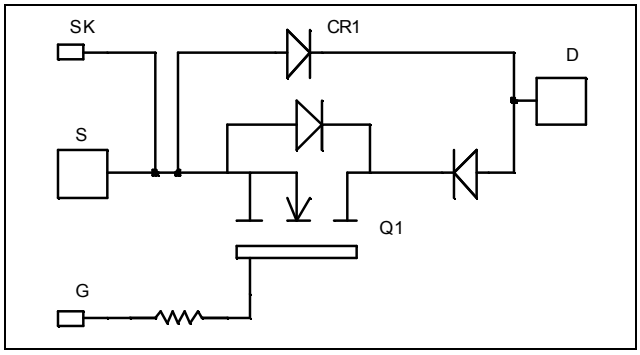
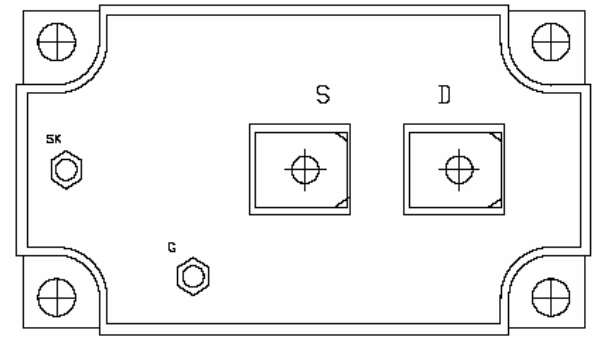
APTM100U13S

Single switch
Series & parallel diodes
MOSFET Power Module

V_{DSS} = 1000V
R_{DSon} = 130mΩ typ @ Tj = 25°C
I_D = 65A @ Tc = 25°C





Application

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

Features

- Power MOS V® MOSFETs
  - Low R_{DSon}
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{DSS}	Drain - Source Breakdown Voltage		1000	V
I_D	Continuous Drain Current	T_c = 25°C	65	A
		T_c = 80°C	48	
I_{DM}	Pulsed Drain current		260	
V_{GS}	Gate - Source Voltage		±30	V
R_{DSon}	Drain - Source ON Resistance		145	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	1250	W
I_{AR}	Avalanche current (repetitive and non repetitive)		17	A
E_{AR}	Repetitive Avalanche Energy		50	mJ
E_{AS}	Single Pulse Avalanche Energy		2500	

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

All ratings @ T_j = 25°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} = 1000V	T_j = 25°C			100	µA
		V_{GS} = 0V, V_{DS} = 800V	T_j = 125°C			400	
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 32.5A			130	145	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 10mA		2		4	V
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±30 V, V_{DS} = 0V				±200	nA

Dynamic Characteristics

Symbol	*Characteristic*	*Test Conditions*	*Min*	*Typ*	*Max*	*Unit*
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1MHz		26.4	31.6	nF
C_{oss}	Output Capacitance			2.38	3.32	
C_{rss}	Reverse Transfer Capacitance			1.16	1.72	
Q_g	Total gate Charge	V_{GS} = 10V V_{Bus} = 500V I_D = 65A		1340	2000	nC
Q_{gs}	Gate – Source Charge			116	180	
Q_{gd}	Gate – Drain Charge			660	1000	
$T_{d(on)}$	Turn-on Delay Time	**Inductive Switching @ 25°C** V_{GS} = 15V V_{Bus} = 667V I_D = 65A R_G = 1.5Ω		20		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			125		
T_f	Fall Time			40		
E_{on}	Turn-on Switching Energy	**Inductive switching @ 25°C** V_{GS} = 15V, V_{Bus} = 667V I_D = 65A, R_G = 1.5Ω		2.6		µJ
E_{off}	Turn-off Switching Energy			1.6		
E_{on}	Turn-on Switching Energy	**Inductive switching @ 125°C** V_{GS} = 15V, V_{Bus} = 667V I_D = 65A, R_G = 1.5Ω		4.2		µJ
E_{off}	Turn-off Switching Energy			1.82		
R_{thJC}	Junction to Case				0.1	°C/W

