250V N-Channel MOSFET

General Description

The 458A has been fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications.This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

Product Summary

BVDSS	RDSON	ID
250V	280mΩ	14A

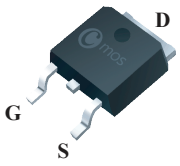
Applications

- PWM Motor Controls
- LED TV
- DC-DC Converters

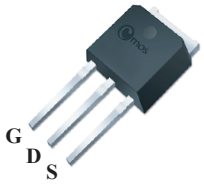
Features

- 14A,250V,$R_{DS(ON)}$<280mΩ @ V_{GS}=10V
- 100% avalanche tested
- Simple Drive Requirements
- RoHS Compliant

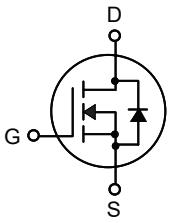
TO-252/251 Pin Configuration



TO-252
(CMD458A)



TO-251
(CMU458A)



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	250	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current [1]	14	A
I_D@T_C=100℃	Continuous Drain Current [1]	10	A
I_{DM}	Pulsed Drain Current [2]	56	A
EAS	Single Pulse Avalanche Energy [3]	98	mJ
I_{AR}	Avalanche Current [2]	3.4	A
P_D@T_C=25℃	Total Power Dissipation [1]	150	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [4,5]	---	55	℃/W
$R_{\theta JC}$	Thermal Resistance Junction -Case [6,7]	---	1	℃/W

Electrical Characteristics (T_J=25℃ , unless otherwise noted)

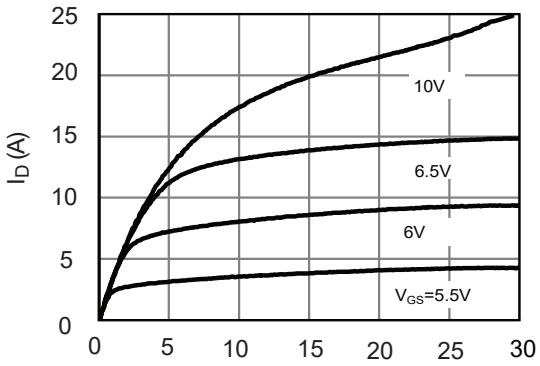
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA, T_J=25℃	250	---	---	V
BV_{DSS} /ΔTJ	Zero Gate Voltage Drain Current	I_D=250μA, V_{GS}=0V	---	0.27	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=7A	---	240	280	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D =250uA	3	---	5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}= 250V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±30V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V, I_D=7A	---	8	---	S
Q_g	Total Gate Charge	V_{DS}=200V, V_{GS}=10V, I_D=14A	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	3.8	---	
Q_{gd}	Gate-Drain Charge		---	4.6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=125V , V_{GS} =10V , R_G=25Ω I_D=14A	---	21	---	ns
T_r	Rise Time		---	58	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	33	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	650	---	pF
C_{oss}	Output Capacitance		---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	6.4	---	

Diode Characteristics

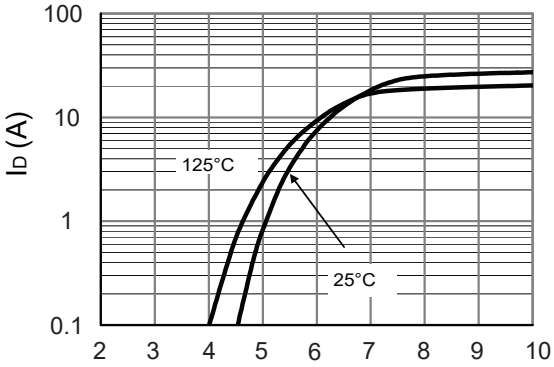
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	14	A
I_{SM}	Pulsed Source Current		---	---	56	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=14A, T_J=25℃	---	0.86	1.2	V
t_{rr}	Reverse Recovery Time	I_F=14A, V_{GS}=0V dI /dt=100A/μs	---	150	---	ns
Q_{rr}	Reverse Recovery Charge		---	1.24	---	μC

Note :
1. The power dissipation P_D is based on $T_{J(MAX)}$=175℃ in a TO-252 package, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
2. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=175℃.
3.The EAS data shows Max. rating .The test condition is V_{DS}=50V , V_{GS}=10V , L=1mH , I_{AS}=14A.
4. The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_A =25℃.
5.These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25℃.
6. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
7. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=175°C.

