

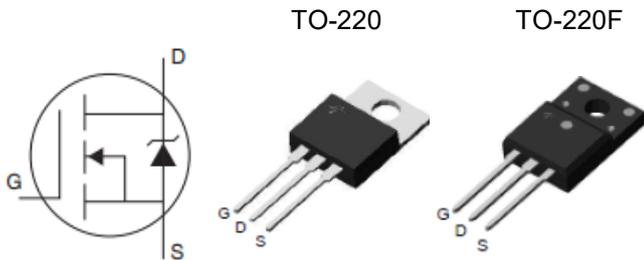
Description

The CM13N65AHP/F 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): 13A
- RDS_{ON} (@VGS=10V) : < 0.8Ω
- High density cell design for extremely low RDS_{ON}
- Excellent on-resistance and DC current capability

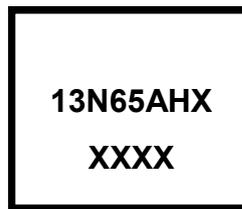
Equivalent Circuit and Pin Configuration



Applications

- AC/DC load switch
- SMPS
- LED power

Marking Information



X=Package type
 XXXX = Marking Code

Ordering Information

P/N	Package Type	Packaging	Remark
CM13N65AHP	TO-220	Tube	ROHS
CM13N65AHF	TO-220F	Tube	ROHS

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

Parameter	Symbol	Maximum		Unit	
		CM13N65AHP	CM13N65AHF		
Drain-source Voltage	VDS	650		V	
Gate-source Voltage	VGS	±30		V	
Continuous Drain Current ⁽¹⁾	ID	Tc=25°C	13	13 ⁽⁴⁾	A
		Tc=100°C	8	8 ⁽⁴⁾	A
Pulsed Drain Current ⁽²⁾	IDM	52	52 ⁽⁴⁾	A	
Total Power Dissipation ⁽³⁾	PD @ Tc=25°C	284	85	W	
	Derating Factor above 25°C	2.3	0.7	W/°C	
Thermal Resistance Junction-to-Case ⁽³⁾	RθJC	0.44	1.47	°C/W	
Junction and Storage Temperature Range	TJ,TSTG	-55 to +150		°C	

Electrical Characteristics (T_c=25 °C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BVDSS	V _{GS} =0V, I _D =250μA	650			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _C =25°C			5	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V
Static Drain-Source on-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =6A		0.65	0.8	Ω
Diode Forward Voltage	V _{SD}	I _S =13A, V _{GS} =0V		0.9	1.2	V
Maximum Body-Diode Continuous Current	I _S				13	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz		2160		pF
Output Capacitance	C _{oss}			149		
Reverse Transfer Capacitance	C _{rss}			6.3		
Switching Parameters						
Total Gate Charge	Q _g	V _{DS} =520V, I _D =13A, V _{GS} =10V		39.5		nC
Gate Source Charge	Q _{gs}			10.5		
Gate Drain Charge	Q _{gd}			13.5		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =50V, I _D =13A, R _{GEN} =25Ω		67		ns
Turn-on Rise Time	t _r			34		
Turn-off Delay Time	t _{D(off)}			108		
Turn-off Fall Time	t _f			36		

