

### Description

The CMN6012U 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.

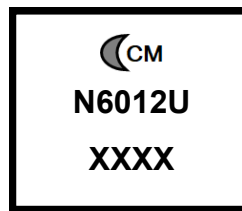
### Features

- $V_{DS}$ : 60V
- $I_D$  : 50A
- $R_{DS(ON)}$  (@ $V_{GS}=10V$ ) : < 16m $\Omega$
- High density cell design for extremely low  $R_{DS(ON)}$
- Excellent on-resistance and DC current capability

### Applications

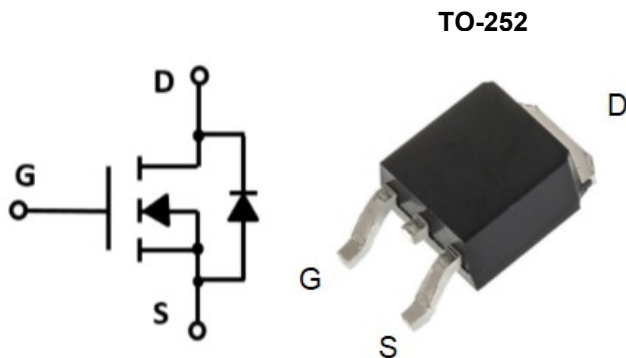
- AC/DC load switch
- SMPS
- Notebooks and Handhelds adapter
- UPS Power

### Marking Information



Marking Code = CMN6012U  
 Date Code = XXXX

### Equivalent Circuit and Pin Configuration



### Ordering Information

P/N	Packaging	Remark
CMN6012U	2500/Tape and Reel	ROHS

### Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-source Voltage	$V_{DS}$	60	V
Gate-source Voltage	$V_{GS}$	$\pm 25$	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	$T_c=25^\circ\text{C}$	50
		$T_c=100^\circ\text{C}$	32
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	200	A
Total Power Dissipation <sup>(3)</sup>	$P_D$	$T_c=25^\circ\text{C}$	75
		Derating Factor above $25^\circ\text{C}$	0.6
Thermal Resistance Junction-to-Case <sup>(3)</sup>	$R_{\theta JC}$	1.67	$^\circ\text{C/W}$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**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	BVDSS	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, 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> =±25V, 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> =50A		12	16	mΩ
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =50A, V <sub>GS</sub> =0V			1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				50	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz		2200		pF
Output Capacitance	C <sub>oss</sub>			247		
Reverse Transfer Capacitance	C <sub>rss</sub>			172		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =48V, I <sub>D</sub> =50A, V <sub>GS</sub> =10V		48		nC
Gate Source Charge	Q <sub>gs</sub>			9.6		
Gate Drain Charge	Q <sub>gd</sub>			19.5		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, I <sub>D</sub> =1A, R <sub>L</sub> =30Ω, R <sub>GEN</sub> =3.6Ω		27.8		ns
Turn-on Rise Time	t <sub>r</sub>			5		
Turn-off Delay Time	t <sub>D(off)</sub>			54.3		
Turn-off Fall Time	t <sub>f</sub>			5.4		

