Description

The CM65R310XP/F is the N-Channel enhancement mode power field effect transistors with high cell density, high voltage Super Junction technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance, .

Applications

- AC/DC load switch
- SMPS
- LED power

Features

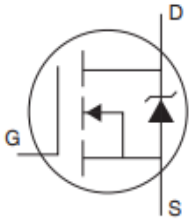
- VDS: 650V
- ID (@VGS=10V): 15A
- RDS_{ON} (@VGS=10V) : < 310mΩ
- High density cell design for extremely low RDS_{ON}
- Excellent on-resistance and DC current capability

Marking Information

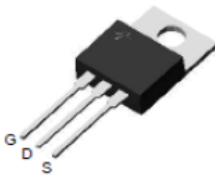
X=Package type

XXXX = Marking Code

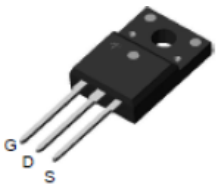
Equivalent Circuit and Pin Configuration



TO-220



TO-220F



Ordering Information

P/N	Package Type	Packaging
CM65R310XP	TO-220	Tube
CM65R310XF	TO-220F	Tube

Absolute Maximum Ratings (Tc=25 ℃ unless otherwise noted)

Parameter		Symbol	Maximum		Unit
			CM65R310XP	CM65R310XF	
Drain-source Voltage		V_{DS}	650		V
Gate-source Voltage		V_{GS}	±30		V
Continuous Drain Current (1)	Tc=25°C	I_D	15	15(4)	A
	Tc=100°C		9	9(4)	A
Pulsed Drain Current(2)		I_{DM}	58	58(4)	A
Single Pulse Avalanche Energy(5)		E_{AS}	185	185	mJ
Total Power Dissipation (3)		P_D @ Tc=25°C	179	35	W
		Derating Factor above 25°C	1.67	0.28	W/°C
Thermal Resistance Junction-to-Ambient		$R_{\theta JA}$	65	65	°C/W
Thermal Resistance Junction-to-Case (3)		$R_{\theta JC}$	0.7	3.6	°C/W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to +150		°C

Electrical Characteristics (T_C=25 ℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	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	2.0		4.0	V
Static Drain-Source on-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=7A		265	310	mΩ
Transconductance	gfs	V_{GS}=10V,I_D=7A		8.8		S
Diode Forward Voltage	V_{SD}	I_S=14A,V_{GS}=0V		0.9	1.3	V
Maximum Body-Diode Continuous Current	I_S				15	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=100V,V_{GS}=0V,f=1MHz		736		pF
Output Capacitance	C_{oss}			57		
Reverse Transfer Capacitance	C_{rss}			2		
Switching Parameters						
Total Gate Charge	Q_g	V_{DS}=480V,I_D=4A,V_{GS}=10V		21		nC
Gate Source Charge	Q_{gs}			3.3		
Gate Drain Charge	Q_{gd}			10		
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=50V, R_L=15Ω, R_{GEN}=25Ω		46		ns
Turn-on Rise Time	t_r			27.6		
Turn-off Delay Time	$t_{D(off)}$			78		
Turn-off Fall Time	t_f			28.8		

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
(5) L=5mH,Rg=25Ω,Vdd=130V,Start T_J=25°C

