

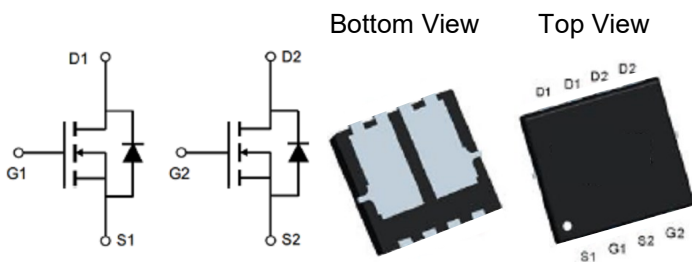
Description

The CMN3013F3D is the N-Channel enhancement mode power field effect transistors with high cell density, trench technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance.

Features

- V_{DS} : 30V
- I_D : 32A
- $R_{DS(on)}$ (@ $V_{GS}=10V$) : < 12m Ω
- $R_{DS(on)}$ (@ $V_{GS}=4.5V$) : < 17m Ω
- High density cell design for extremely low $R_{DS(on)}$
- Excellent on-resistance and DC current capability

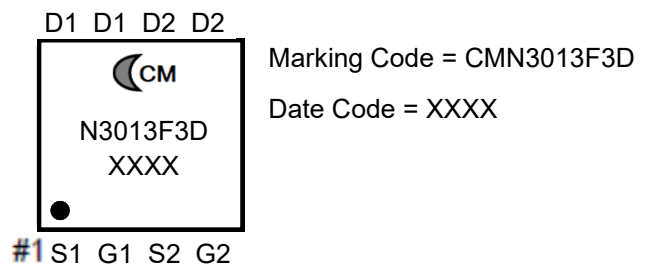
Equivalent Circuit and Pin Configuration



Applications

- Battery management
- Power management
- Load switch

Marking Information



Ordering Information

Part Number	Packaging	Reel Size
CMN3013F3D	5000/Tape & Reel	13 inch

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

Parameter		Symbol	Maximum	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current ⁽¹⁾⁽⁶⁾	$T_C=25^\circ\text{C}$	I_D	32	A
	$T_C=100^\circ\text{C}$		20	A
	$T_A=25^\circ\text{C}$	I_D	13	A
	$T_A=100^\circ\text{C}$		8	A
Pulsed Drain Current ⁽³⁾		I_{DM}	128	A
Total Power Dissipation ⁽⁴⁾	$T_C=25^\circ\text{C}$	P_D	18	W
	$T_A=25^\circ\text{C}$		3	W
Thermal Resistance Junction-to-Ambient ⁽²⁾⁽⁵⁾		$R_{\theta JA}$	40	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case		$R_{\theta Jc}$	7	$^\circ\text{C/W}$
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BVDSS	VGS=0V,ID=250μA	30			V
Zero Gate Voltage Drain Current	IDSS	VDS=30V,VGS=0V,Tc=25°C			1	μA
Gate-Body Leakage Current	IGSS	VGS=±20V,VDS=0V			±100	nA
Gate Threshold Voltage	VGS(th)	VDS=VGS,ID=250μA	1.0		3.0	V
Static Drain-Source on-Resistance	RDS(on)	VGS=10V,ID=13A		9	12	mΩ
		VGS=4.5V,ID=10A		12	17	
Diode Forward Voltage	VSD	IS=13A,VGS=0V			1.2	V
Maximum Body-Diode Continuous Current	IS				13	A
Dynamic Parameters						
Input Capacitance	Ciss	VDS=15V,VGS=0V,f=1MHz		1020		pF
Output Capacitance	Coss			176		
Reverse Transfer Capacitance	Crss			133		
Switching Parameters						
Total Gate Charge	Qg	VGS=10V,VDS=15V,ID=30A		21.8		nC
Gate Source Charge	Qgs			3.4		
Gate Drain Charge	Qgd			6.5		
Turn-on Delay Time	tD(on)	VGS=10V,VDD=20V, ID=2A, RL=1Ω,RGEN=3Ω		8		ns
Turn-on Rise Time	tr			15		
Turn-off Delay Time	tD(off)			27		
Turn-off Fall Time	tf			7		

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

- (2) The value of R_{θJA} is measured with the device mounted on lin2 FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C. The Power dissipation PDSM is based on R_{θJA} t ≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
- (3) Single pulse width limited by junction temperature T_{J(MAX)} = 150°C.
- (4) The power dissipation PD is based on T_{J(MAX)} = 150°C, using junction-to-case thermal resistance, and is more useful in setting the upper Dissipation limit for cases where additional heatsinking is used.
- (5) The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJA} and case to ambient.
- (6) The maximum current rating is limited by maximum junction temperature.