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

**Typical Performance Characteristics**

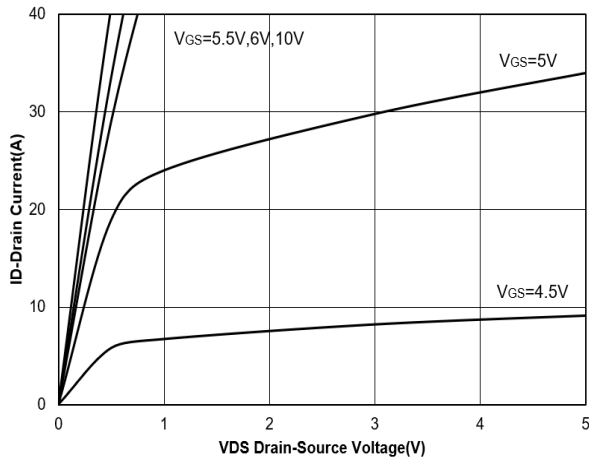


Figure 1. Output Characteristics

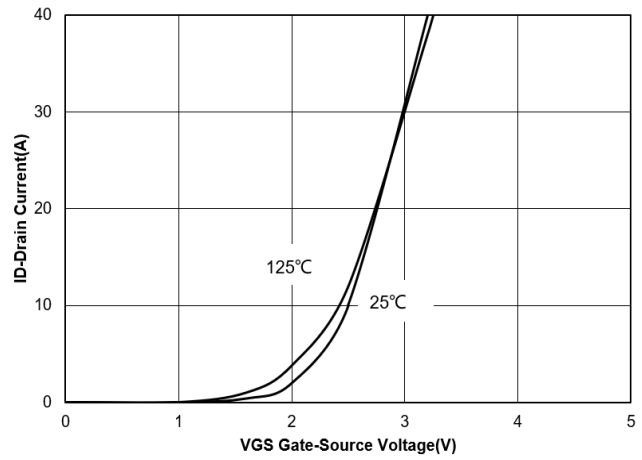


Figure 2. Transfer Characteristics

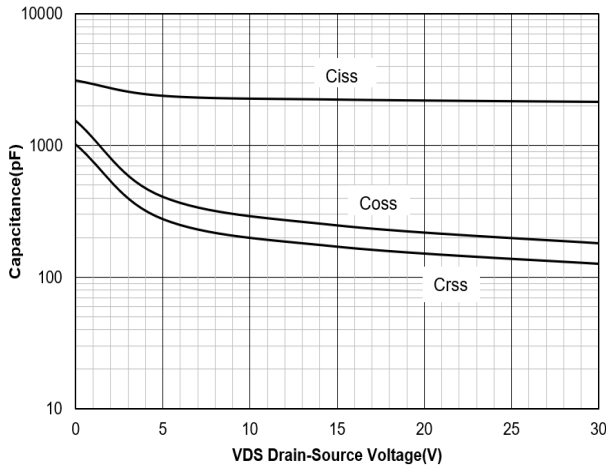


Figure 3. Capacitance Characteristics

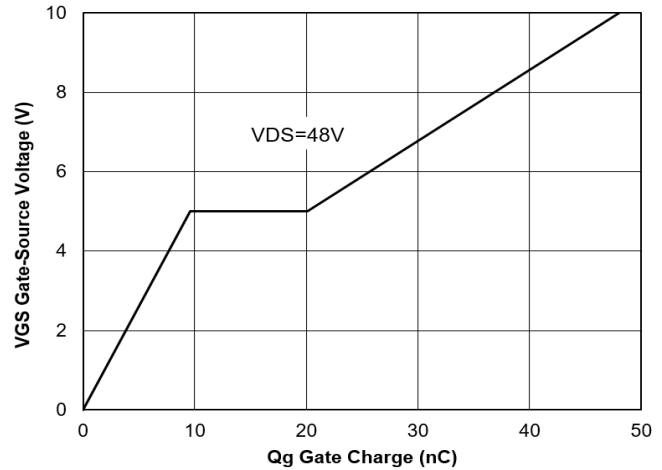