Typical Performance Characteristics

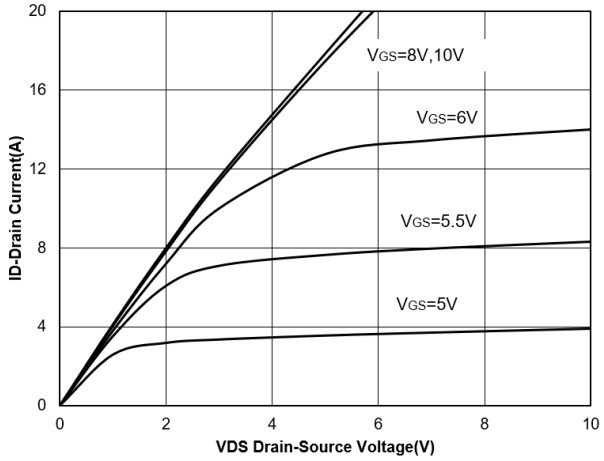


Figure 1. Output Characteristics

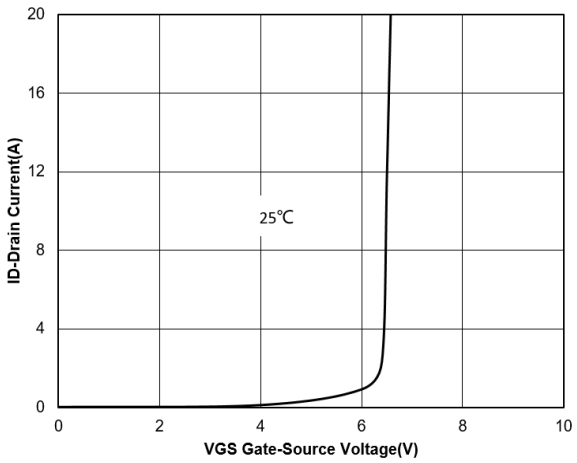


Figure 2. Transfer Characteristics

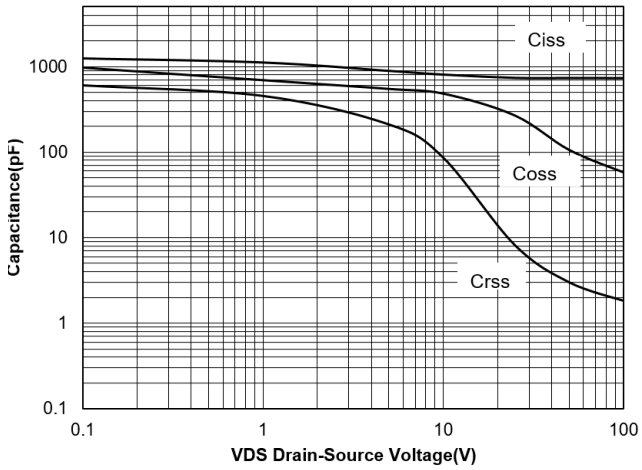


Figure 3. Capacitance Characteristics

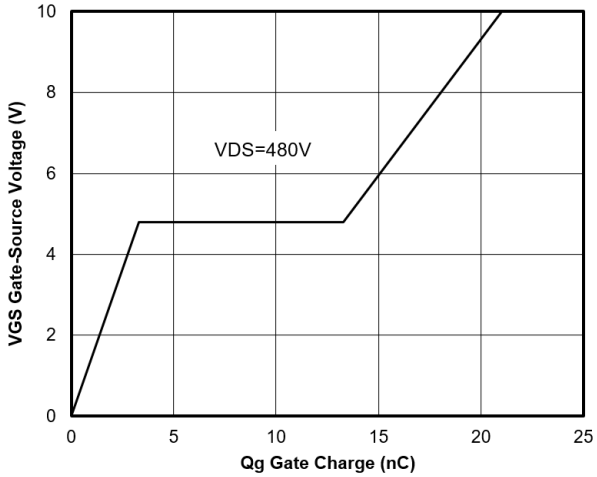


Figure 4. Gate Charge

