

### Description

The CM04N65U/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, .

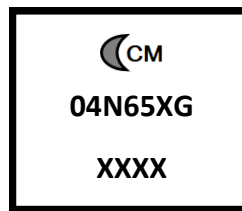
### Features

- VDS: 650V
- ID (@VGS=10V): 4A
- RDS<sub>ON</sub> (@VGS=10V) : < 3Ω
- High density cell design for extremely low RDS<sub>ON</sub>
- Excellent on-resistance and DC current capability

### Applications

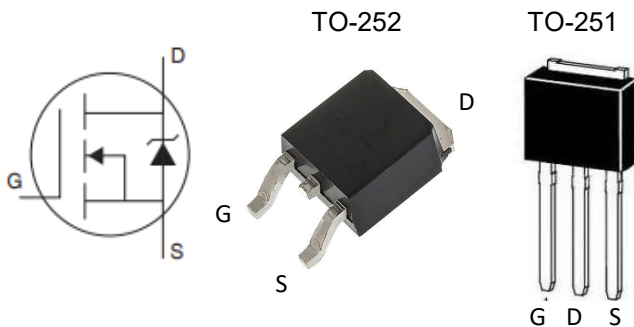
- AC/DC load switch
- SMPS
- LED power

### Marking Information



X=Package type  
 G=Halogen Free  
 XXXX = Marking Code

### Equivalent Circuit and Pin Configuration



### Ordering Information

P/N	Package Type	Packaging	Remark
CM04N65U	TO-252	Tape and reel	ROHS
CM04N65UG	TO-252	Tape and reel	Halogen Free
CM04N65D	TO-251	Tube	ROHS
CM04N65DG	TO-251	Tube	Halogen Free

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

Parameter	Symbol	Maximum		Unit
		CM04N65U	CM04N65D	
Drain-source Voltage	VDS	650		V
Gate-source Voltage	VGS	±30		V
Continuous Drain Current <sup>(1)</sup>	ID	Tc=25°C	4	A
		Tc=100°C	3.2	A
Pulsed Drain Current <sup>(2)</sup>	IDM	16		A
Total Power Dissipation <sup>(3)</sup>	PD @ Tc=25°C	75		W
	Derating Factor above 25°C	0.6		W/°C
Thermal Resistance Junction-to-Case <sup>(3)</sup>	RθJC	1.67		°C/W
Junction and Storage Temperature Range	TJ, TSTG	-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	650			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =650, V <sub>GS</sub> =0V, T <sub>c</sub> =25°C			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, 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> =2A		2.5	3	Ω
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =4A, V <sub>GS</sub> =0V			1.4	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				4	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		700		pF
Output Capacitance	C <sub>oss</sub>			45		
Reverse Transfer Capacitance	C <sub>rss</sub>			2.5		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =520V, I <sub>D</sub> =4.0A, V <sub>GS</sub> =10V		15		nC
Gate Source Charge	Q <sub>gs</sub>			3.6		
Gate Drain Charge	Q <sub>gd</sub>			6.5		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =325V, R <sub>L</sub> =15Ω, I <sub>D</sub> =4A, R <sub>GEN</sub> =12Ω		20		ns
Turn-on Rise Time	t <sub>r</sub>			22		
Turn-off Delay Time	t <sub>D(off)</sub>			62		
Turn-off Fall Time	t <sub>f</sub>			32		

Noted: (1) Pulse Test: Pulse Width ≤ 300us, 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

