



## TO-251S Plastic-Encapsulate MOSFETS

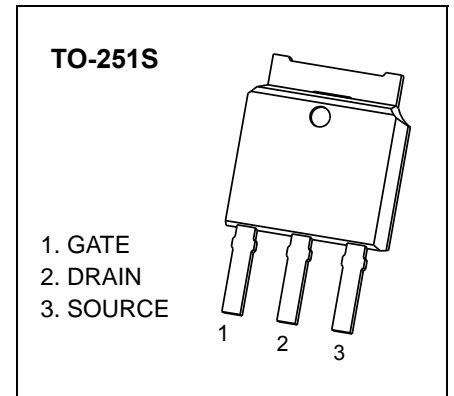
### CJD04N65

N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
650V	2.3Ω@10V	4A

#### GENERAL DESCRIPTION

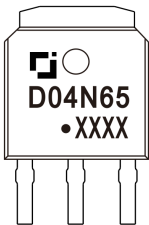
This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.



#### FEATURE

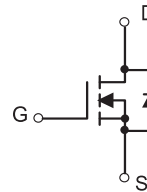
- High Current Rating
- Lower  $R_{DS(on)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter  $V_{SD}$  Specifications
- Avalanche Energy Specified

#### MARKING



D04N65 = Device code  
 Solid dot = Green molding compound device,  
 if none, the normal device  
 XXXX=Code

#### EQUIVALENT CIRCUIT



#### Maximum ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	±30	
Continuous Drain Current	$I_D$	4.0	A
Pulsed Drain Current	$I_{DM}$	16	
Single Pulsed Avalanche Energy (note1)	$E_{AS}$	280	mJ
Power Dissipation	$P_D$	1.25	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	100	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 ~+150	°C
Maximum lead temperature for soldering purposes , 1/8"from case for 5 seconds	$T_L$	260	