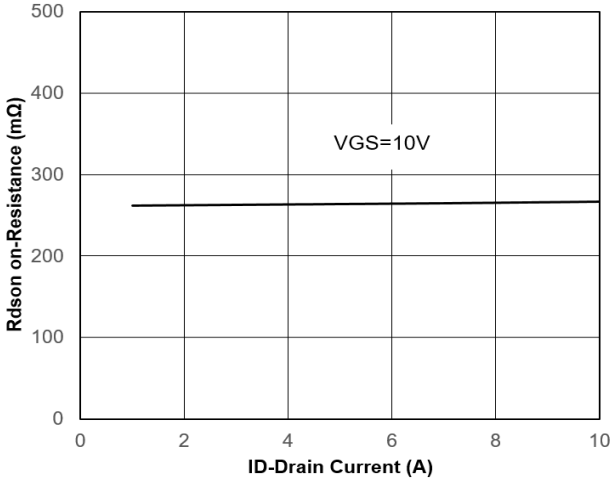


Figure 5. Drain-Source on Resistance

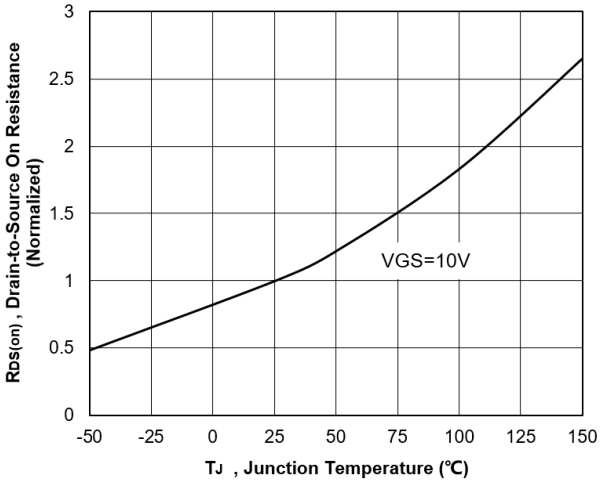


Figure 6. Normalized On-Resistance Vs. Temperature

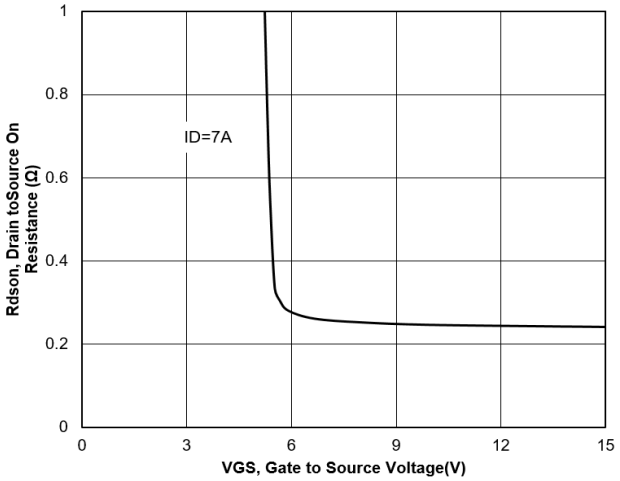


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

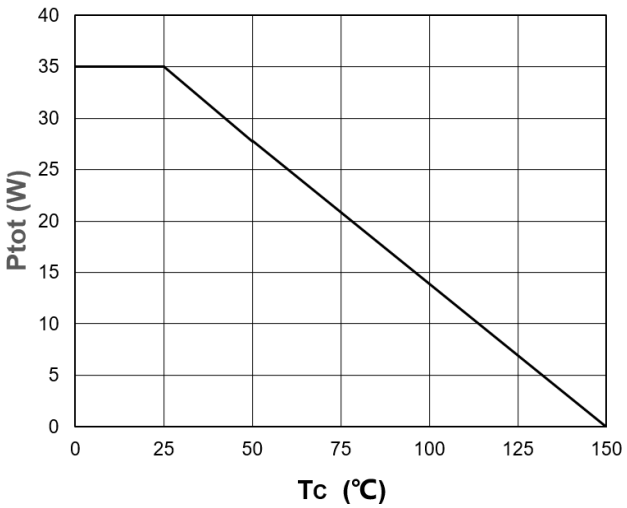


Figure 8. Power Dissipation (TO-220F)

