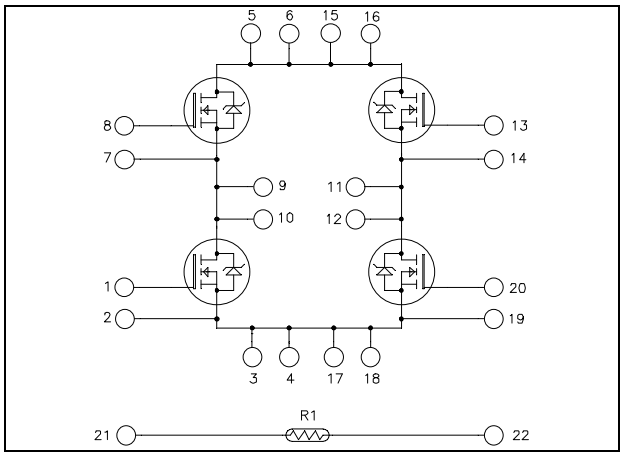
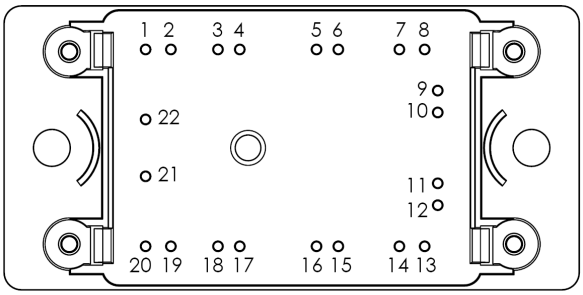
APTC90H12T2G

Full - Bridge Super Junction MOSFET Power Module

V_{DSS} = 900V
R_{DSon} = 120mΩ max @ Tj = 25°C
I_D = 30A @ Tc = 25°C





Pins 5/6/15/16 ; 3/4/17/18 ; 9/10 ; 11/12 must be shorted together

Application

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

Features

- CoolMOS™
  - Ultra low R_{DSon}
  - Low Miller capacitance
  - Ultra low gate charge
  - Avalanche energy rated
  - Very rugged
- Very low stray inductance
- 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 both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

All ratings @ T_j = 25°C unless otherwise specified

Absolute maximum ratings (per CoolMOS™)

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{DSS}	Drain - Source Breakdown Voltage		900	V
I_D	Continuous Drain Current	T_c = 25°C	30	A
		T_c = 80°C	23	
I_{DM}	Pulsed Drain current		75	
V_{GS}	Gate - Source Voltage		±20	V
R_{DSon}	Drain - Source ON Resistance		120	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	250	W
I_{AR}	Avalanche current (repetitive and non repetitive)		8.8	A
E_{AR}	Repetitive Avalanche Energy		2.9	mJ
E_{AS}	Single Pulse Avalanche Energy		1940	

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

Electrical Characteristics (per CoolMOS™)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0V, V_{DS} = 900V	T_j = 25°C			100	µA
		V_{GS} = 0V, V_{DS} = 900V	T_j = 125°C		500		
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 26A			100	120	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 3mA		2.5	3	3.5	V
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0V				100	nA

Dynamic Characteristics (per CoolMOS™)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS} = 0V ; V_{DS} = 100V f = 1MHz			6.8		nF
C_{oss}	Output Capacitance				0.33		
Q_g	Total gate Charge	V_{GS} = 10V V_{Bus} = 400V I_D = 26A			270		nC
Q_{gs}	Gate – Source Charge				32		
Q_{gd}	Gate – Drain Charge				115		
$T_{d(on)}$	Turn-on Delay Time	**Inductive Switching (125°C)** V_{GS} = 10V V_{Bus} = 600V I_D = 26A R_G = 7.5Ω			70		ns
T_r	Rise Time				20		
$T_{d(off)}$	Turn-off Delay Time				400		
T_f	Fall Time				25		
E_{off}	Turn-off Switching Energy	**Inductive switching** V_{GS} = 10V; I_D = 26A V_{Bus} = 600V; R_G = 7.5Ω	T_j = 25°C		0.75		mJ
E_{off}	Turn-off Switching Energy		T_j = 125°C		0.85		mJ
R_{thJC}	Junction to Case Thermal Resistance					0.5	°C/W

