

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 |

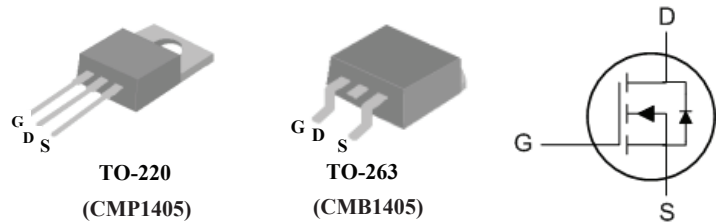
Product Summary

| 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 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------|------|-------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 55 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.057 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =101A 4 | --- | --- | 5.5 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =10V, I _D =250uA | 2 | --- | 4 | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =55V, V _{GS} =0V | --- | --- | 20 | uA |
| | | V _{DS} =44V, V _{GS} =0V@150°C | --- | --- | 250 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V | --- | --- | ±200 | nA |
| Q _g | Total Gate Charge | I _D =101A V _{DS} =44V V _{GS} =10V 4 | --- | 160 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 40 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 58 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DS} =38V I _D =110A R _G =1.1Ω, V _{GS} =10V 4 | --- | 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=1MHz | --- | 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°C 4 | --- | --- | 1.3 | V |

Note :

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