

VP0300M**352-810**

Siliconix

P-Channel Enhancement Mode Switch

MOSPOWER

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PIN 1 — Source
PIN 2 — Gate
PIN 3 & TAB — Drain



TO-237

1 2 3

PRODUCT SUMMARY

Part Number	BV_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
VP0300M	-30	2.5	TO-237

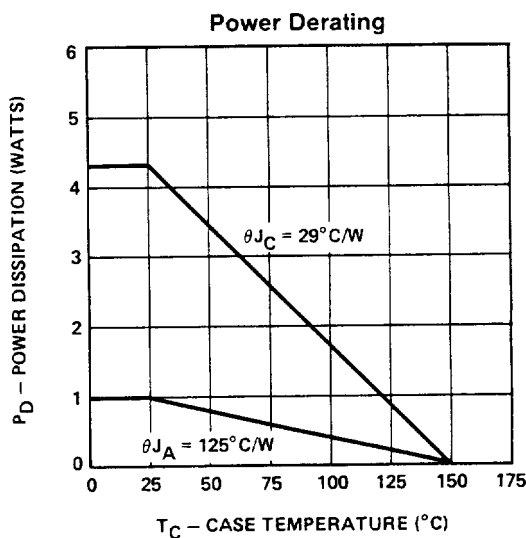
For Additional Curves
See Section 5: VPMH03

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	VP0300M	Units
V_{DS} Drain-Source Voltage	-30	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	-30	V
I_D @ $T_C = 25^\circ\text{C}$ Continuous Drain Current	± 0.5	A
I_D @ $T_C = 100^\circ\text{C}$ Continuous Drain Current	± 0.32	A
I_{DM} Pulsed Drain Current ¹	± 3	A
V_{GS} Gate-Source Voltage	± 40	V
P_D Max Continuous Power Dissipation	1	W
P_D Max Pulse ² Power Dissipation	4.3	W
Junction to Case Linear Derating Factor	0.034	W/ $^\circ\text{C}$
Junction to Ambient Linear Derating Factor	0.008	W/ $^\circ\text{C}$
T_J Operating and Storage Temperature Range	-55 To +150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	$^\circ\text{C}$

1 Pulse Test: Pulsewidth $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$

2 1 Sec Continuous Power Single Pulse



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	VP0300M	-30	-45		V	$V_{GS} = 0$ $I_D = -10\ \mu\text{A}$
$V_{GS(th)}$ Gate-Threshold Voltage	VP0300M	-2	-3.4	-4.5	V	$V_{DS} = V_{GS}$, $I_D = -1\ \text{mA}$
I_{GSSF} Gate-Body Leakage Forward	VP0300M		-1	-100	nA	$V_{GS} = -30\text{V}$, $V_{DS} = 0$
I_{GSSR} Gate-Body Leakage Reverse	VP0300M		1	100	nA	$V_{GS} = +30\text{V}$, $V_{DS} = 0$
I_{DSS} Zero Gate Voltage Drain Current	VP0300M		-1	-10	μA	$V_{DS} = -25\text{V}$, $V_{GS} = 0$
	VP0300M		-50	-500	μA	$V_{DS} = -25\text{V}$, $V_{GS} = 0$ $T_C = 125^\circ\text{C}$
$I_{D(on)}$ On-State Drain Current ¹	VP0300M	-1.5	-1.7		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = -12\text{V}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹	VP0300M		-2.2	-2.5	V	$V_{GS} = -12\text{V}$, $I_D = -1\text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	VP0300M		2.2	2.5	Ω	$V_{GS} = -12\text{V}$, $I_D = -1\text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	VP0300M		3.2	3.63	Ω	$V_{GS} = -12\text{V}$, $I_D = -1\text{A}$, $T_C = 125^\circ\text{C}$

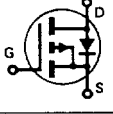
DYNAMIC

g_{fs} Forward Transconductance ¹	VP0300M	200	300		mS(V)	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = -0.5\text{A}$
C_{iss} Input Capacitance	VP0300M		125	150	pF	$V_{GS} = 0$, $V_{DS} = -15\text{V}$ $f = 1\ \text{MHz}$
C_{oss} Output Capacitance	VP0300M		92	100	pF	
C_{rss} Reverse Transfer Capacitance	VP0300M		25	60	pF	
$t_{d(on)}$ Turn-On Delay Time	VP0300M		20	30	ns	$V_{DD} = -25\text{V}$, $I_D \cong -1\text{A}$ $R_g = 25\Omega$, $R_L = 23\Omega$ (MOSFET switching times are essentially independent of operating temperature)
$t_{d(off)}$ Turn-Off Delay Time	VP0300M		20	30	ns	

THERMAL RESISTANCE

R_{thJC} Junction-to-Case	VP0300M		24	29	$^\circ\text{C/W}$	
R_{thJA} Junction-to-Ambient	VP0300M			125	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S Continuous Source Current (Body Diode)	VP0300M			0.5	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I_{SM} Source Current ¹ (Body Diode)	VP0300M			3	A	
V_{SD} Diode Forward Voltage ¹	VP0300M		1.2		V	$T_C = 25^\circ\text{C}$, $I_S = 0.5\text{A}$, $V_{GS} = 0$

¹ Pulse Test Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

Data Sheet Curves VPMH03