(4) Drain current limited by maximum junction temperature

**Typical Performance Characteristics**

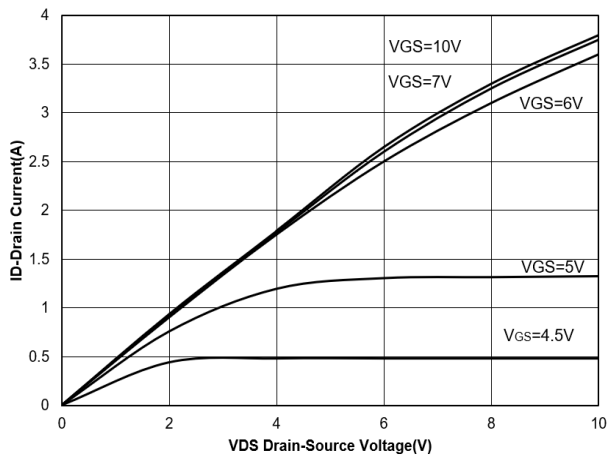


Figure 1. Output Characteristics

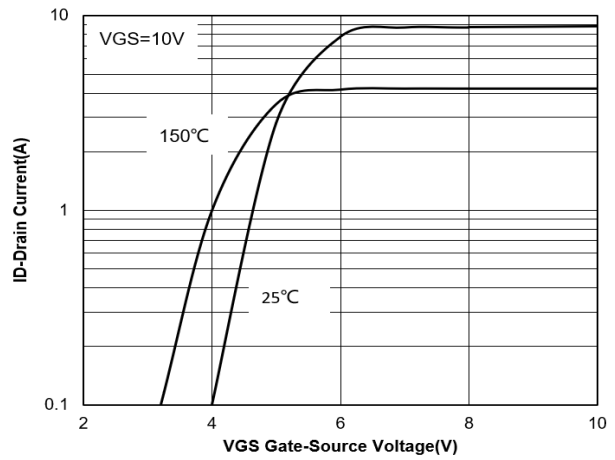


Figure 2. Transfer Characteristics

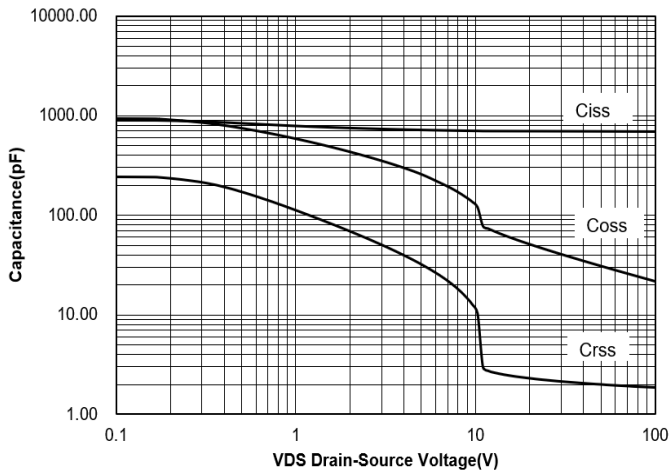


Figure 3. Capacitance Characteristics

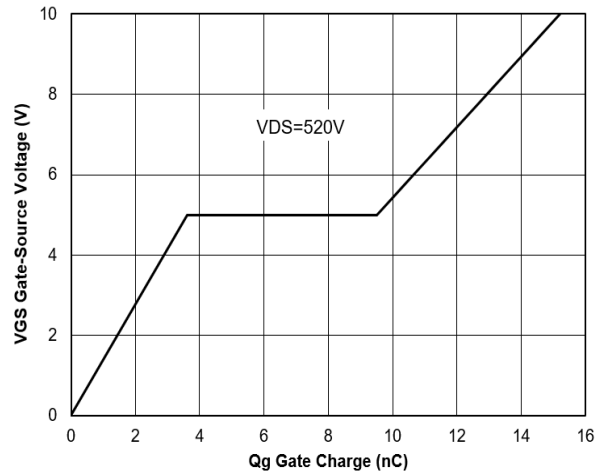


