

General Description

The 516 is N-channel MOSFET device that features a low on-state resistance and excellent switching characteristics, and designed for low voltage high current applications such as DC/DC converter with synchronous rectifier.

Features

- Simple Drive Requirement
- Low Gate Charge
- Fast Switching
- Ultra-Low RDS(on)
- Green Device Available

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current ¹	46	A
$I_D@T_C=100^\circ C$	Continuous Drain Current ¹	36	A
I_{DM}	Pulsed Drain Current ²	170	A
EAS	Avalanche energy $L=0.1mH^2$	42	mJ
I_{AS}	Avalanche Current ²	29	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	50	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ^{4,5}	---	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction -Case	---	3	$^\circ C/W$

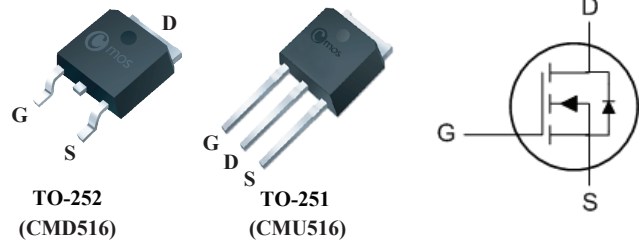
Product Summary

BVDSS	RDSON	ID
30V	5m Ω	46A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- DC/DC converter
- Motor drives

TO-252/251 Pin Configuration



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A	---	---	5	mΩ
		V _{GS} =4.5V, I _D =20A	---	---	10	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1	---	3	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =30V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	---	83	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.7	---	Ω
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _D =20A	---	18	---	nC
Q _{gs}	Gate-Source Charge		---	4.8	---	
Q _{gd}	Gate-Drain Charge		---	2.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =15V, V _{GS} =10V, R _{GEN} =3Ω R _L =0.75Ω	---	7.5	---	ns
T _r	Rise Time		---	4.8	---	
T _{d(off)}	Turn-Off Delay Time		---	24	---	
T _f	Fall Time		---	4.5	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1300	---	pF
C _{oss}	Output Capacitance		---	500	---	
C _{rss}	Reverse Transfer Capacitance		---	42	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ¹	V _G =V _D =0V, Force Current	---	---	46	A
I _{SM}	Pulsed Source Current ²		---	---	170	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

Note :

- The maximum current rating is package limited.
- Single pulse width limited by junction temperature T_J(MAX)=175°C.
- The power dissipation PD is based on T_J(MAX)=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- The RθJA is the sum of the thermal impedance from junction to case RθJC and case to ambient.
- The value of RθJA is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C. The Power dissipation PDSM is based on RθJA and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

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