

T-39-27
**International
 IOR Rectifier**

HEXFET® Power Module

CPW200 Series Power H-Bridges

Description/Features

The CPW200 series of HEXFET power modules are intended for use in power supply and motor control applications. Connected in an H-bridge configuration, these modules are offered with voltages of 250 and 500V, with current ratings up to 16.1 amperes.

The CPW200 series simplifies circuit design and construction by replacing eight discrete devices with a single, electrically-isolated and tested part. Zener diodes are included across the gate of each HEXFET to greatly reduce the risk of electrostatic discharge damage. Dual source connections to each HEXFET allow the user to isolate the common node voltages caused by loadswitching currents into the driver circuits.

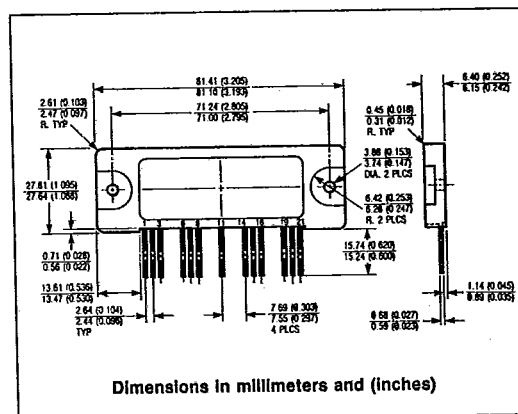
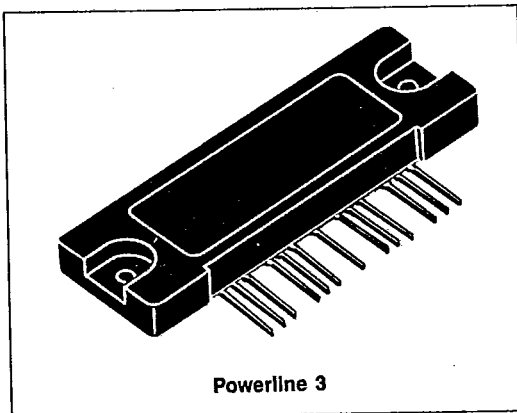
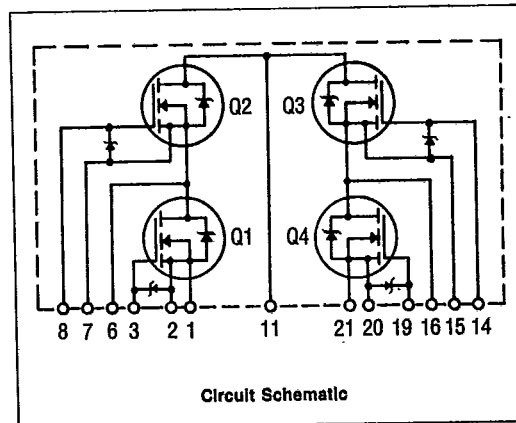
These modules minimize the space requirements of your power components while also serving to simplify thermal management and reduce assembly time and cost.

Typical Applications:

- Switching power supplies
- UPS systems
- AC or DC motor control
- High voltage amplifiers

Product Summary

Part Number	V _{DS}	R _{DS (on)}	I _D
CPW235P	250V	0.14Ω	16.1A
CPW255P	500V	0.40Ω	9.5A
CPW256P	500V	0.27Ω	13.9A



Absolute Maximum Ratings

Parameter	CPW235P	CPW255P	CPW256P	Units	Conditions/Notes
Breakdown Voltage	250	500	500	V	
Gate-to-Source Voltage	±20				
Continuous Current	16.1	9.5	13.9	A	Any two complementary devices, $T_C = 25^\circ\text{C}$
	14.7	8.7	12.7		Any two complementary devices, $T_C = 45^\circ\text{C}$
	10.1	6.0	8.8		Any two complementary devices, $T_C = 100^\circ\text{C}$
Operating & Storage Temperature	-40 to +150			°C	
Lead Temperature	300				1.6mm (0.063") from case for 10 sec
Mounting Torque	5.0 to 7.0			in • lb	For mounting & assy recommendations, see page 73
RMS Isolation Voltage	3750			V	Any pin to case

HEXFET Electrical Characteristics @ $T_C = 25^\circ\text{C}$ (Unless otherwise specified)