Typical Performance Characteristics

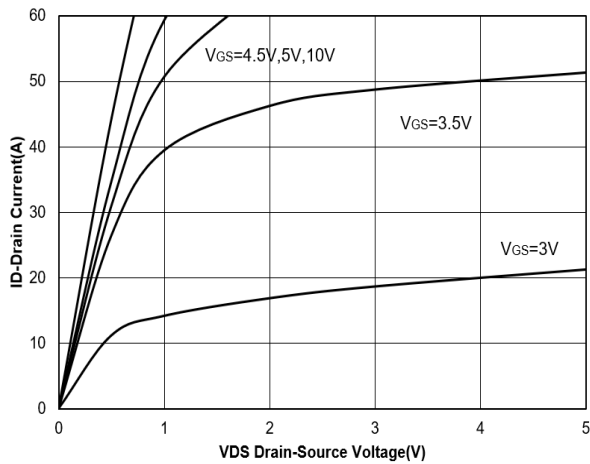


Figure 1. Output Characteristics

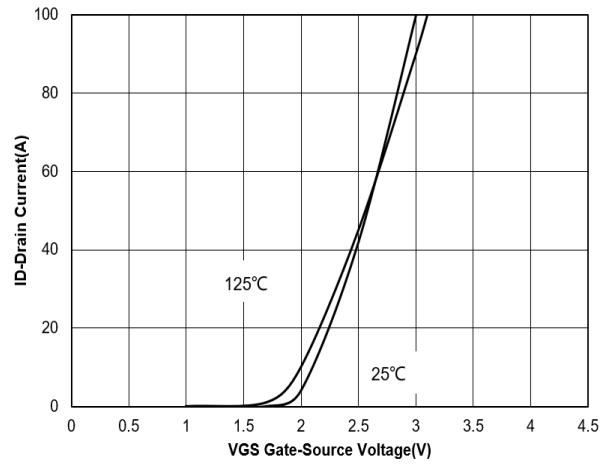


Figure 2. Transfer Characteristics

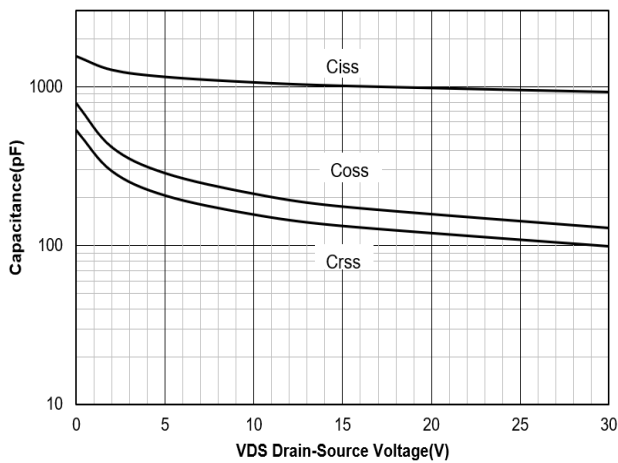


Figure 3. Capacitance Characteristics

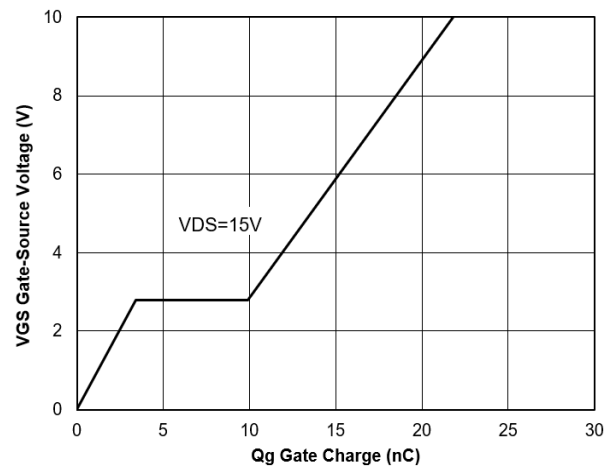


Figure 4. Gate Charge

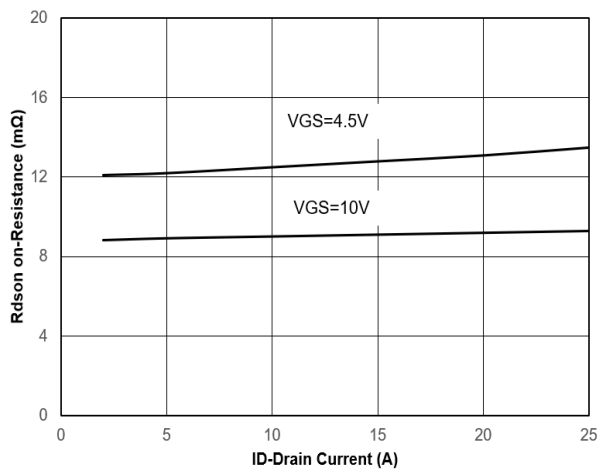


Figure 5. Drain-Source on Resistance

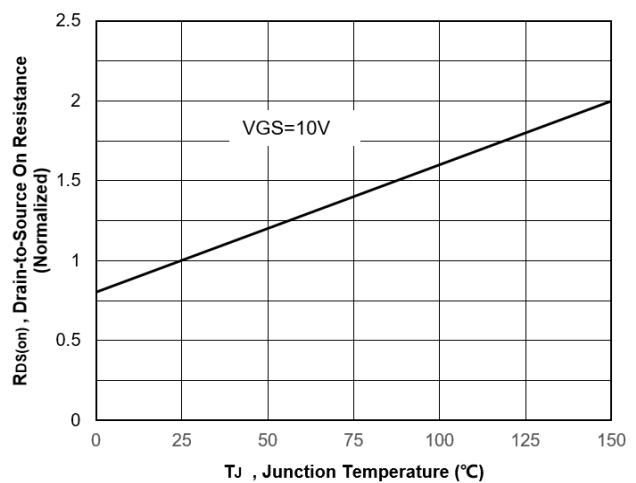


Figure 6. Normalized On-Resistance