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

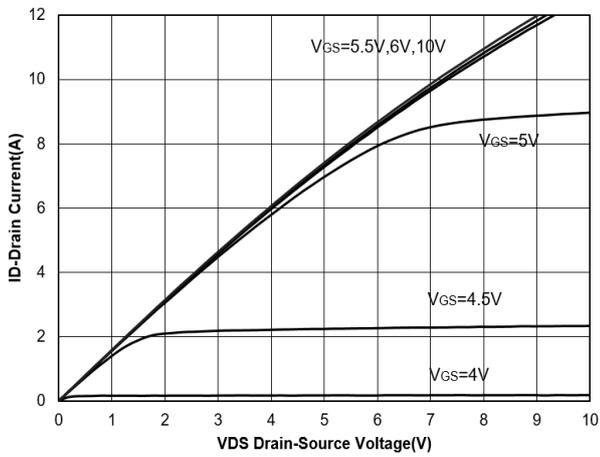


Figure 1. Output Characteristics

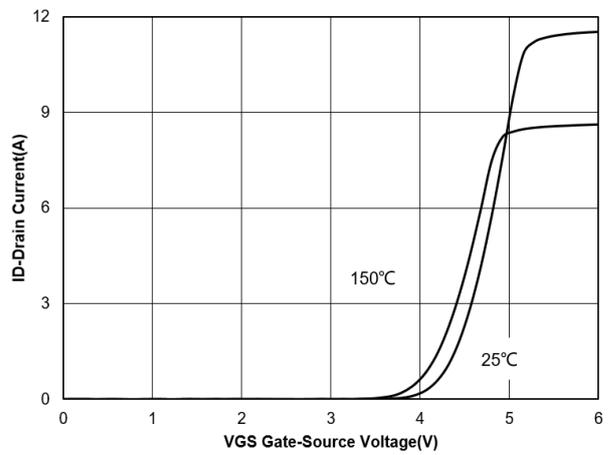


Figure 2. Transfer Characteristics

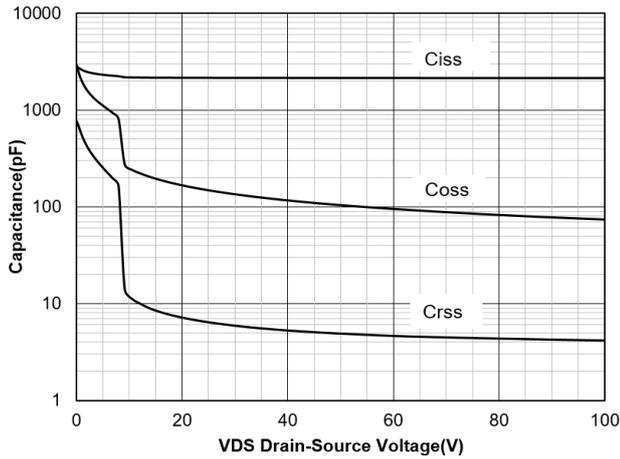


Figure 3. Capacitance Characteristics

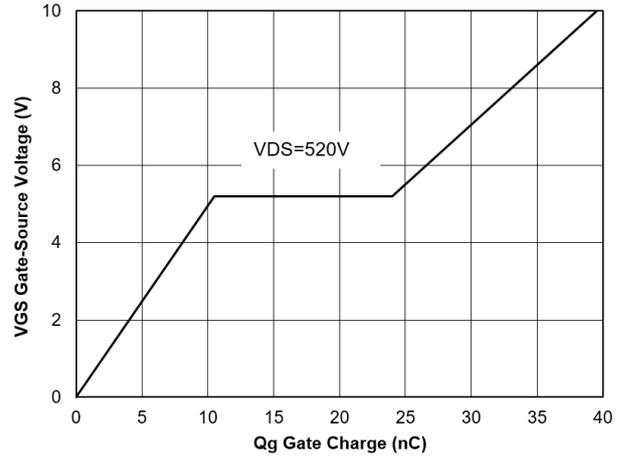


Figure 4. Gate Charge

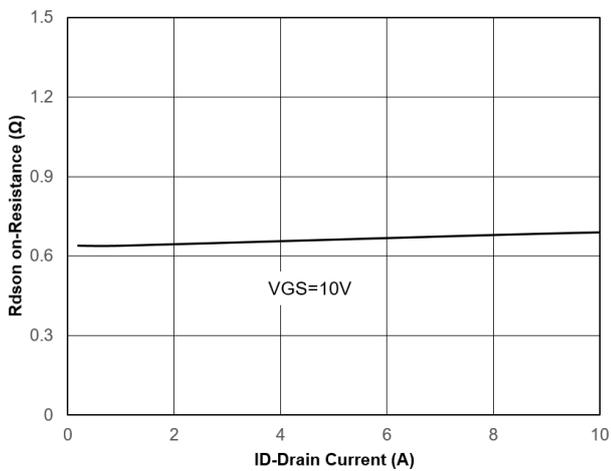


Figure 5. Drain-Source on Resistance