Source - Drain diode ratings and characteristics (per CoolMOS™)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)		Tc = 25°C			30	A
			Tc = 80°C			23	
V_{SD}	Diode Forward Voltage	V_{GS} = 0V, I_S = - 26A			0.8	1.2	V
t_{rr}	Reverse Recovery Time	I_S = - 26A V_R = 400V di_S/dt = 200A/µs	T_j = 25°C		920		ns
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		30		µC

Temperature sensor NTC

Symbol	*Characteristic*	*Min*	*Typ*	*Max*	*Unit*
R_{25}	Resistance @ 25°C		22		kΩ
$\Delta R_{25}/R_{25}$	Resistance tolerance			5	%
$\Delta B/B$	Beta tolerance			3	
$B_{25/100}$	T_{25} = 298.16 K		3980		K

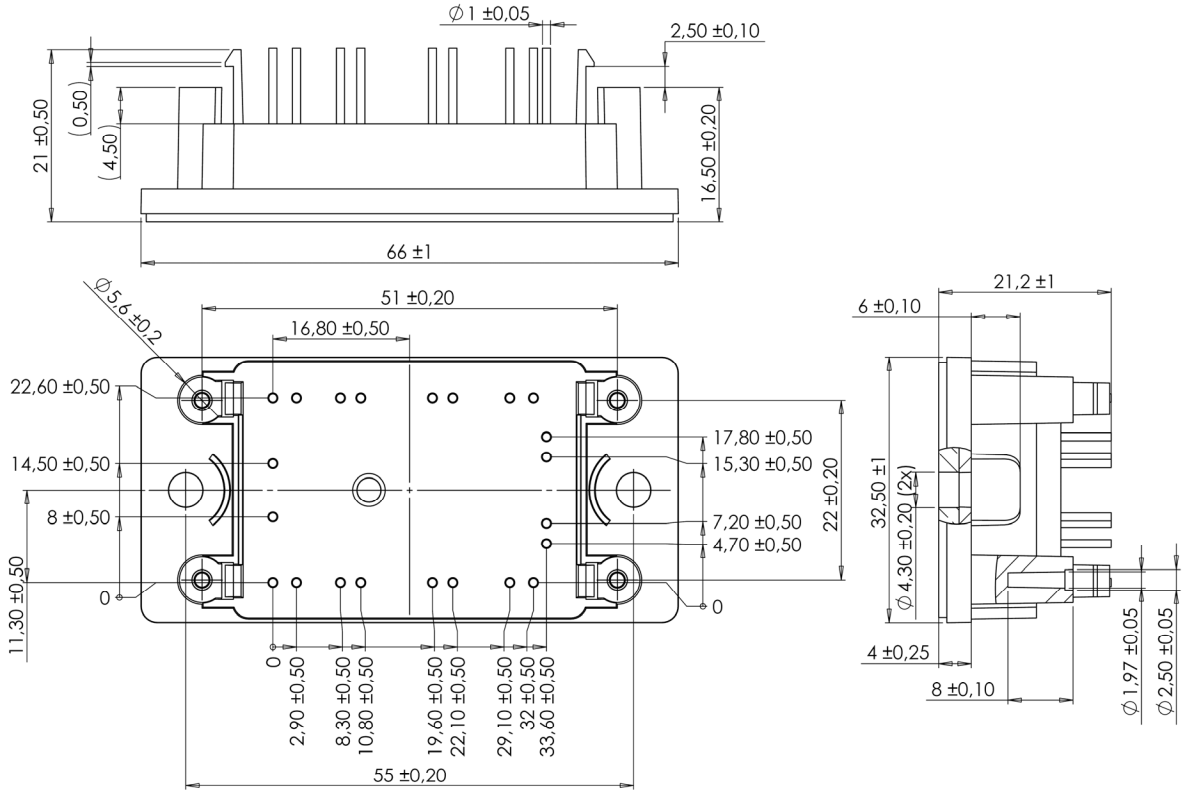
$$R_T = \frac{R_{25}}{\exp\left[B_{25/100}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

