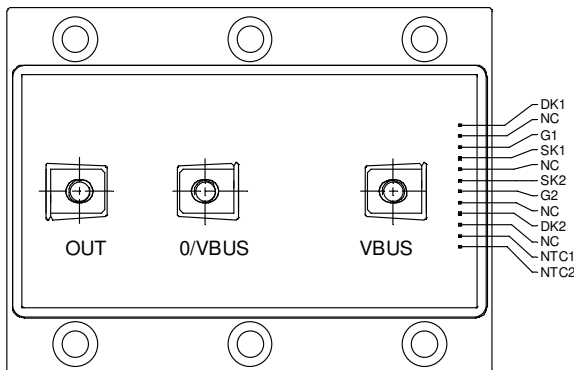
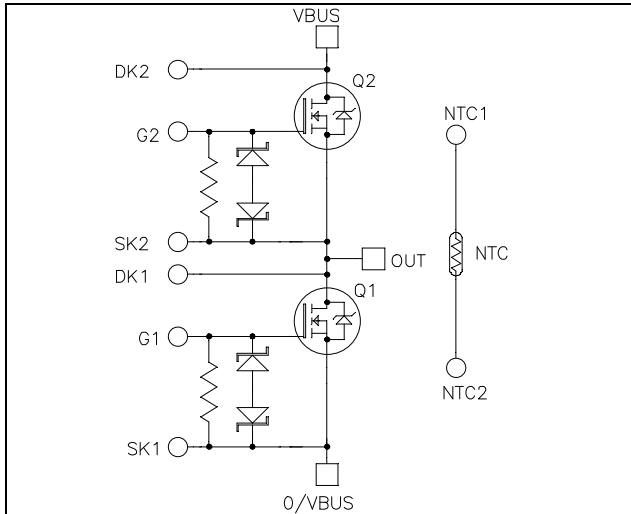


Phase leg MOSFET Power Module

$$V_{DSS} = 500V$$

$$R_{DSon} = 25m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 149A \text{ @ } T_c = 25^\circ C$$



Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Power MOS V[®] FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Kelvin Drain for VDS monitoring
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals for signal and M5 for power for easy PCB mounting
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	149
		$T_c = 80^\circ C$	111
I_{DM}	Pulsed Drain current	450	A
V_{GS}	Gate - Source Voltage	$\pm 15^*$	V
R_{DSon}	Drain - Source ON Resistance	25	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
I_{AR}	Avalanche current (repetitive and non repetitive)	149	A
E_{AR}	Repetitive Avalanche Energy	30	mJ
E_{AS}	Single Pulse Avalanche Energy	1300	

* Limited by internal zener protection.

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.
See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 500V$			1000	μA
		$V_{GS} = 0V, V_{DS} = 400V$			2500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 74.5A$			25	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 8\text{mA}$	2		4	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 15V, V_{DS} = 0V$			± 250	nA
R	Gate Source input impedance			10		$\text{k}\Omega$

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{MHz}$		29.6		nF
C_{oss}	Output Capacitance			4.1		
C_{rss}	Reverse Transfer Capacitance			1.6		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 250V$ $I_D = 149A$		1200		nC
Q_{gs}	Gate – Source Charge			200		
Q_{gd}	Gate – Drain Charge			560		
$T_{d(on)}$	Turn-on Delay Time	Resistive Switching $V_{GS} = 15V$ $V_{Bus} = 250V$ $I_D = 149A$ $R_G = 0.22 \Omega$		15		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			50		
T_f	Fall Time			10		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
I_S	Continuous Source current (Body diode)		$T_c = 25^\circ\text{C}$			149	A
			$T_c = 80^\circ\text{C}$			111	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -149A$			1.3	V	
dv/dt	Peak Diode Recovery ①				5	V/ns	
t_{rr}	Reverse Recovery Time	$I_S = -149A$ $V_R = 250V$ $di_s/dt = 800A/\mu\text{s}$	$T_j = 25^\circ\text{C}$			250	ns
			$T_j = 125^\circ\text{C}$			500	
Q_{rr}	Reverse Recovery Charge	$I_S = -149A$ $V_R = 250V$ $di_s/dt = 800A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		10.4	μC	
			$T_j = 125^\circ\text{C}$		36		

① dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -149A \quad di/dt \leq 700A/\mu\text{s} \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resisatnce			0.1	°C/W	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I isol<1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M5	2	3.5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight			550	g	

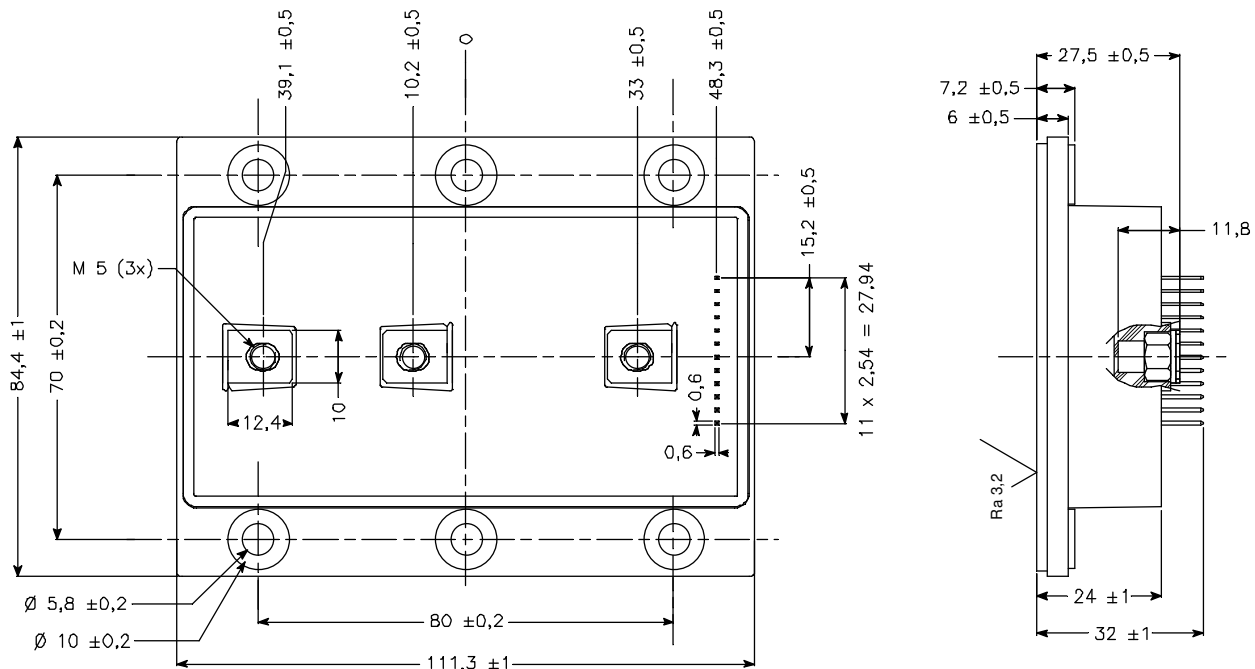
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

Package outline (dimensions in mm)



Microsemi reserves the right to change, without notice, the specifications and information contained herein

Microsemi's products are covered by one or more of U.S patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 7,352,045 5,283,201 5,801,417 5,648,283 7,196,634 6,664,594 7,157,886 6,939,743 7,342,262 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.