

General Description

The 1405 uses advanced process technology and design to provide excellent RDS(ON). It can be used in a wide variety of applications.

Features

- Low On-Resistance
- 100% avalanche tested
- Fast Switching
- RoHS Compliant

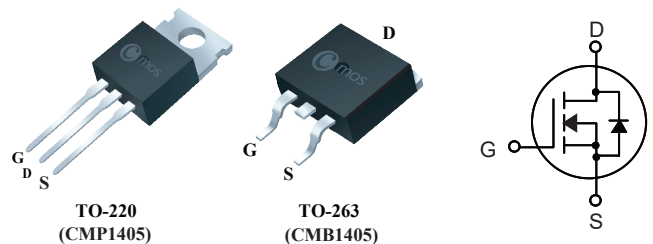
Product Summary

BVDSS	RDSON	ID
55V	5.5mΩ	140A

Applications

- Electric Power Steering
- Anti-lock Braking System
- Wiper Control
- Climate Control
- Power Door

TO-220/263 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	55	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	140	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	99	A
I_{DM}	Pulsed Drain Current	560	A
EAS	Single Pulse Avalanche Energy ¹	1012	mJ
$P_D@T_C=25^\circ\text{C}$	Power Dissipation	200	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	60	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.75	$^\circ\text{C/W}$

N-Channel Enhancement Mode Field Effect Transistor

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	55	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=40A$	---	4.5	5.5	$m\Omega$
		$V_{GS}=6V$, $I_D=30A$	---	5.7	6.8	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=10V$, $I_D=250\mu A$	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=48V$, $V_{GS}=0V$	---	---	1	μA
		$V_{DS}=48V$, $V_{GS}=0V@125^\circ\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=10V$, $I_D=20A$	---	34	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1.2	---	Ω
Q_g	Total Gate Charge	$I_D=101A$	---	160	---	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=44V$	---	40	---	
Q_{gd}	Gate-Drain Charge	$V_{GS}=10V$	---	58	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=38V$ $I_D=110A$ $R_G=1.1\Omega$, $V_{GS}=10V$	---	18	---	ns
T_r	Rise Time		---	175	---	
$T_{d(off)}$	Turn-Off Delay Time		---	138	---	
T_f	Fall Time		---	100	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	3400	---	pF
C_{oss}	Output Capacitance		---	600	---	
C_{rss}	Reverse Transfer Capacitance		---	470	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	140	A
I_{SM}	Pulsed Source Current		---	---	560	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=20A$, $T_J=25^\circ\text{C}$	---	---	1.3	V

Note :

