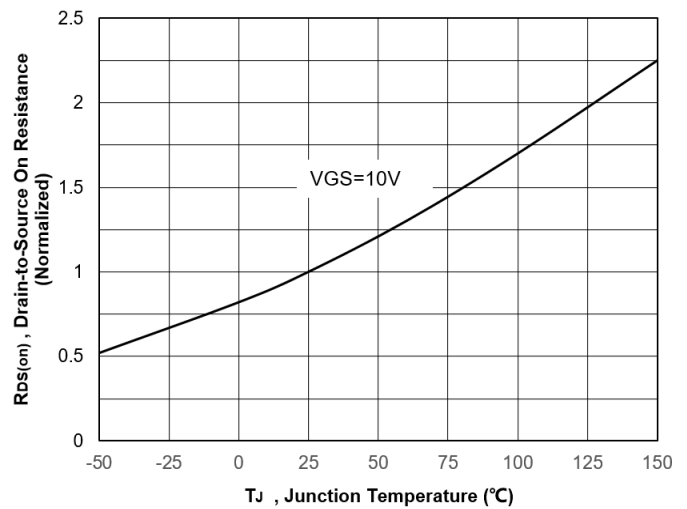


Figure 6. Normalized On-Resistance Vs. Temperature

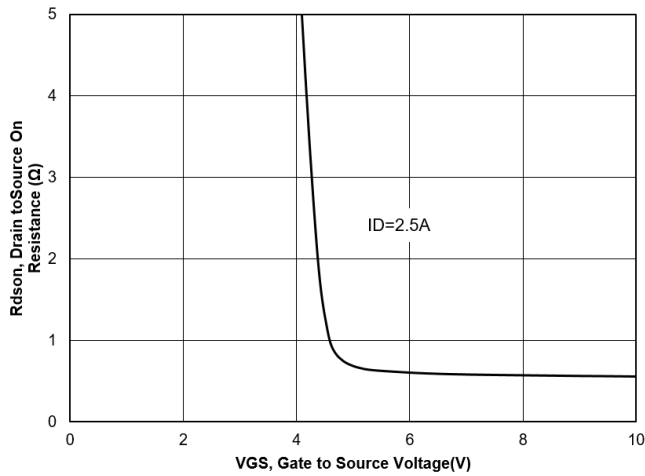


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

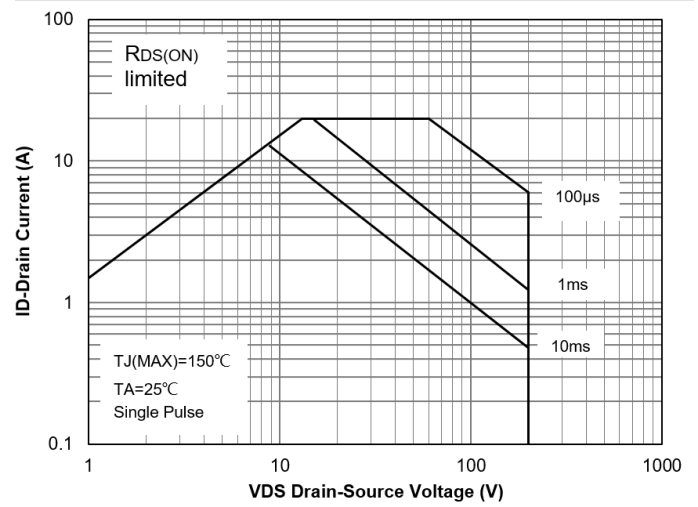


Figure 8. Safe Operation Area

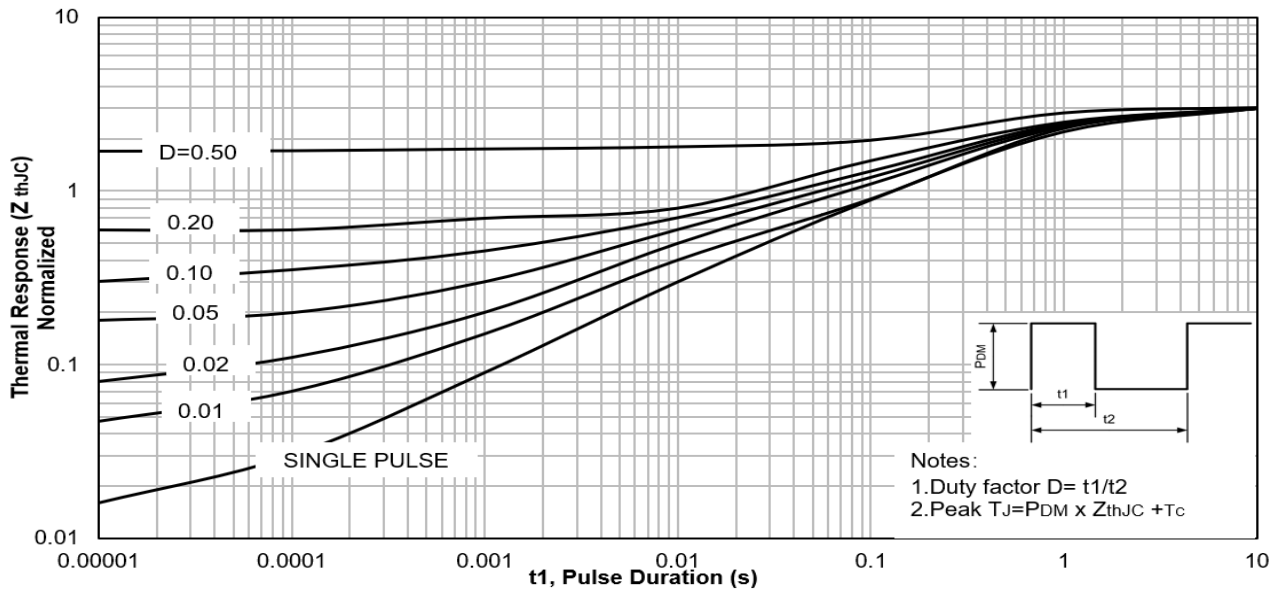


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

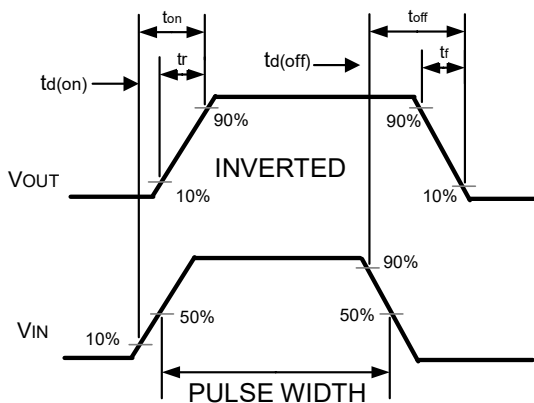