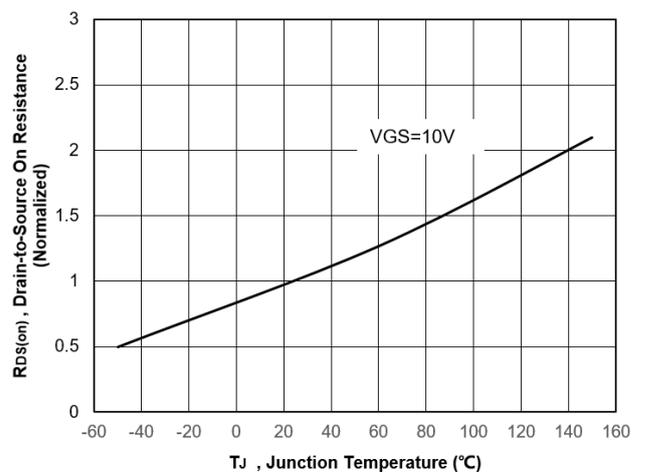


Figure 6. Normalized On-Resistance Vs. Temperature

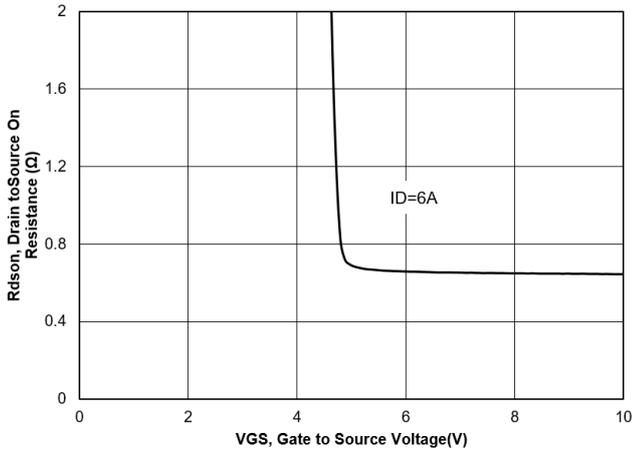


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

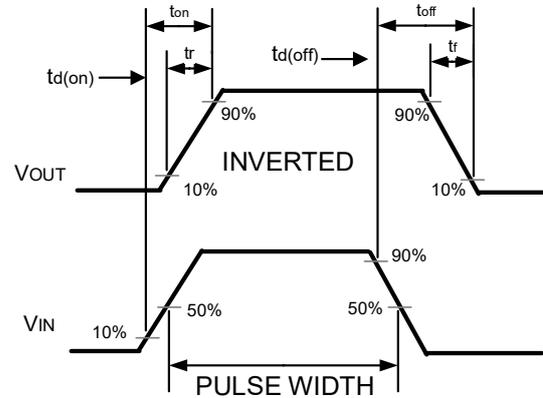


Figure 8. Switching wave

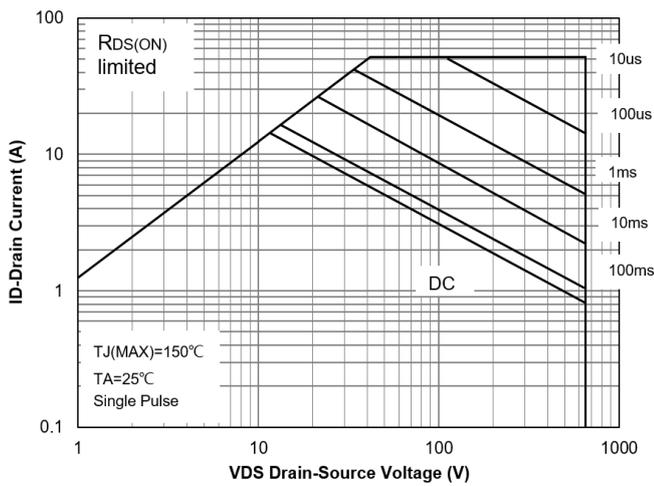


Figure 9. Safe Operation Area (TO-220)

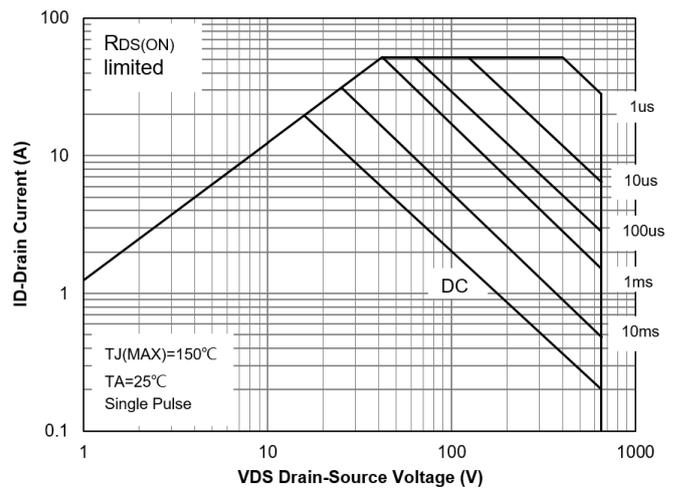


Figure 10. Safe Operation Area (TO-220F)