Figure 4. Gate Charge

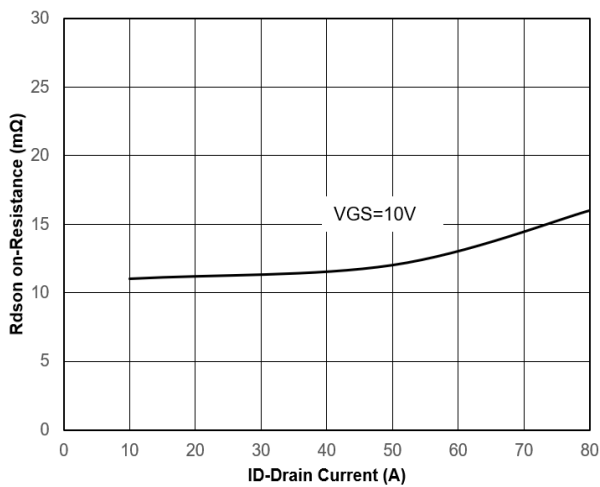


Figure 5. Drain-Source on Resistance

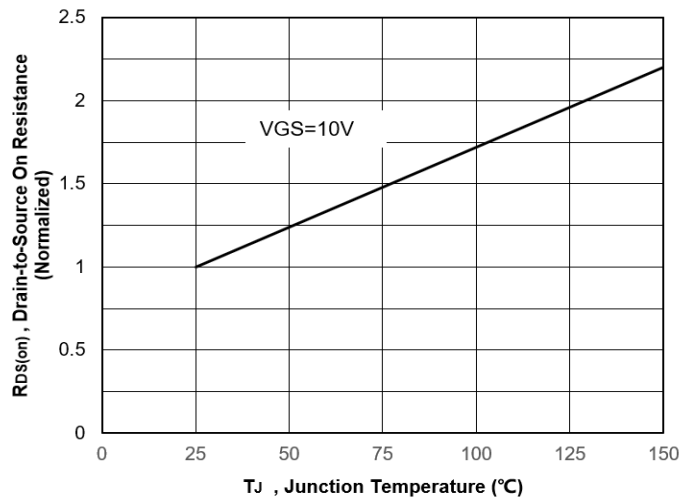


Figure 6. Normalized On-Resistance Vs. Temperature

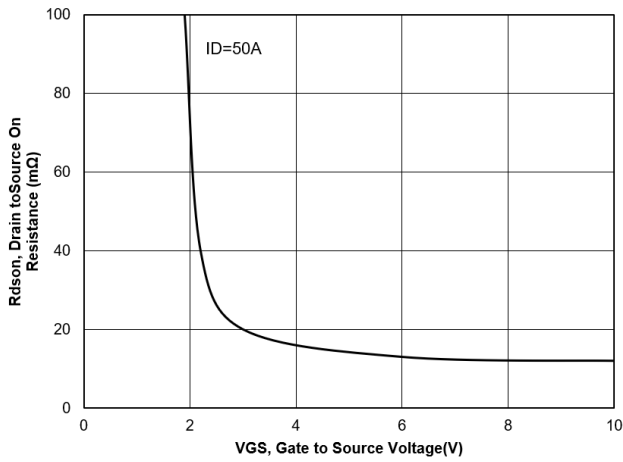


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

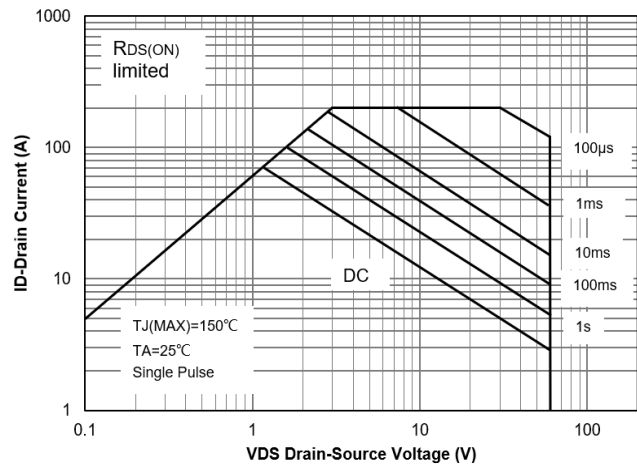