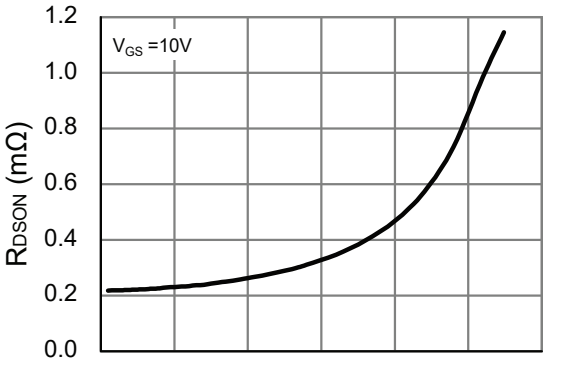
Typical Characteristics



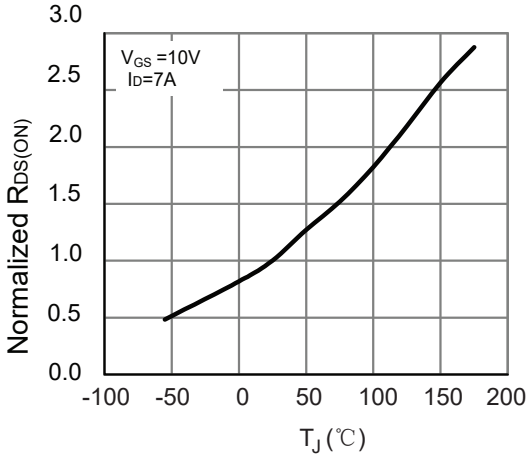
Output Characteristics



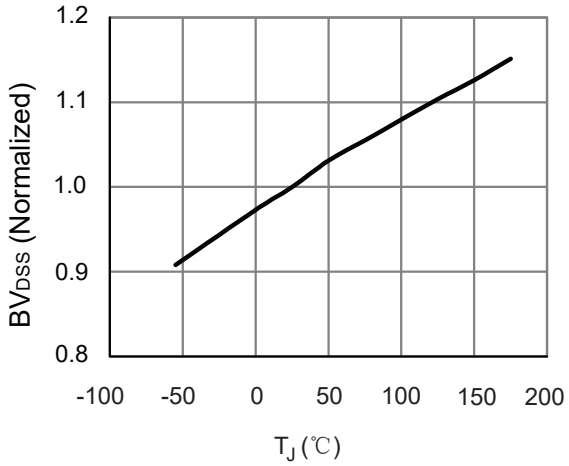
transfer characteristics



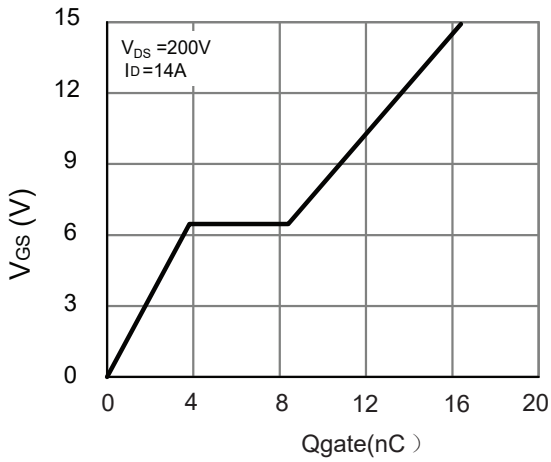
drain-source on-resistance



On-Resistance vs. Junction Temperature

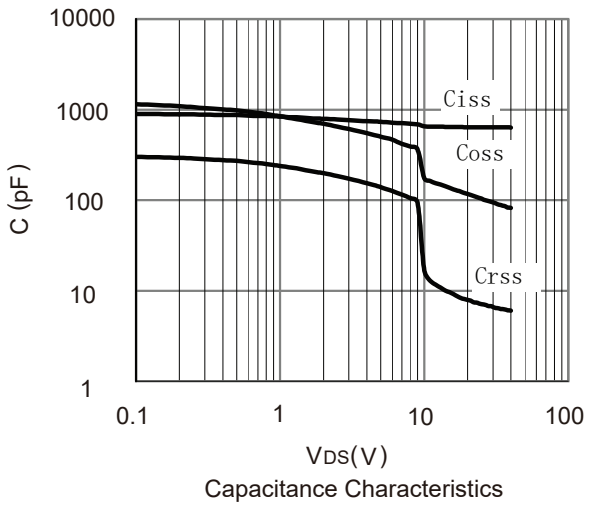


