

General Description

The 1405 is a N-channel Power MOSFET. It has specifically been designed to minimize input capacitance and gate charge. The device is therefore suitable in advanced high-efficiency switching applications.

Features

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	55	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	140	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	99	A
I_{DM}	Pulsed Drain Current ¹	420	A
EAS	Single Pulse Avalanche Energy ²	550	mJ
$P_D@T_C=25^\circ C$	Power Dissipation	200	W
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Junction-to-Ambient (PCB mount) ³	---	40	°C/W
$R_{\theta JC}$	Junction-to-Case	---	0.75	°C/W

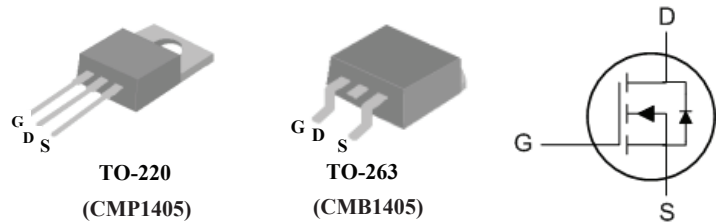
Product Summary

BVDSS	RDSON	ID
55V	5.5mΩ	140A

Applications

- LED power controller
- DC-DC & DC-AC converters
- High current, High speed switching
- Solenoid and relay drivers
- Motor control, Audio amplifiers

TO220 / TO263 Pin Configuration



N-Channel Enhancement Mode Field Effect Transistor

Electrical Characteristics ($T_J=25\text{ }^\circ\text{C}$, 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	
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.057	---	V/ $^\circ\text{C}$	
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=101A$	4	---	5.5	$m\Omega$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=10V, I_D=250\mu A$	2	---	4	V	
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=55V, V_{GS}=0V$	---	---	20	μA	
		$V_{DS}=44V, V_{GS}=0V@150^\circ\text{C}$	---	---	250		
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$	---	---	± 200	nA	
Q_g	Total Gate Charge	$I_D=101A$ $V_{DS}=44V$ $V_{GS}=10V$	---	160	---	nC	
Q_{gs}	Gate-Source Charge		---	40	---		
Q_{gd}	Gate-Drain Charge		4	---	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		4	---	138		---
T_f	Fall Time		---	100	---		
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	4800	---	pF	
C_{oss}	Output Capacitance		---	1080	---		
C_{rss}	Reverse Transfer Capacitance		---	250	---		

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 ¹		---	---	420	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=101A, T_J=25^\circ\text{C}$	4	---	1.3	V

Note :

- 1.Repetitive rating; pulse width limited by max. junction temperature.
- 2.Starting $T_J = 25^\circ\text{C}$, $L = 0.11\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 101A$.
- 3.This is applied to D2Pak, when mounted on 1" square PCB (FR-4 or G-10 Material).
- 4.Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.