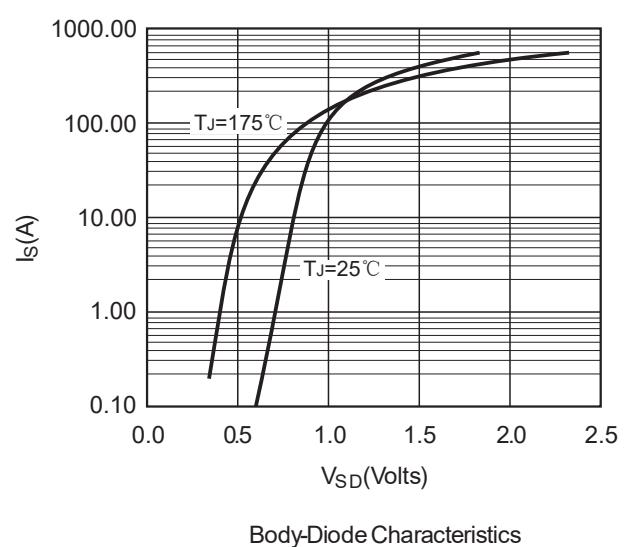
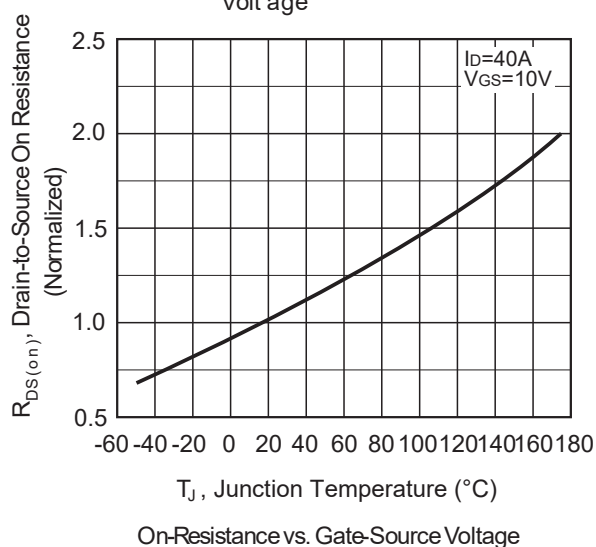
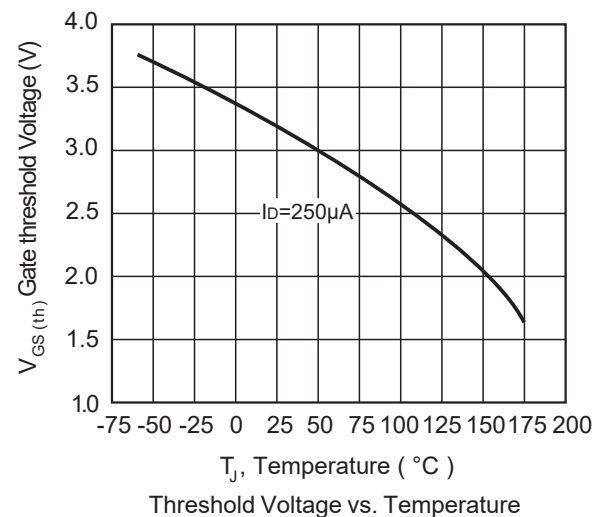
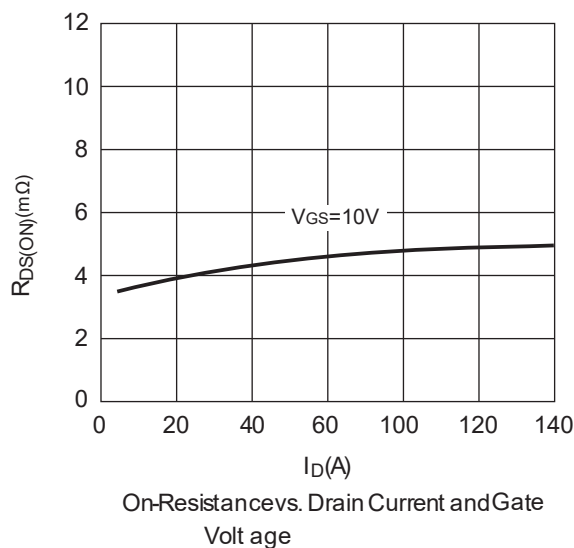