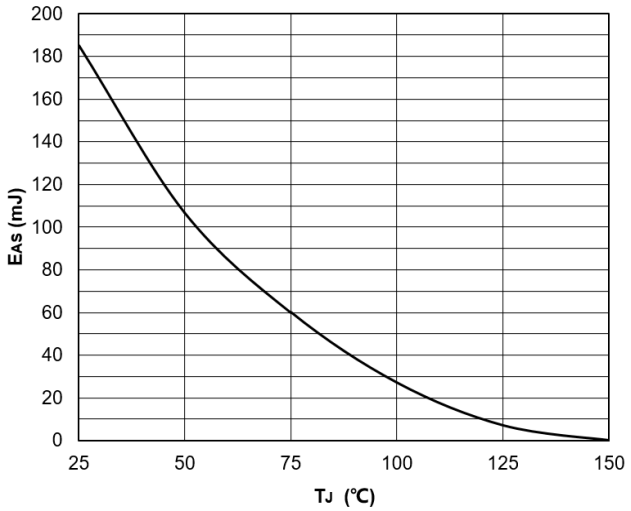


Figure 9. Avalanche Energy

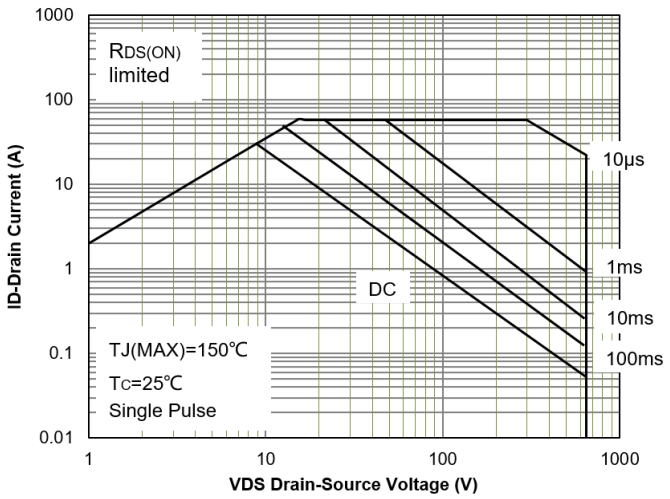


Figure 10. Safe Operation Area

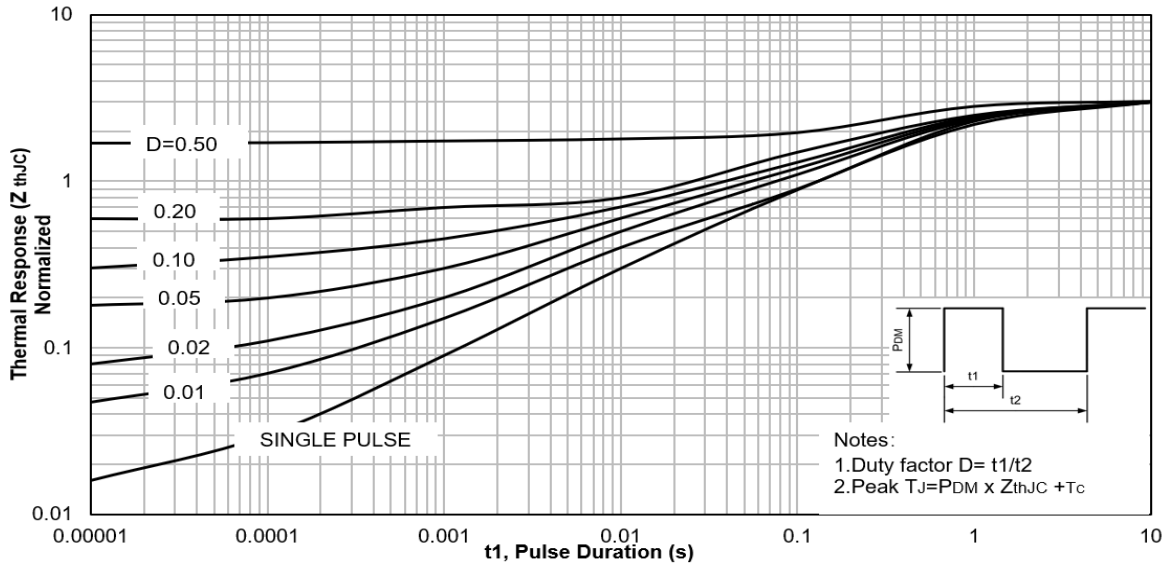


Figure 11. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

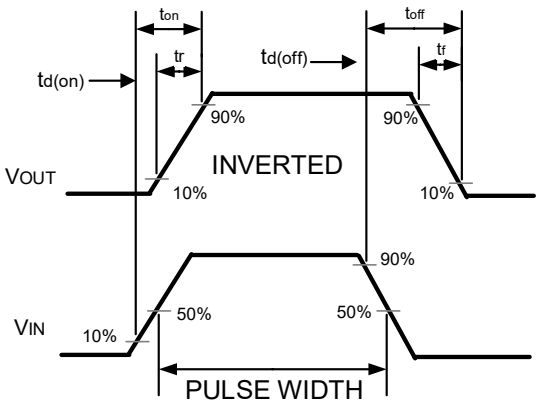
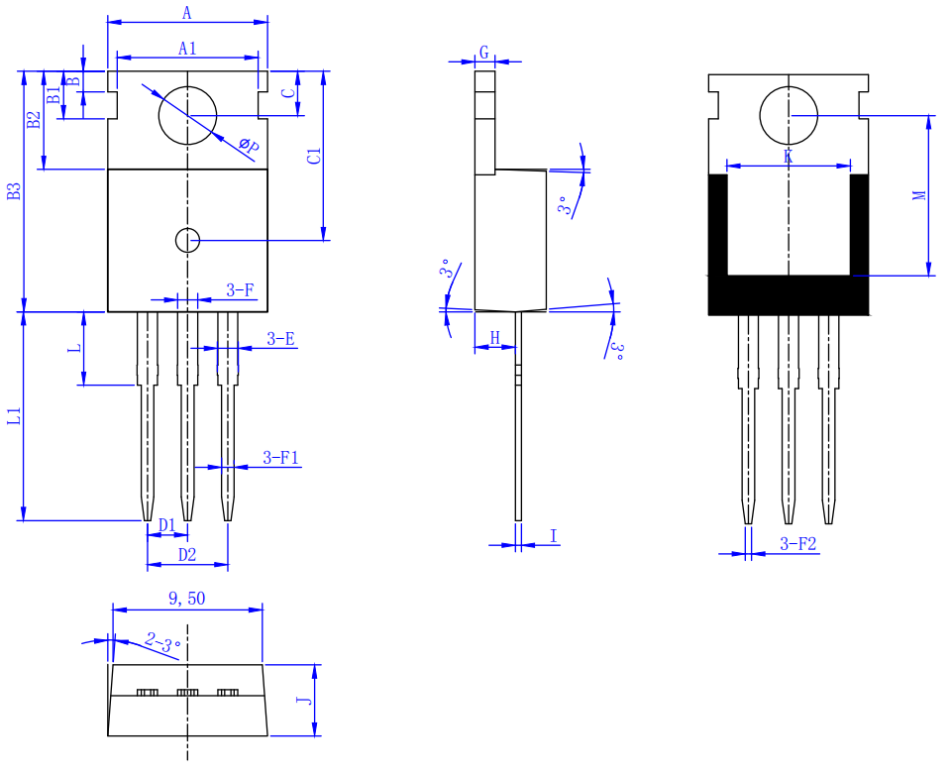