Series diode ratings and characteristics

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			200			V
I_{RM}	Maximum Reverse Leakage Current	V_R=200V	T_j = 25°C			350	µA
			T_j = 125°C			600	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	T_c = 80°C		120		A
V_F	Diode Forward Voltage	I_F = 120A			1.1	1.15	V
		I_F = 240A			1.4		
		I_F = 120A	T_j = 125°C		0.9		
t_{rr}	Reverse Recovery Time	I_F = 120A V_R = 133V di/dt = 400A/µs	T_j = 25°C		31		ns
			T_j = 125°C		60		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		120		nC
			T_j = 125°C		500		
R_{thJC}	Junction to Case					0.46	°C/W

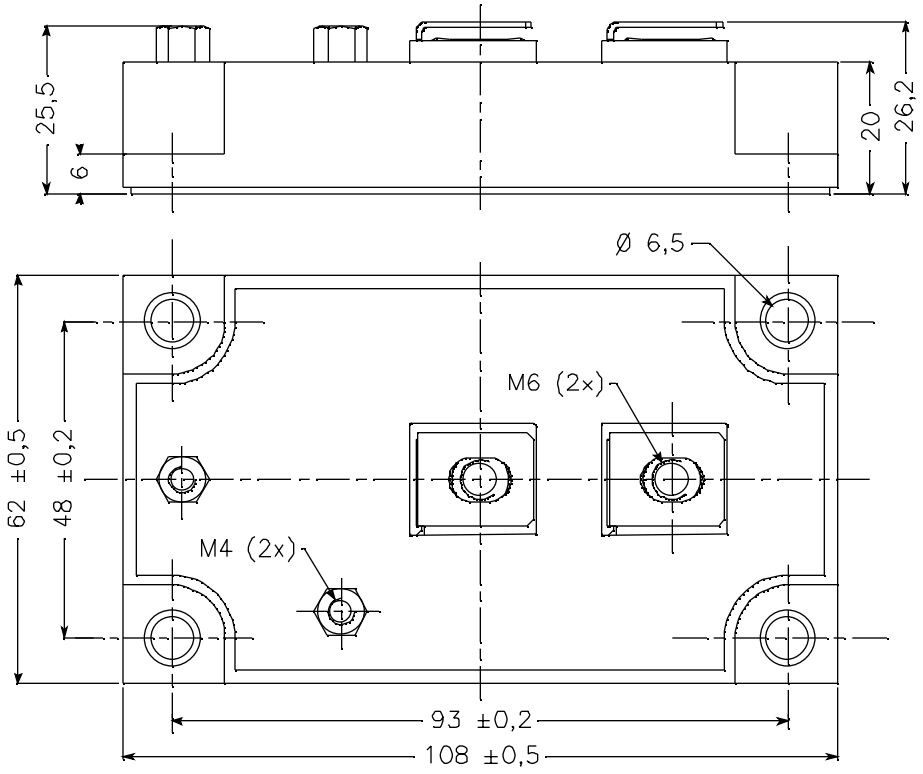
Parallel diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1000			V
I_{RM}	Maximum Reverse Leakage Current	V_R=1000V	T_j = 25°C			250	µA
			T_j = 125°C			500	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	T_c = 40°C		100		A
V_F	Diode Forward Voltage	I_F = 100A			1.9	2.5	V
		I_F = 200A			2.2		
		I_F = 100A	T_j = 125°C		1.7		
t_{rr}	Reverse Recovery Time	I_F = 100A V_R = 667V di/dt = 200A/µs	T_j = 25°C		300		ns
			T_j = 125°C		360		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		800		nC
			T_j = 125°C		4050		
R_{thJC}	Junction to Case					0.6	°C/W

Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
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	M4			1.2	N.m
		M6	3		5	
Wt	Package Weight				400	g

J3 Package outline (dimensions in mm)



Typical Performance Curve