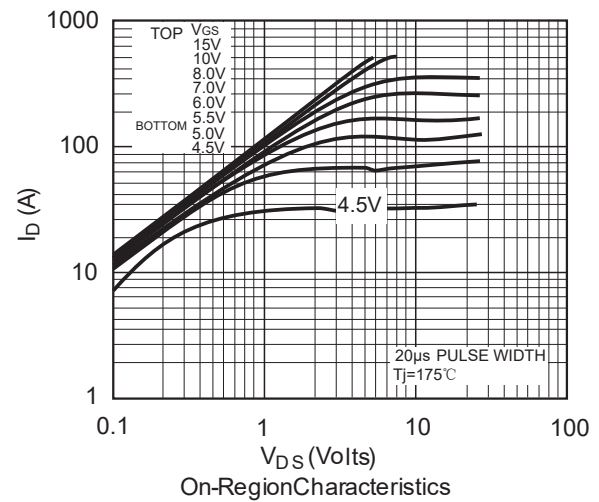
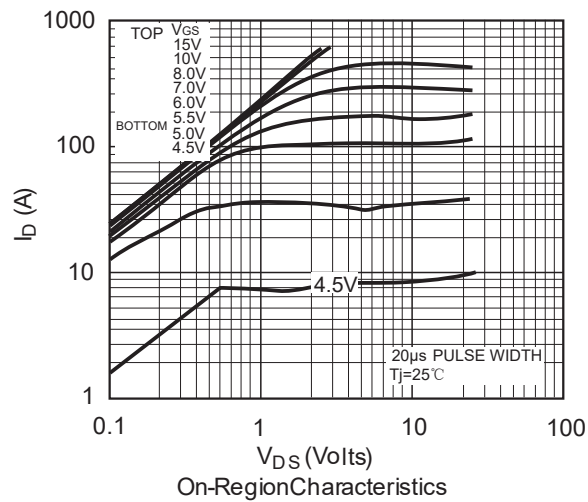
1.The EAS data shows Max. rating . The test condition is $V_{DD}=30V$, $V_{GS}=10V$, $L=1\text{mH}$, $I_{AS}=45A$.