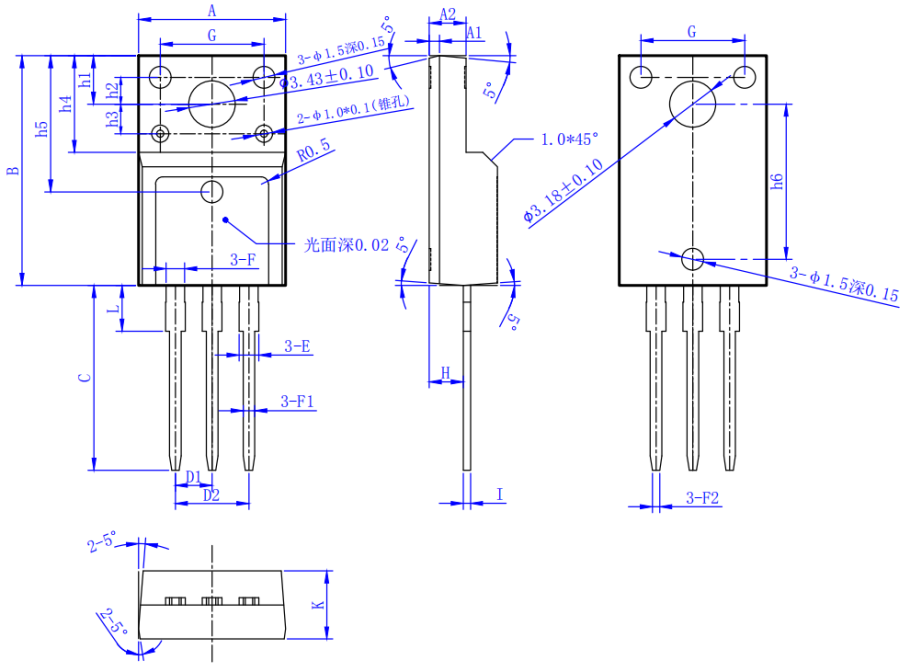
Figure 12. Switching wave

TO-220 Package Outline Drawing



Symbol	Millimeters		
	Min.	Nom.	Max.
A	9.90	10.00	10.10
A1		8.70	
B		1.30	
B1		3.00	
B2		6.48	
B3	15.60	15.78	16.00
C		2.80	
C1		11.08	
D1		2.54BSC	
D2		5.08BSC	
E	1.27	1.30	1.35
F	1.15	1.25	1.35
F1	0.70	0.80	0.90
F2	0.30	0.40	0.50
G	1.25	1.30	1.35
H	2.30	2.50	2.70
I	0.45	0.50	0.60
J	4.40	4.50	4.60
K	7.50	7.60	7.70
L	2.68	2.88	3.08
L1	12.95	13.00	13.15
M		10.50	
N	9.40	9.50	9.65
ΦP	3.60	3.65	3.70

TO-220F Package Outline Drawing



Symbol	Millimeters		
	Min.	Nom.	Max.
A	10.00	10.20	10.40
A1		0.70	
A2	2.35	2.55	2.75
B	15.70	15.90	16.10
C	13.00	13.25	13.50
D1		2.54 BSC	
D2		5.08 BSC	
E	1.27	1.32	1.40
F	1.25	1.28	1.30
F1	0.75	0.80	0.85
F2	0.35	0.40	0.50
G	6.90	7.00	7.10
H	2.66	2.76	2.86
h1	3.20	3.30	3.40
h2	1.70	1.80	1.90
h3	2.00	2.10	2.20
h4	6.70	6.79	6.90
h5	9.30	9.41	9.50
h6	10.44	10.54	10.64
I	0.40	0.50	0.60
K	4.60	4.70	4.80
L	2.90	3.00	3.10