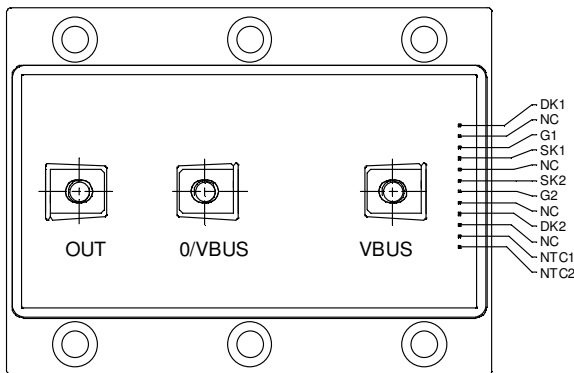
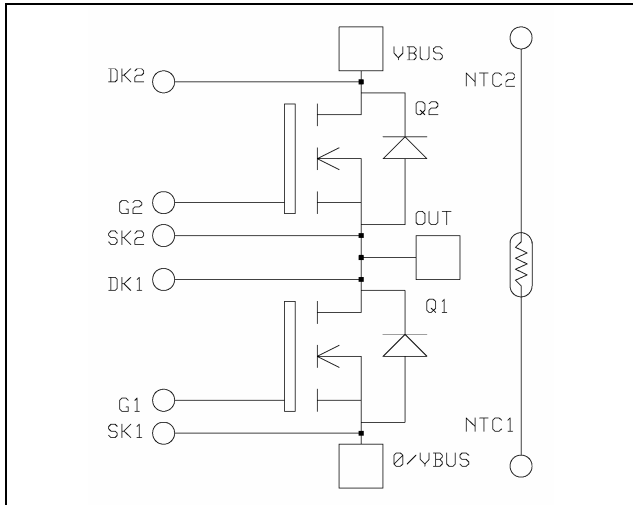


*Phase leg  
MOSFET Power Module*

**$V_{DSS} = 200V$**   
 **$R_{DSon} = 5m\Omega \text{ max @ } T_j = 25^\circ C$**   
 **$I_D = 333A \text{ @ } T_c = 25^\circ C$**



**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

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	333
		$T_c = 80^\circ C$	249
$I_{DM}$	Pulsed Drain current	700	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	5	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
$I_{AR}$	Avalanche current (repetitive and non repetitive)	333	A
$E_{AR}$	Repetitive Avalanche Energy	30	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1300	

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

## Electrical Characteristics

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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$BV_{DSS}$	Drain - Source Breakdown Voltage	$V_{GS} = 0V, I_D = 1mA$	200			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 200V$			1000	$\mu A$
		$V_{GS} = 0V, V_{DS} = 160V$			2500	
$R_{DS(on)}$	Drain - Source on Resistance	$V_{GS} = 10V, I_D = 166.5A$			5	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 8mA$	2		4	V
$I_{GSS}$	Gate - Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 250$	nA

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$		40.8		nF
$C_{oss}$	Output Capacitance			9.1		
$C_{rss}$	Reverse Transfer Capacitance			3.1		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 100V$ $I_D = 333A$		1184		nC
$Q_{gs}$	Gate - Source Charge			376		
$Q_{gd}$	Gate - Drain Charge			600		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive Switching</b> $V_{GS} = 15V$ $V_{Bus} = 100V$ $I_D = 333A$ $R_G = 0.22 \Omega$		15		ns
$T_r$	Rise Time			25		
$T_{d(off)}$	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)		$T_c = 25^\circ\text{C}$		333	A
			$T_c = 80^\circ\text{C}$		249	
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = -333A$			1.3	V
dv/dt	Peak Diode Recovery ❶				8	V/ns
$t_{rr}$	Reverse Recovery Time	$I_S = -333A$ $V_R = 100V$ $di_s/dt = 800A/\mu s$	$T_j = 25^\circ\text{C}$		240	ns
			$T_j = 125^\circ\text{C}$		420	
$Q_{rr}$	Reverse Recovery Charge	$I_S = -333A$ $V_R = 100V$ $di_s/dt = 800A/\mu s$	$T_j = 25^\circ\text{C}$	8		$\mu C$
			$T_j = 125^\circ\text{C}$	16		

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

$$I_S \leq -333A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

## Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case			0.1	°C/W	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t = 1 min, I <sub>isol</sub> < 1mA, 50/60Hz	2500			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°C	
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	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	

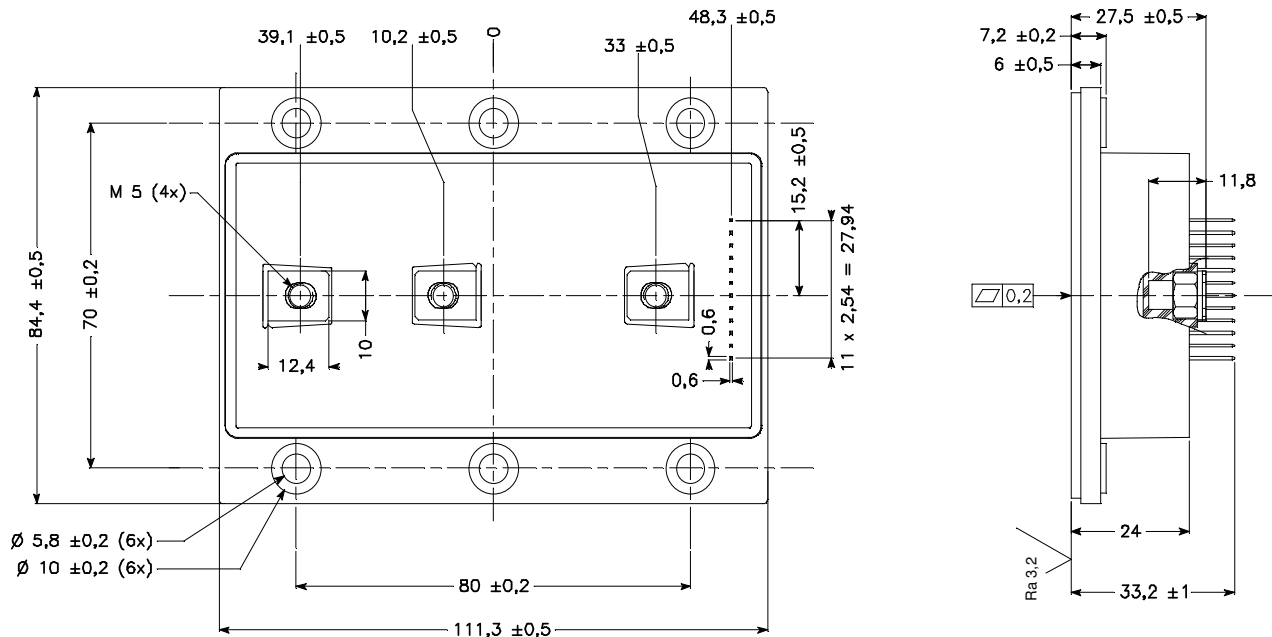
## Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		68		kΩ
B <sub>25/85</sub>	T <sub>25</sub> = 298.16 K		4080		K

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

T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

## Package outline



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

APT'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 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.