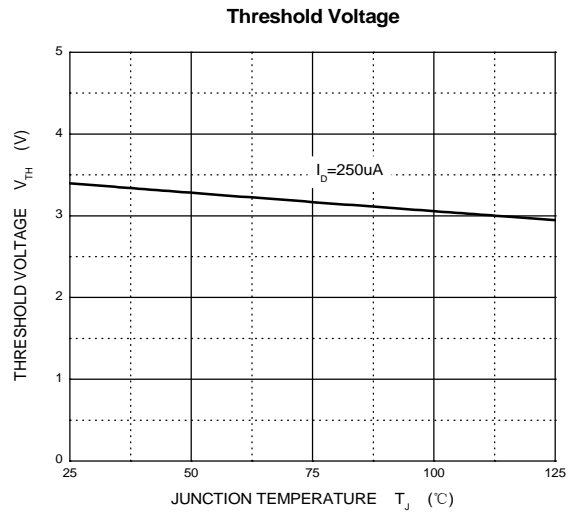
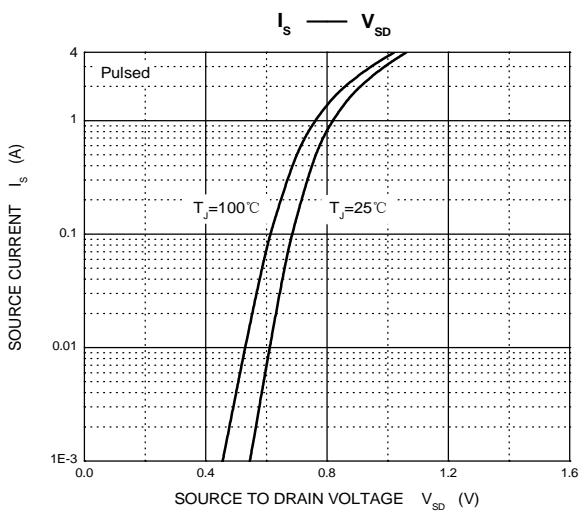
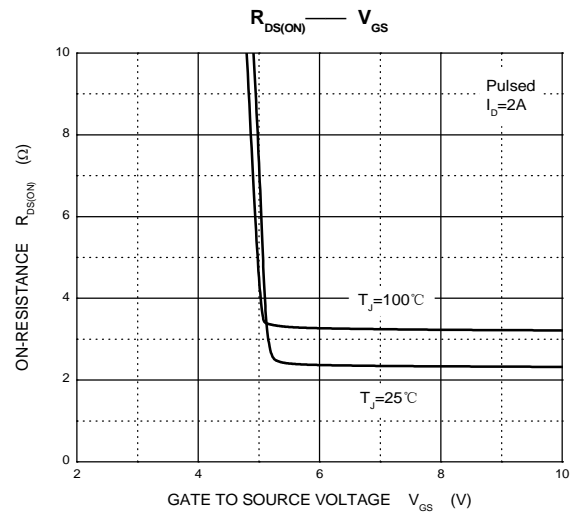
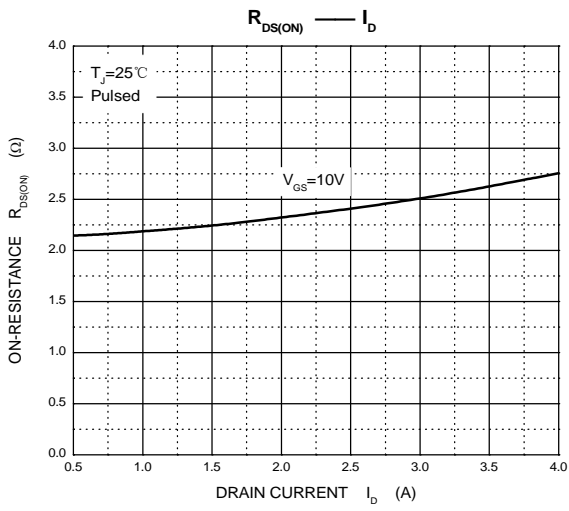
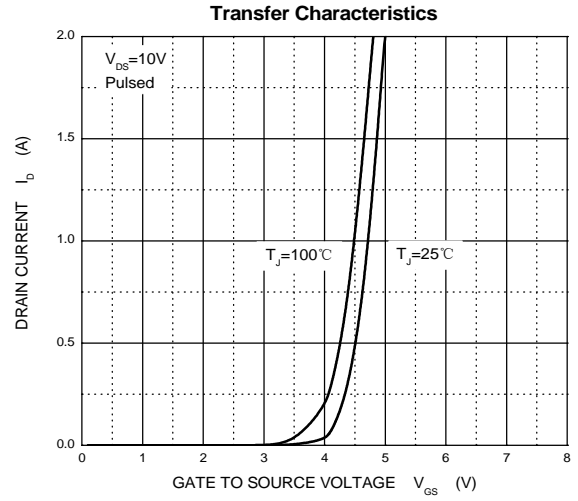
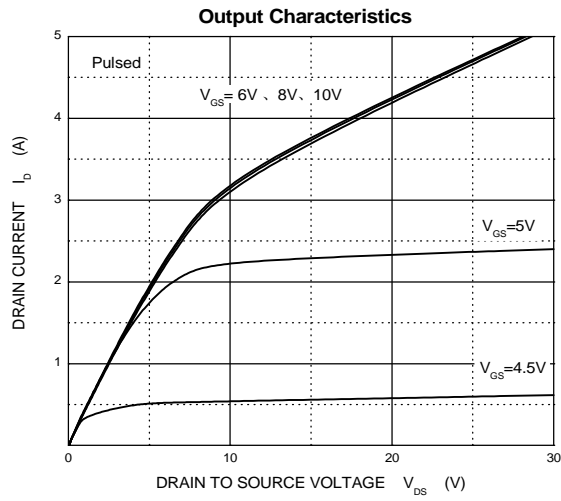
**Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Off characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	650			V
Drain-source diode forward voltage(note2)	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> =4.0A			1.5	
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			25	μA
Gate-body leakage curren (note2)	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±30V			±100	nA
<b>On characteristics (note2)</b>						
Gate-threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	3.5	4.0	V
Static drain-source on-resistance	R <sub>Ds(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.0A		2.3	3.0	Ω
<b>Dynamic characteristics (note 3)</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz			760	pF
Output capacitance	C <sub>oss</sub>				180	
Reverse transfer capacitance	C <sub>rss</sub>				20	
<b>Switching characteristics (note 3)</b>						
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =480V, V <sub>GS</sub> =10V, I <sub>D</sub> =4.0A		5.0	10	nC
Gate-source charge	Q <sub>gs</sub>			2.7		
Gate-drain charge	Q <sub>gd</sub>			2.0		
Turn-on delay time (note3)	t <sub>d(on)</sub>	V <sub>DD</sub> =300V, V <sub>GS</sub> =10V, R <sub>G</sub> =9.1Ω, I <sub>D</sub> =4.0A			20	ns
Turn-on rise time (note3)	t <sub>r</sub>				10	
Turn-off delay time (note3)	t <sub>d(off)</sub>				40	
Turn-off fall time (note3)	t <sub>f</sub>				20	