Figure 4. Gate Charge

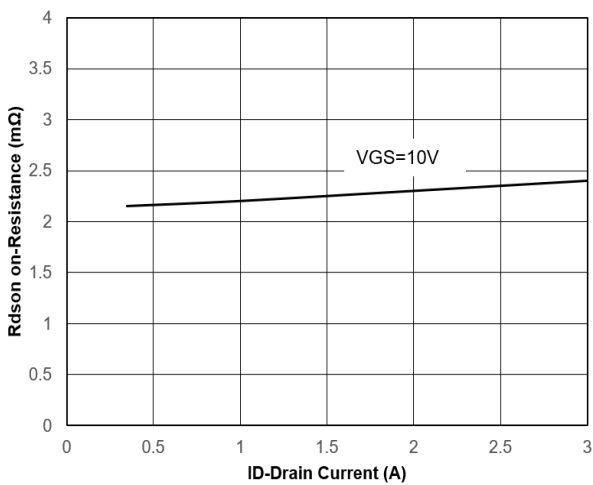


Figure 5. Drain-Source on Resistance

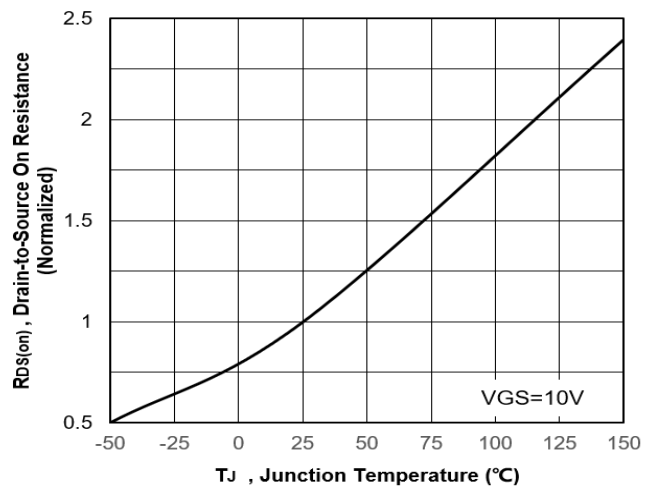


Figure 6. Normalized On-Resistance Vs. Temperature

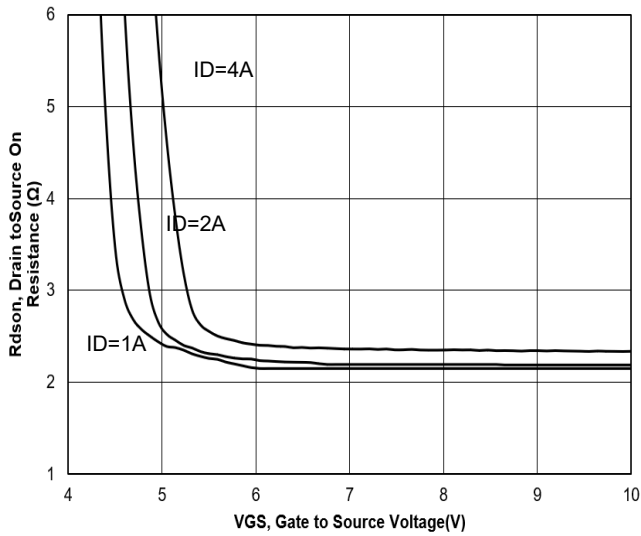


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

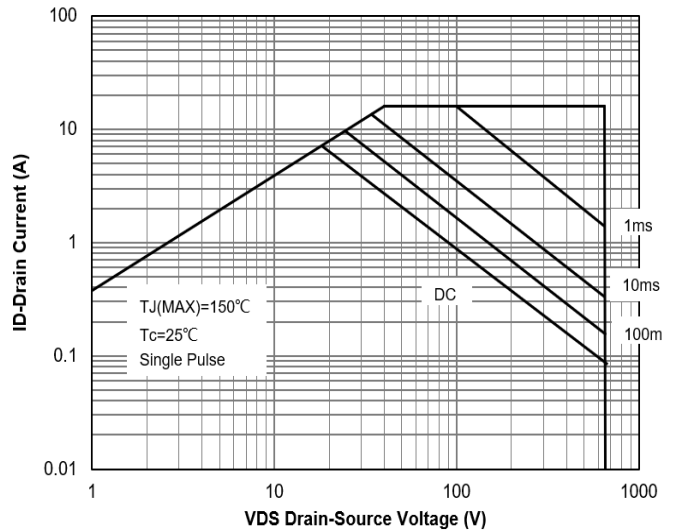


Figure 8. Safe Operation Area