Parameter	Type	CPW235P	CPW255P	CPW256P	Units	Conditions/Note
BV_{DSS} Min. Drain Source Breakdown	N-Channel	250	500	500	V	$V_{GS} = 0, I_D = 250 \mu\text{A}, T_J = 25^\circ\text{C to } 150^\circ\text{C}$
$V_{GS(th)}$ Gate Threshold Voltage	N-Channel	2.0 to 4.0				$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$
I_{GSS} Max. Gate Source Leakage, Forward Voltage	N-Channel	500			nA	$V_{GS} = 20\text{V}$
	N-Channel	-500				$V_{GS} = -20\text{V}$
I_{DSS} Max. Zero Gate Voltage Drain Current	N-Channel	250			μA	$V_{DS} = \text{Max. Rating}, V_{GS} = 0\text{V}$
	N-Channel	1000				$V_{DS} = \text{Max. Rating} \times 80\%, V_{GS} = \text{V}, T_J = 125^\circ\text{C}$
$R_{DS(on)}$ Max. Static Drain-Source On-State Resistance of Die	N-Channel	0.14	0.40	0.27	Ω	$V_{GS} = 10\text{V}$, Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$
R_p Max. Resistance Contribution of Package		—				
g_{fs} Min. Forward Transconductance	N-Channel	11.0	9.3	13.0	S (1)	$V_{DS} = 2 \times V_{GS}, I_{DS} = \text{Max. } I_D \text{ Rating @ } 100^\circ\text{C}$

HEXFET Dynamic Characteristics @ $T_C = 25^\circ\text{C}$ (Unless otherwise specified)

Parameter	Type	CPW235P	CPW255P	CPV256P	Units	Conditions/Note
C_{iss} Typical Input Capacitance	N-Channel	2700	2700	4100	pF	$V_{GS} = 0V, V_{DS} = 25V, f = 1.0 \text{ MHz}$
C_{oss} Typical Output Capacitance	N-Channel	580	350	480		
C_{rss} Typical Reverse Transfer Capacitance	N-Channel	130	75	84		
$t_{d(on)}$ Max. Turn-on Delay Time	N-Channel	29	27	35	nS	$V_{DD} = 50\%$ of Rated Value, $I_D = \text{Max. Cont. Rating}$ (MOSFET switching times are essentially independent of operating temperature).
t_r Max. Rise Time	N-Channel	130	86	120		
$t_{d(off)}$ Max. Turn-off Delay Time	N-Channel	110	100	130		
t_f Max. Fall Time	N-Channel	98	60	98		
Q_g Max. Total Gate Charge	N-Channel	130	130	190	nC	$V_{GS} = 10V, I_D = \text{Max. Cont. Rating}, V_{DS} = \text{Max. Rating} \times 80\%$. (Gate charge is essentially independent of operating temperature).
Q_{gs} Typical Gate-to-Source Charge	N-Channel	14	11	18		
Q_{gd} Typical Gate-to-Drain ("Miller") Charge	N-Channel	73	43	62		

Source-Drain Diode Electrical Characteristics @ $T_C = 25^\circ\text{C}$ (Unless otherwise specified)

Parameter	Type	CPW235P	CPW255P	CPW256P	Units	Conditions/Note
I_S Max. Continuous Source Current (Body Diode)		16.1	9.5	13.9		
V_{SD} Max. Diode Forward Voltage	N-Channel	1.8	1.4	1.8	V	$V_{GS} = 0V, I_S = \text{Max. Rating}, T_J = 25^\circ\text{C}$
t_{rr} Max. Reverse Recovery Time	N-Channel	650	1200	1200	nS	$I_F = I_S \text{ Max. Rating}, dI_F/dt = 100 \text{ A}/\mu\text{S}, T_J = 25^\circ\text{C}$
Q_{RR} Max. Reverse Recovery Charge	N-Channel	8.4	14.0	18.0	μC	

CPW200 Series

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Thermal Characteristics

Parameter	CPW235P	CPW255P	CPW256P	Units	Conditions/Notes
R_{thJC} Max. Thermal Resistance Junction-to-Case	1.5	1.5	1.0	°C/W	Any one device
R_{thJA} Typical Thermal Resistance Junction-to-Ambient	25	25	25		
P_D Max. Power Dissipation	83	83	125	W	Any one device, $T_C = 25^\circ\text{C}$

For additional HEXFET characteristics, the electrical characteristic curves located from pages 37 to 72 can be referenced. This data represents the typical performance of each of the HEXFET die included in these power modules.

Parameter	Type	CPW235P	CPW255P	CPW256P	Conditions/Notes
HEXFET Electrical Characteristic Curves	N-Channel	IRFC254 See page 53	IRFC450 See page 59	IRFC460 See page 61	

These power modules can be manufactured in a variety of voltages and on-resistances along with substituted or additional components. For additional information on these semi-custom possibilities, refer to the Custom Capabilities section on page ix.