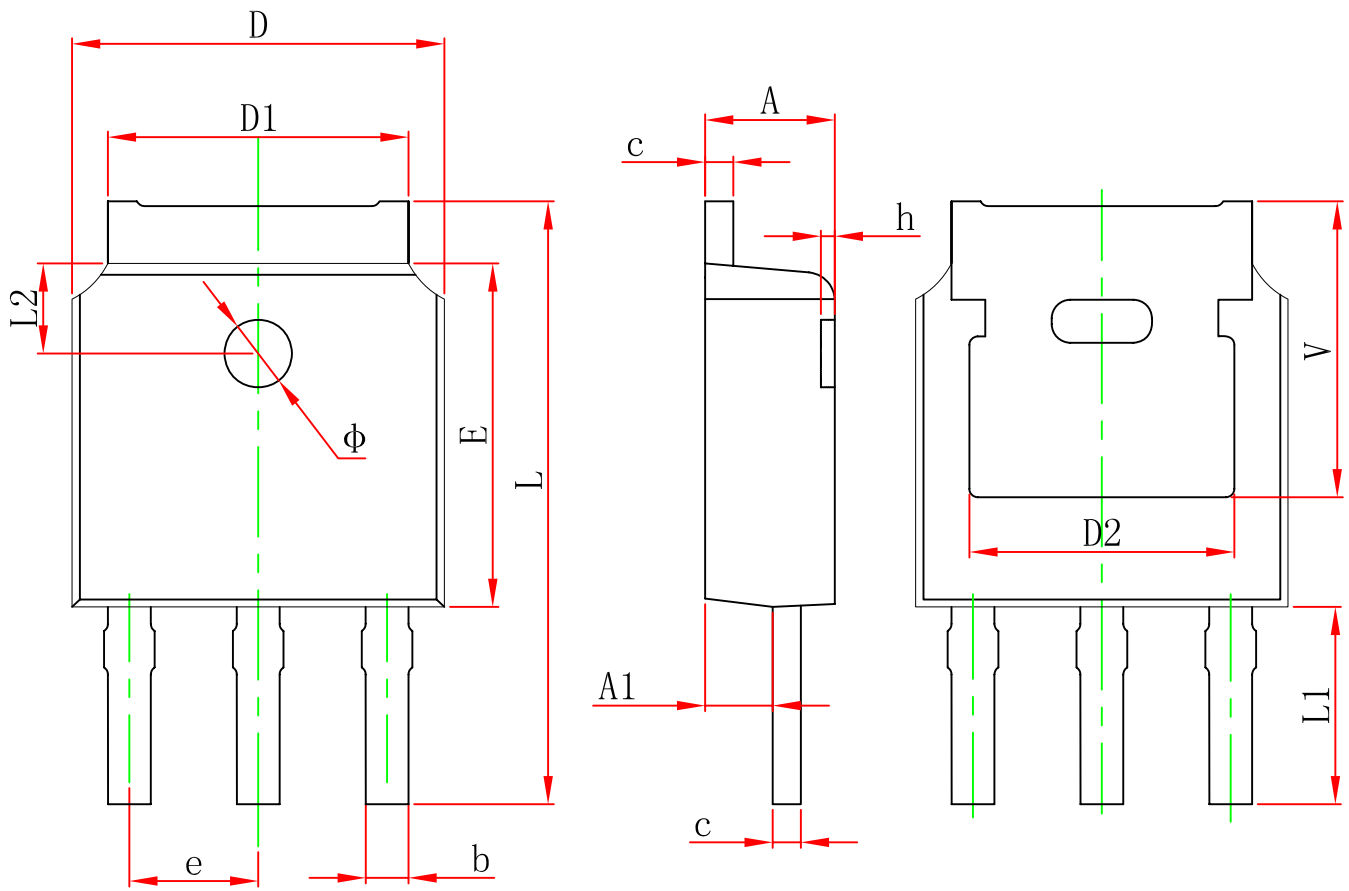
**Notes :**

1. L=30mH, I<sub>L</sub>=4 A, V<sub>DD</sub>=100V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
2. Pulse Test : Pulse width≤300μs, duty cycle ≤2%.
3. These parameters have no way to verify.

# Typical Characteristics



# TO-251S Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.860	1.160	0.034	0.046
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	10.400	11.000	0.409	0.433
L1	3.300	3.700	0.130	0.146
L2	1.600 REF.		0.063 REF.	
φ	1.100	1.300	0.043	0.051
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	