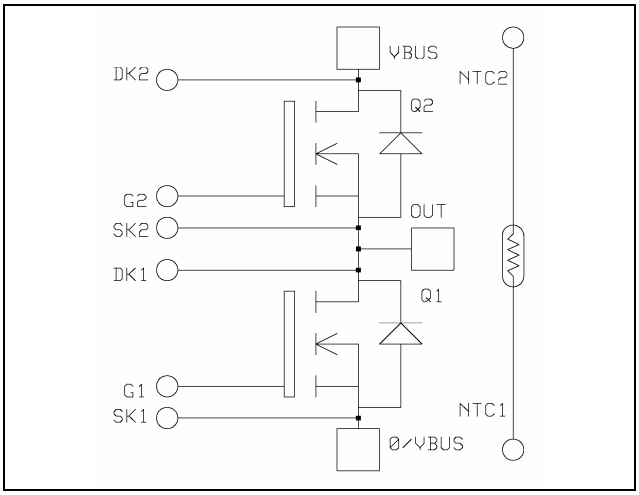
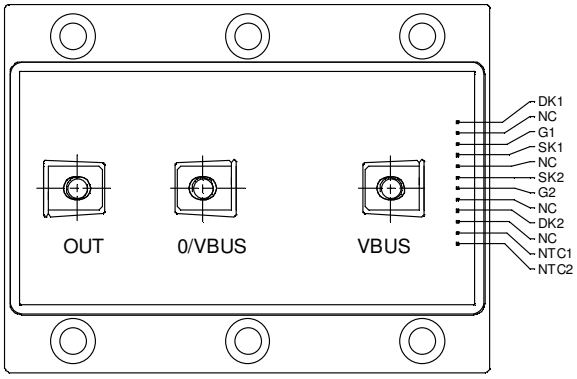
Phase leg MOSFET Power Module

V_{DSS} = 500V
R_{DSon} = 25mΩ max @ Tj = 25°C
I_D = 149A @ Tc = 25°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		500	V
I_D	Continuous Drain Current	T_c = 25°C	149	A
		T_c = 80°C	111	
I_{DM}	Pulsed Drain current		450	
V_{GS}	Gate - Source Voltage		±30	V
R_{DSon}	Drain - Source ON Resistance		25	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	1250	W
I_{AR}	Avalanche current (repetitive and non repetitive)		149	A
E_{AR}	Repetitive Avalanche Energy		30	mJ
E_{AS}	Single Pulse Avalanche Energy		1300	

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

Electrical Characteristics

All ratings @ T_j = 25°C unless otherwise specified

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
BV_{DSS}	Drain - Source Breakdown Voltage	V_{GS} = 0V, I_D = 1mA		500			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0V,V_{DS} = 500V	T_j = 25°C			1000	µA
		V_{GS} = 0V,V_{DS} = 400V	T_j = 125°C			2500	
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 74.5A				25	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 8mA		2		4	V
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±30 V, V_{DS} = 0V				±250	nA

Dynamic Characteristics

Symbol	*Characteristic*	*Test Conditions*	*Min*	*Typ*	*Max*	*Unit*
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1MHz		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 Ω		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)		Tc = 25°C			149	A
			Tc = 80°C			111	
V_{SD}	Diode Forward Voltage	V_{GS} = 0V, I_S = - 149A				1.3	V
dv/dt	Peak Diode Recovery ❶					5	V/ns
t_{rr}	Reverse Recovery Time	I_S = - 149A V_R = 250V di_S/dt = 800A/µs	T_j = 25°C			250	ns
			T_j = 125°C			500	
Q_{rr}	Reverse Recovery Charge	I_S = - 149A V_R = 250V di_S/dt = 800A/µs	T_j = 25°C		10.4		µC
			T_j = 125°C		36		

❶ dv/dt numbers reflect the limitations of the circuit rather than the device itself.
$I_S \le$ - 149A di/dt ≤ 700A/µs $V_R \le V_{DSS}$ $T_j \le$ 150°C

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R_{thJC}	Junction to Case					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

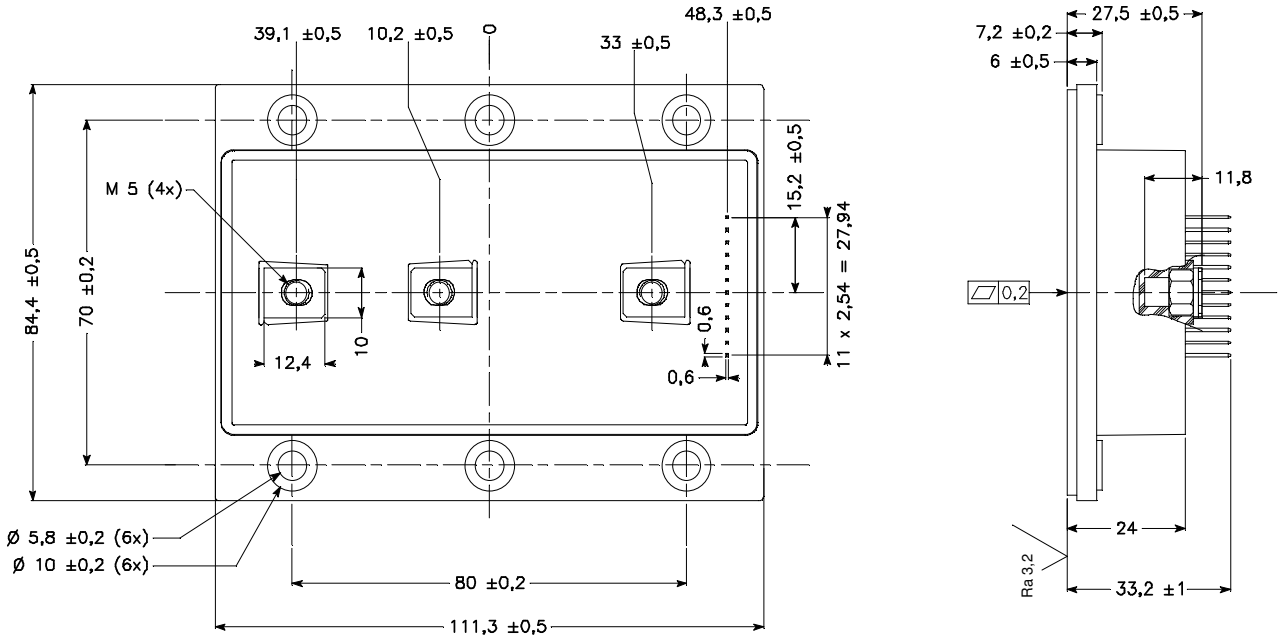
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		68		kΩ
$B_{25/85}$	T_{25} = 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_T: 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.