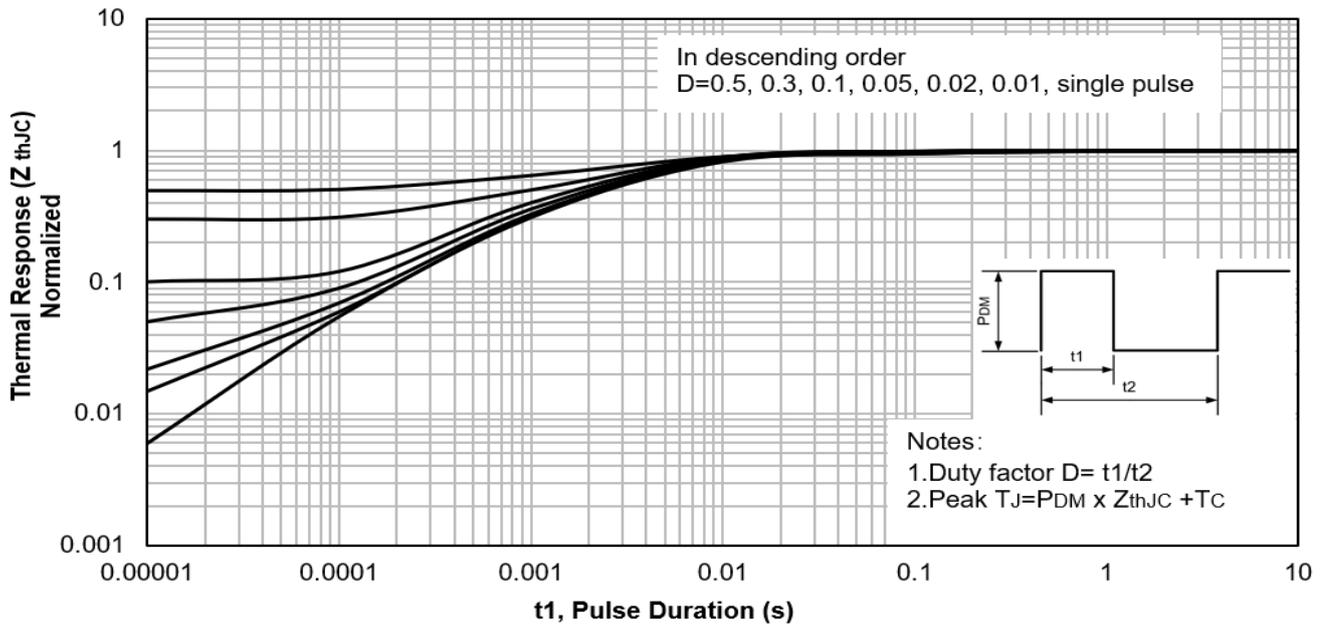


Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220)

