

DESCRIPTION

Power MOS V(R) MOSFET in ultra low profile patented Powermite 3(TM) package provides the designer with the best combination of fast Switching, ruggedized device design, low on-resistance, cost effectiveness in the industry's smallest high power surface mount package.

The UPF1N50 is ideal for ultra small motor control and switch mode power supply applications.

The Powermite 3 is designed for surface mounting using vapor phase, infrared, or wave soldering techniques. With power dissipation levels up to 1.8 Watts, the Powermite 3 offers similar power handling capability to device 4 times its size by using a patented full metal wrap around bottom.

IMPORTANT: For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

KEY FEATURES

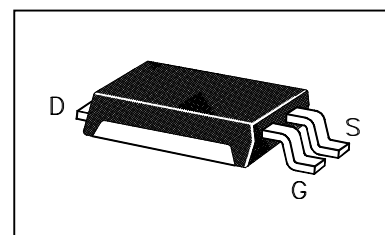
- POWERMITE 3 Surface Mount Package
- Low On-State Resistance
- High Frequency Switching
- Ultra Low Leakage current
- Integral Heat Sink / Locking Tabs
- Supplied in 16mm Tape and Reel – 6000 units/reel
- Superior Low Thermal And Electrical capability

APPLICATIONS/BENEFITS

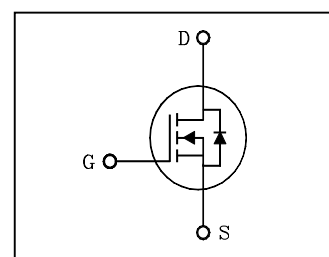
- Motor Control
- Switch Mode Power Supplies

MECHANICAL CHARACTERISTICS
POWERMITE 3 Surface Mount Package

- Footprint Area of 16.51 mm²
- Case: Molded Epoxy
- Meets UL94VO at 1/8 inch
- Weight: 72 milligrams
- Lead and Mounting Temperatures: 260 °C max for 10 seconds


MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Drain-to-Source Voltage	V _{DSS}	500	Volts
Drain-to-Source Voltage	V _{GS}	+/-20	Volts
Continuous Drain Current @ TC = 25°C	I _{D1}	1.0	Amps
Continuous Drain Current @ TC = 100°C	I _{D2}	0.8	Amps
Operating & Storage Junction Temperature Range	T _J , T _{STG}	- 40 to + 125	°C
Total Power Dissipation	PD (1)	1.8	Watts


THERMAL CHARACTERISTICS

STEADY-STATE THERMAL RESISTANCE:	SYMBOL	VALUE	UNIT
Junction-to-Tab	R _{θJ-TAB}	2.0	°C/Watts
(1) Junction-to-ambient	R _{θJA} (1)	55	°C/Watts
(2) Junction-to-ambient	R _{θJA} (2)	120	°C/Watts