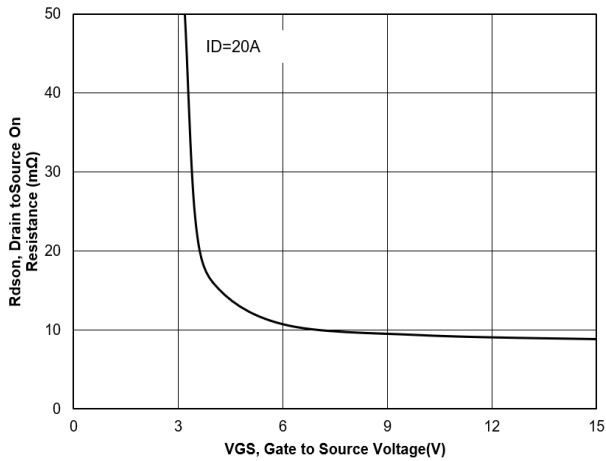


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

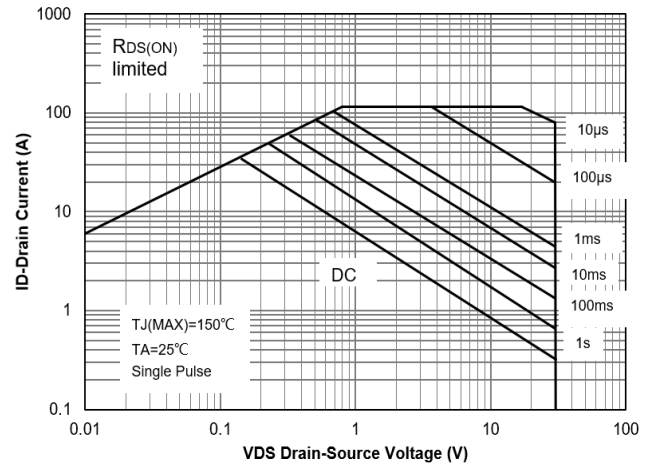


Figure 8. Safe Operation Area

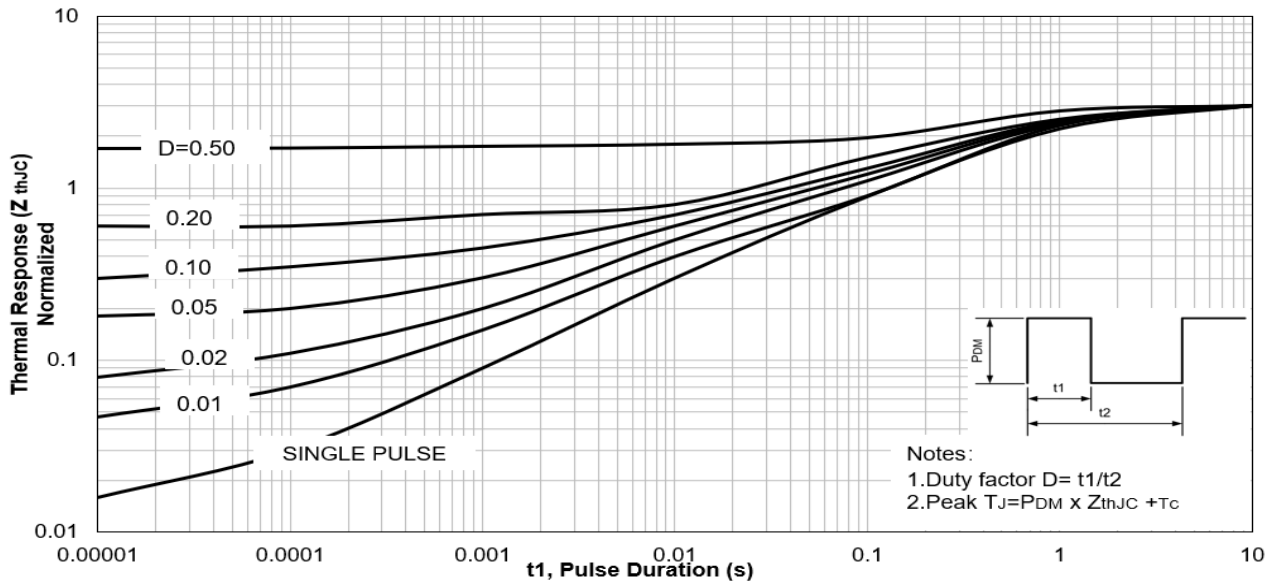


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

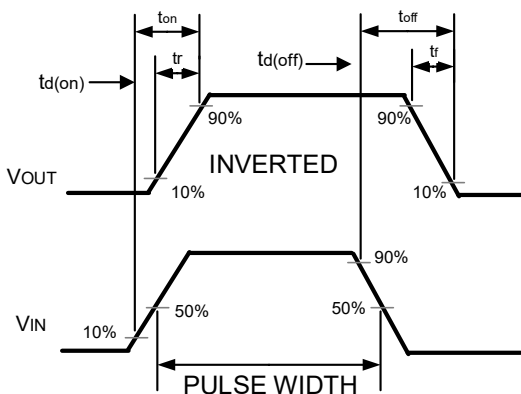
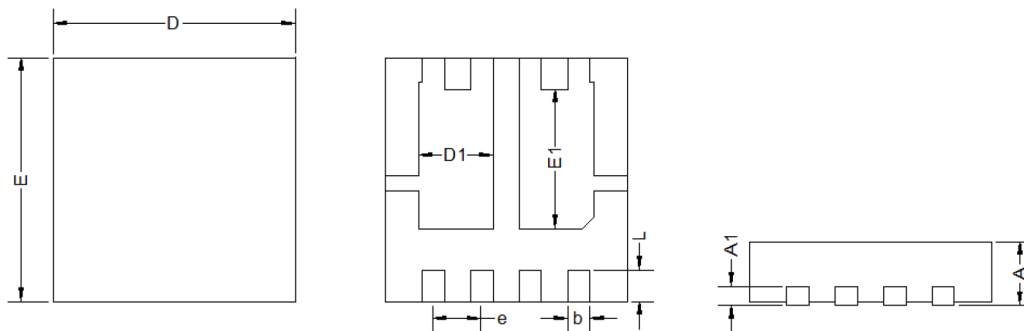


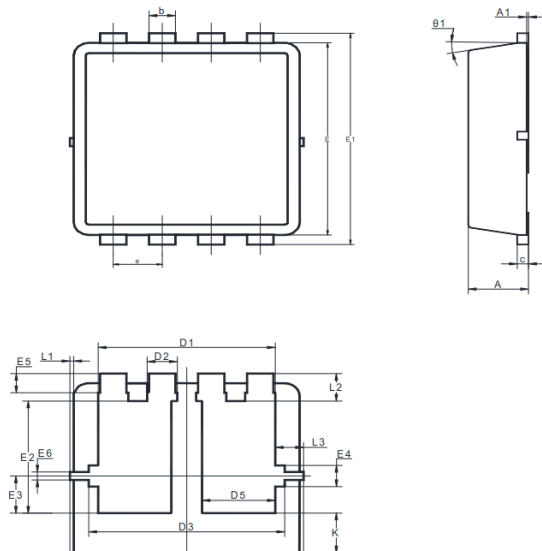
Figure 10. Switching wave

DFN3333-8L Package Outline Drawing



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	3.15	3.25	3.35
E	3.15	3.25	3.35
A	0.70	0.80	0.90
A1	0.2 BSC		
D1	0.90	1.00	1.10
E1	1.75	1.85	1.95
L	0.325	0.425	0.525
b	0.20	0.30	0.40
e	0.65 BSC		

PDFN3333-8L Package Outline Drawing



UNIT	A	A1	b	c	D1	D2	D3	D4	D5	E	E1	E2	E3
mm	0.9	0.05	0.35	0.25	2.6	0.5	2.7	3.2	1.135	3.1	3.3	1.85	0.68
	0.7	0	0.24	0.1	2.4	0.3	2.5	3	0.935	2.9	3.1	1.65	0.48

UNIT	E4	E5	E6	e	K	L	L1	L2	L3	θ1
mm	0.43	0.4	0.25	0.7	0.72	0.5	0.1	0.53	0.475	12°
	0.23	0.2	0.15	0.6	0.52	0.3	0	0.33	0.275	0°