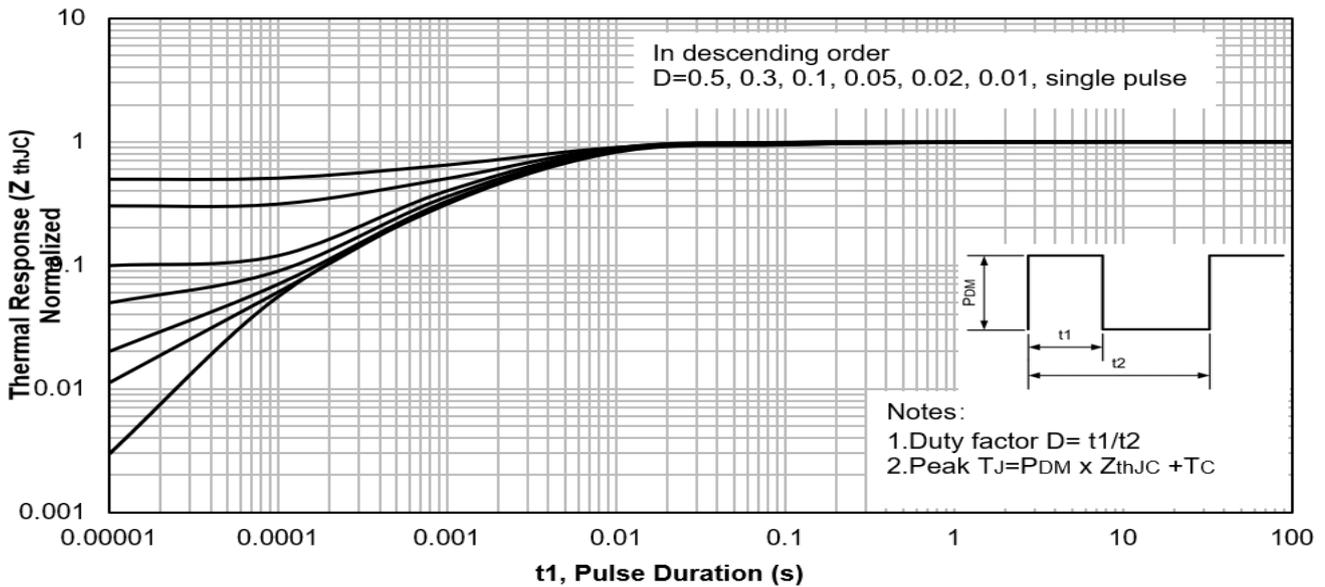
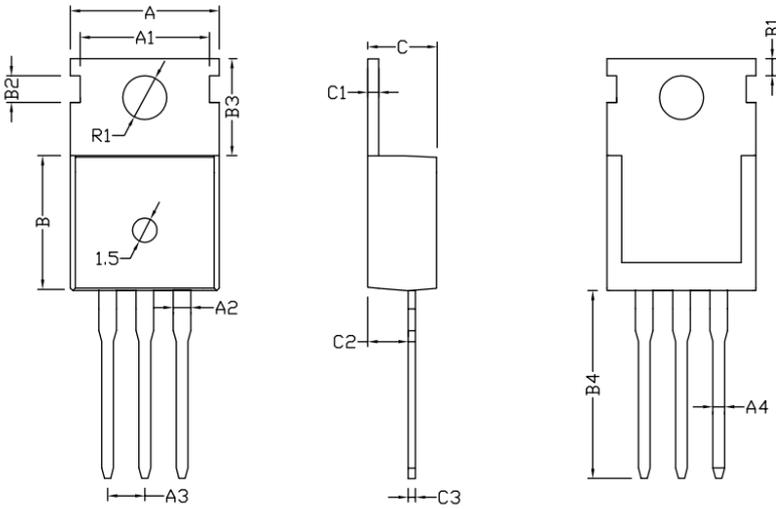
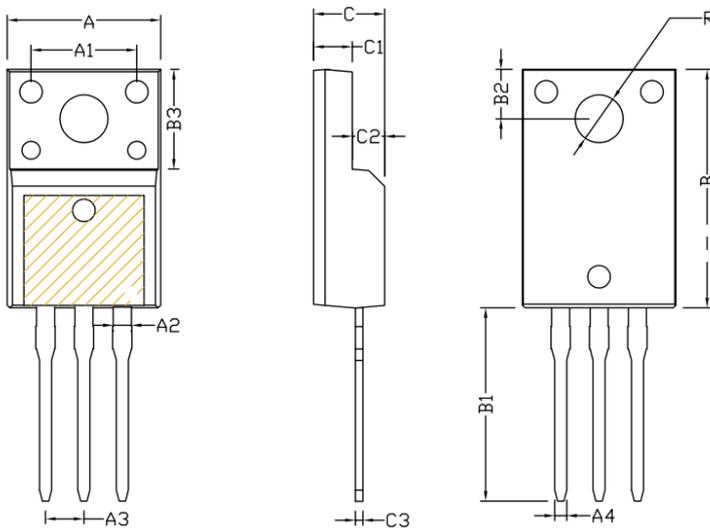


Figure 12. Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220F)

TO-220 Package Outline Drawing


SYMBOL	MM		
	MIN	NOM	MAX
A	9.78	9.88	9.98
A1	8.65	8.70	8.75
A2	1.22	1.27	1.35
A3	2.50	2.54	2.59
A4	0.77	0.80	0.83
B	8.70	9.20	9.70
B1	1.25	1.30	1.35
B2	1.65	1.70	1.75
B3	6.50	6.60	6.70
B4	12.90	13.08	13.18
C	4.42	4.50	4.58
C1	1.27	1.30	1.33
C2	2.37	2.40	2.43
C3	0.48	0.50	0.52
R	3.60	3.65	3.70

TO-220F Package Outline Drawing


SYMBOL	MM		
	MIN	NOM	MAX
A	10.03	10.13	10.23
A1	6.50	7.00	7.50
A2	1.20	1.28	1.36
A3		2.54	
A4	0.70	0.80	0.90
B	15.81	15.91	16.01
B1	12.79	12.89	12.99
B2	3.00	3.30	3.60
B3	6.60	6.65	6.70
C	4.62	4.70	4.78
C1	2.50	2.55	2.60
C2	2.10	2.15	2.20
C3		0.50	
R		3.18	