Break Down vs. Junction Temperature

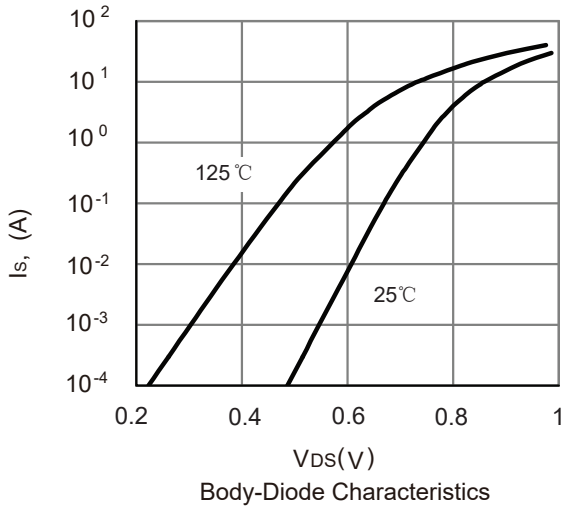


Gate charge vs gate-source voltage

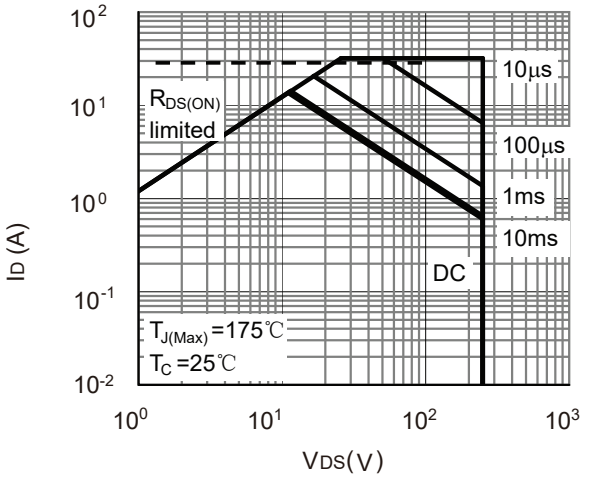
Typical Characteristics



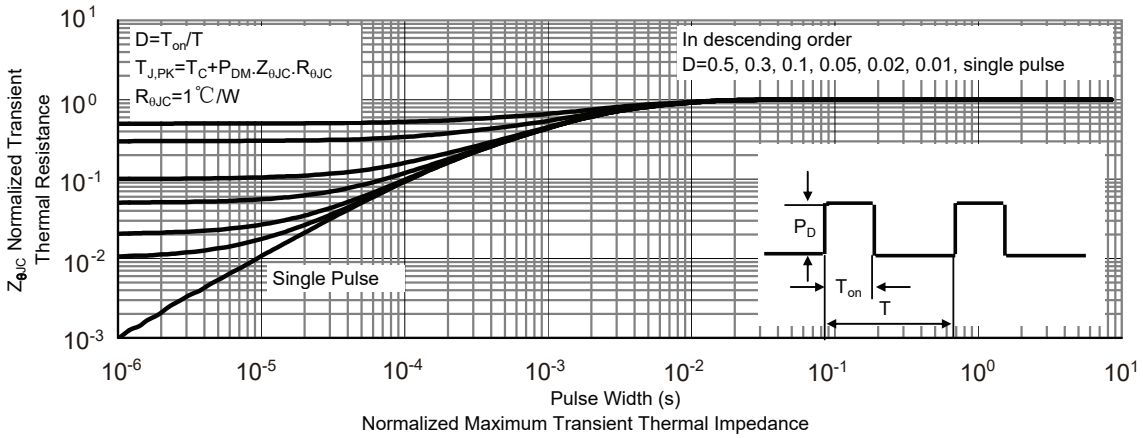
Capacitance Characteristics



Body-Diode Characteristics



Safe operating area



Normalized Maximum Transient Thermal Impedance