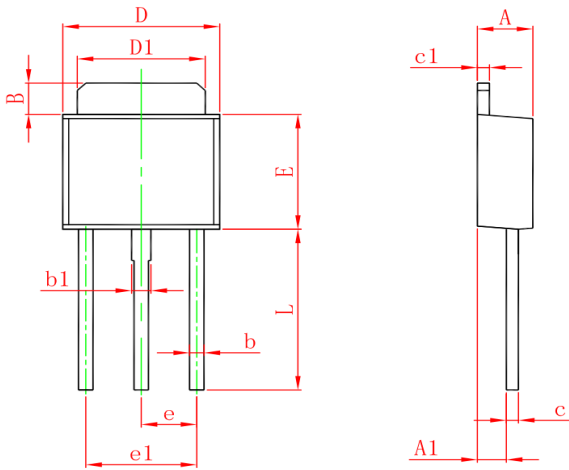


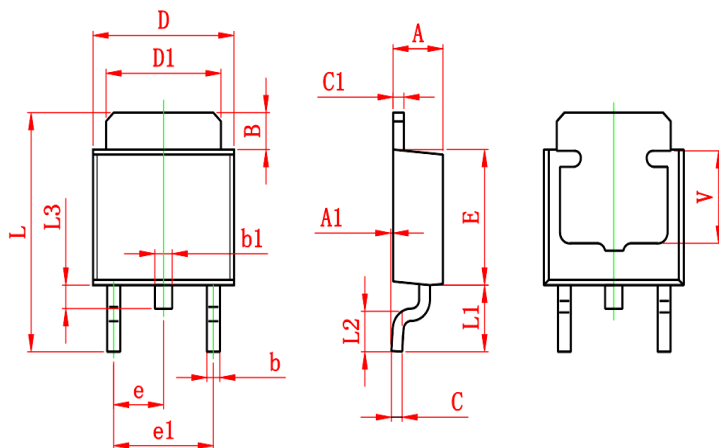
Figure 10. Switching wave

### TO-251 Package Outline Drawing



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311

### TO-252 Package Outline Drawing



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	

### Contact Information

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