Figure 8. Safe Operation Area

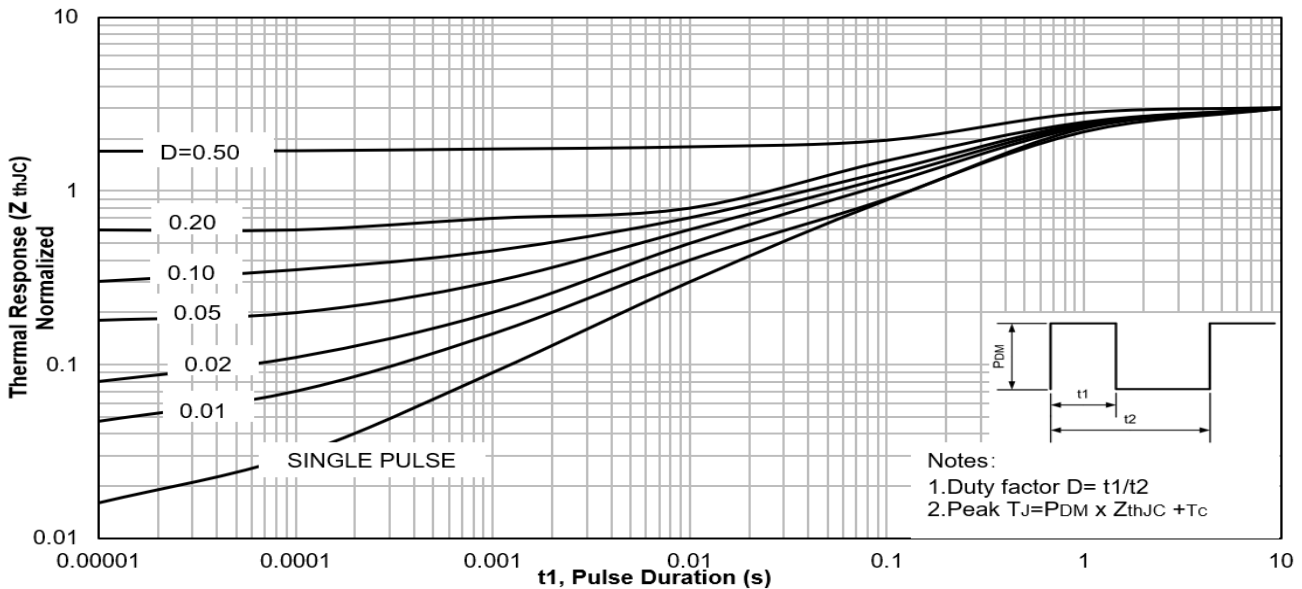


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Case

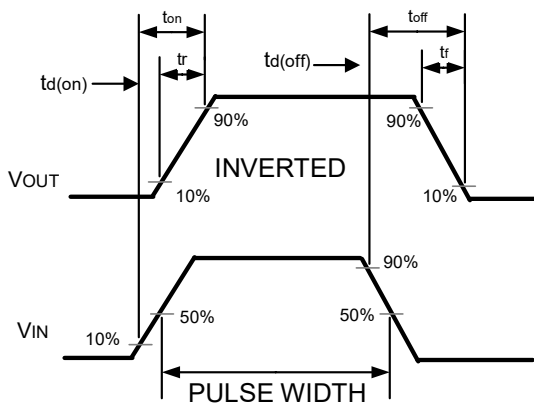
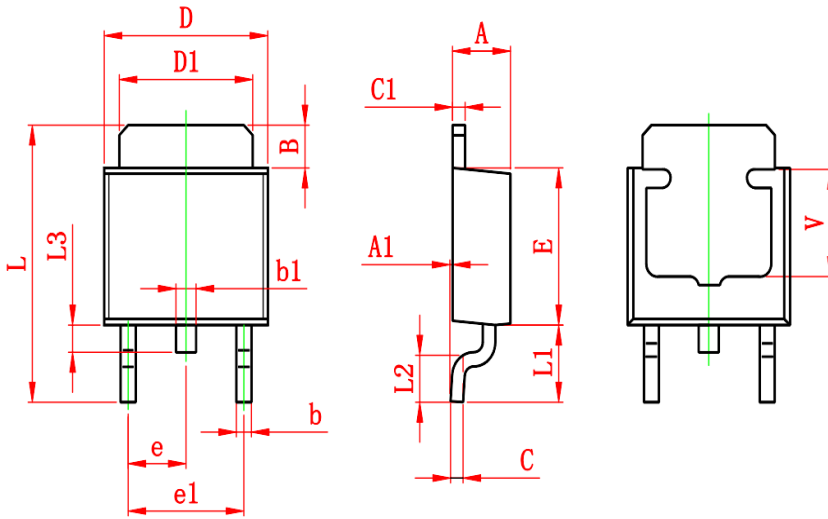


Figure 10. Switching wave

### TO-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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