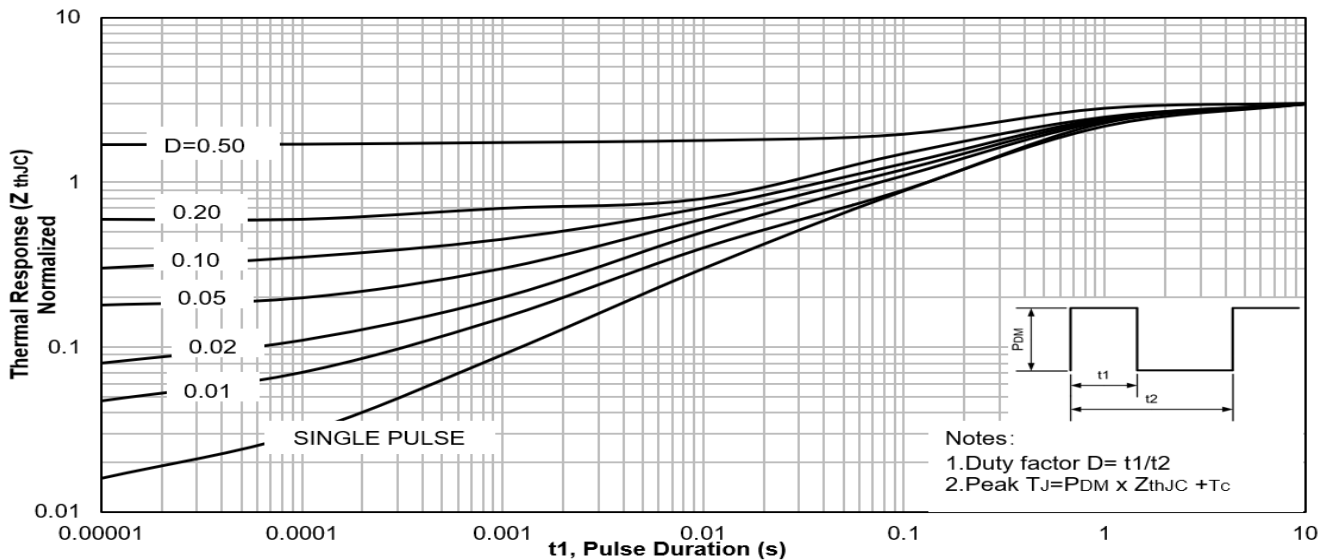


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

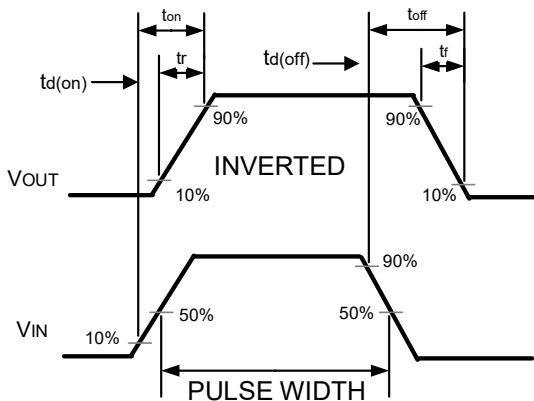
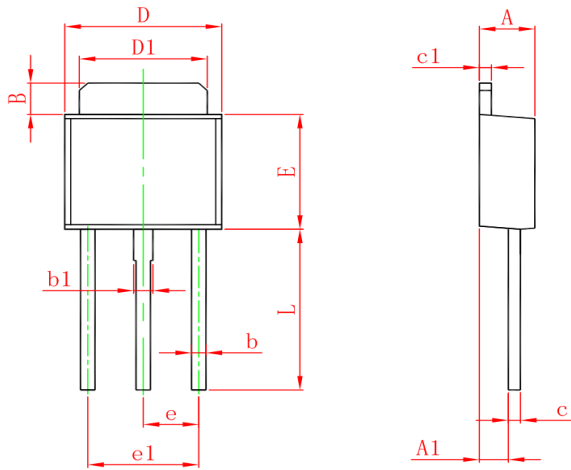


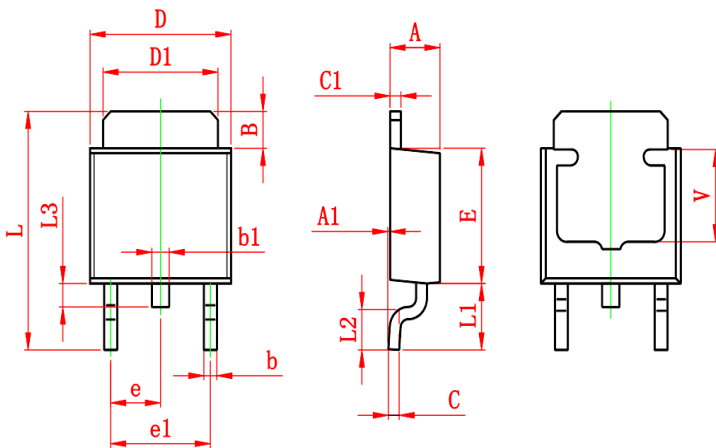
Figure 10. Switching wave

### 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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