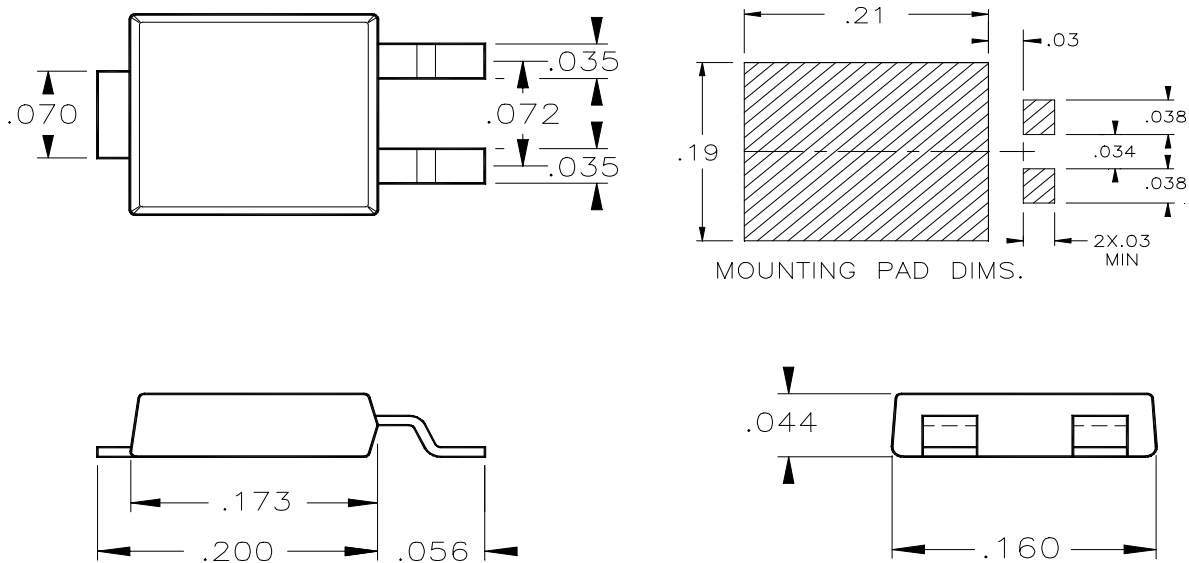
- (1) Mounted on 2" square by 0.06" thick FR4 board with a 1" x 1" square 2-ounce cooper pattern.
 (2) Mounted on 0.06" thick FR4 board, using recommended footprint.

STATIC ELECTRICAL CHARACTERISTICS

SYMBOL	CHARACTERISTICS / TEST CONDITIONS	UPF1N50			Units
		Min	Typ	Max	
BV_{DSS}	Drain to Source Breakdown Voltage (VGS=0V, ID=0.25mA)	500			Volts
$V_{GS(TH)2}$	Gate Threshold Voltage (VDS≥VGS, ID=1mA, TJ=37°C)	2.0	3.4	4.0	Volts
$V_{GS(TH)1}$	Gate Threshold Voltage (VDS≥VGS, ID=1mA, TJ=25°C)		3.5		Volts
$R_{DS(ON)1}$	Drain to Source ON-State Resistance (VGS=10V, ID=1.0A, TJ=25°C)		2.7	3.5	Ohms
I_{DSS1}	Zero Gate Voltage-Drain Current (VDS=400V, VGS=0V, TJ= 25°C)			2	uA
I_{DSS2}	Zero Gate Voltage-Drain Current (VDS=400V, VGS=0V, TJ=125°C)			250	UA
I_{GSS1}	Gate to Source Leakage Current (VGS= ±20V, VDS=0V, TJ = 25°C)			±100	nA

STATIC ELECTRICAL CHARACTERISTICS

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	Min	Typ	Max	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}$		200	250	pF
C_{oss}	Output Capacitance	$V_{DS} = 50\text{ V}$		30	50	pF
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{ MHz}$		15	20	PF
Q_g	Total Gate Charge	$V_{GS} = 10\text{ V}$		20		nC
Q_{gs}	Gate to Source Charge	$V_{DS} = 0.5 V_{DSS}$		1.0		nC
Q_{gd}	Gate to Drain Charge	$I_D = 10\text{ Ma}$		10		nC
$t_d(on)$	Turn-ON Delay Time	Resistive Switching (25°C)		20		ns
t_r	Rise Time	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 BV_{DSS}$		10		ns
t_d	Turn-OFF Delay Time	$I_D = 20\text{ mA}$		30		ns
t_f	Fall Time	$R_g = 1.6\ \Omega$		30		us
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1\text{ A}, T_J = 25^\circ\text{C}$		0.85	1.2	V
t_{rr}	Reverse Recovery Time	$I_S = 1\text{ A}, di/dt = 100\text{ A/us}$			150	ns
Q_{rr}	Reverse Recovery Charge	$I_S = 1\text{ A}, di/dt = 100\text{ A/us}$			0.8	uC



DIMENSIONS ARE NOMINAL INCHES

MECHANICAL SPECIFICATIONS