This product has been designed and qualified for the consumer market.

Cmos assumes no liability for customers' product design or applications.

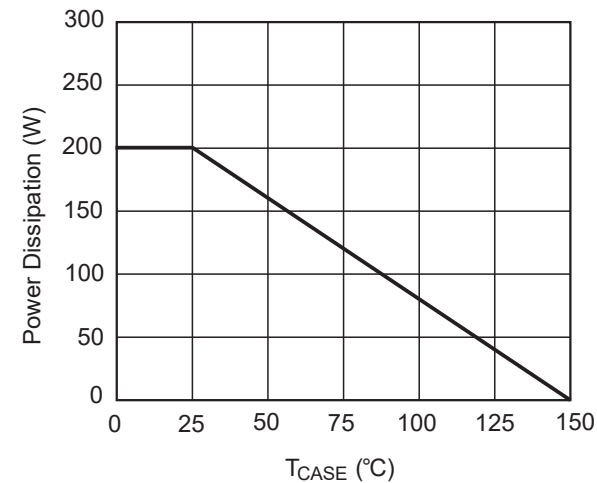
Cmos reserves the right to improve product design, functions and reliability without notice.

Typical Characteristics

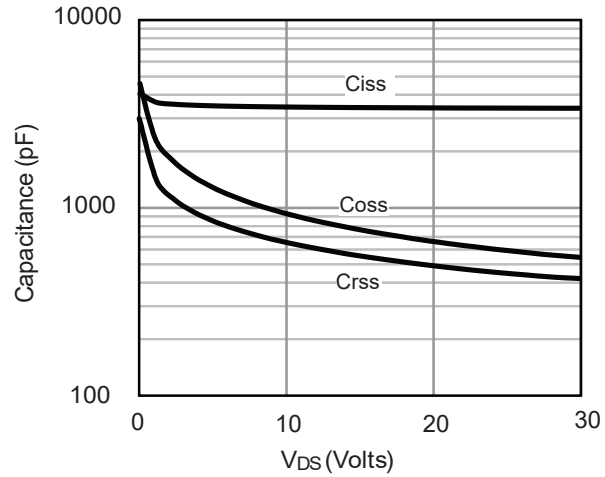


N-Channel Enhancement Mode Field Effect Transistor

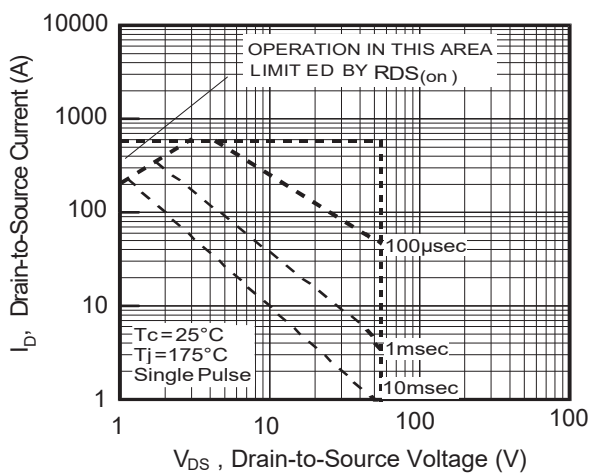
Typical Characteristics



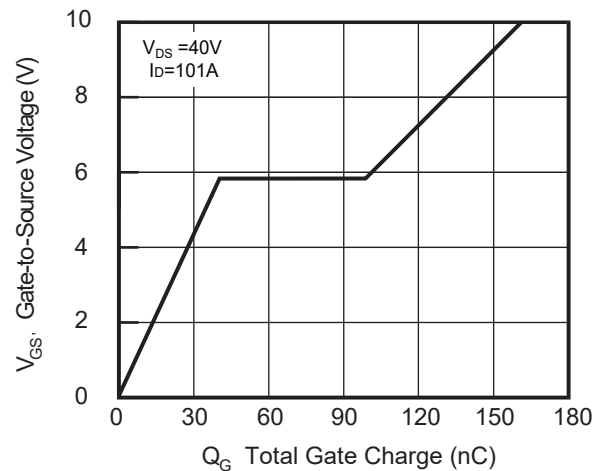
Power De-rating



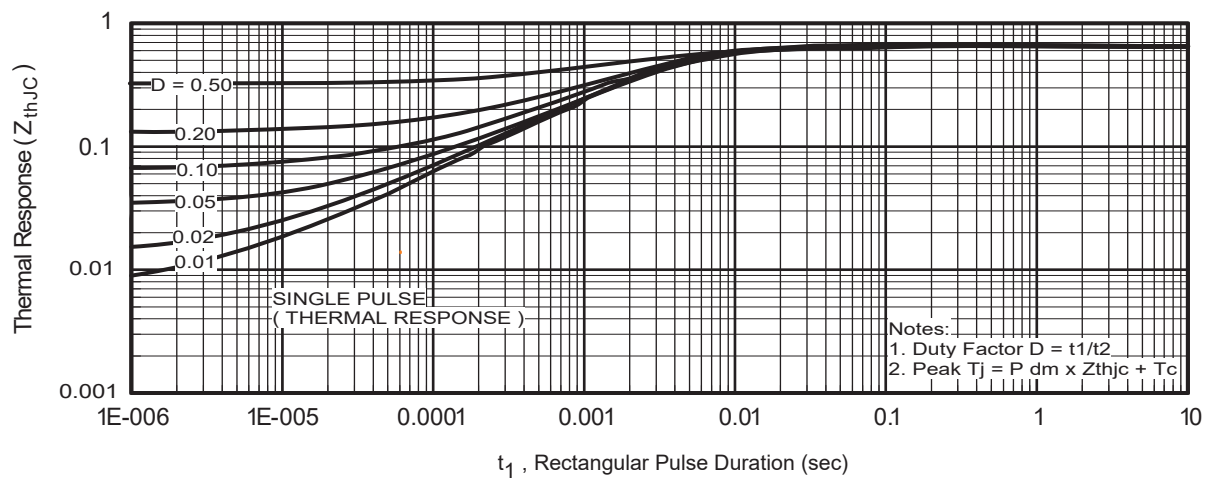
Capacitance Characteristics



Maximum Safe Operating Area



Typical Gate Charge vs. Gate-to-Source Voltage



Maximum Effective Transient Thermal Impedance, Junction-to-Case

Notes:
 1. Duty Factor $D = t_1/t_2$
 2. Peak $T_J = P_{dm} \times Z_{thJC} + T_C$