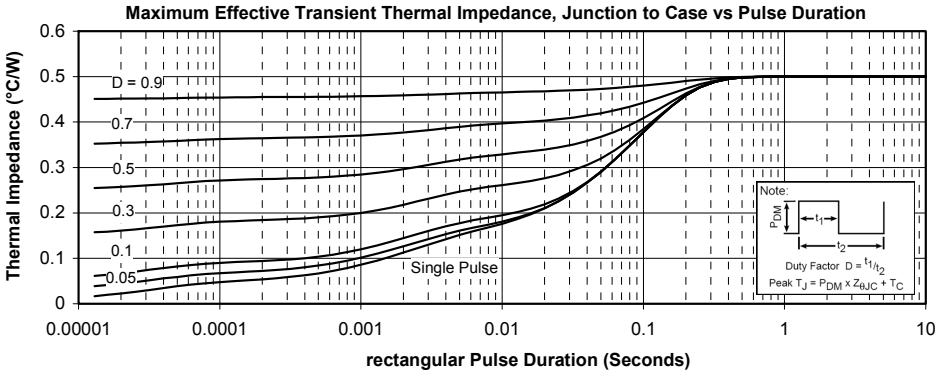
Thermal and package characteristics

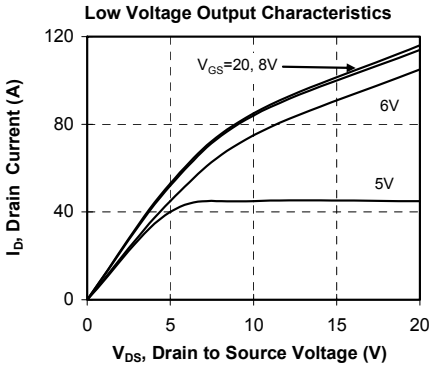
Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		150	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M4	2		3	N.m
Wt	Package Weight					75	g

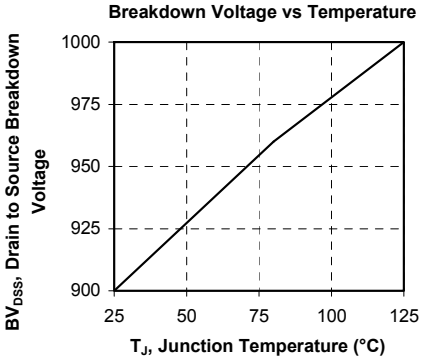
Package outline (dimensions in mm)

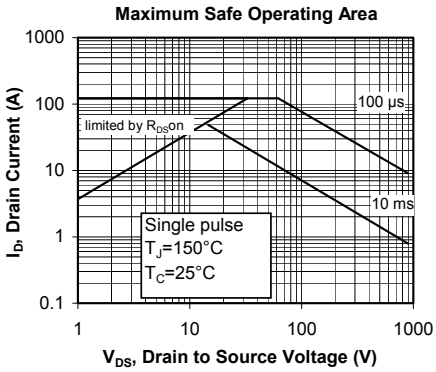


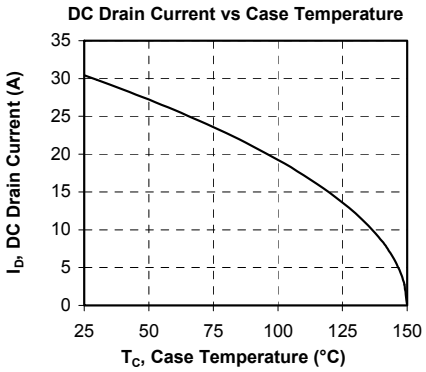
Typical performance Curve (per CoolMOS™)

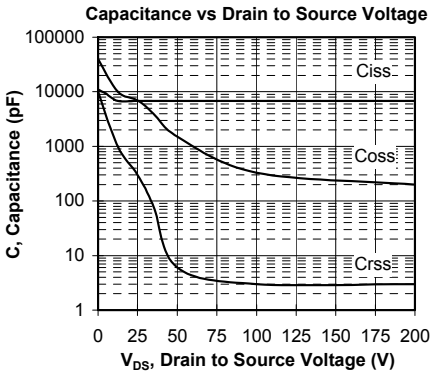


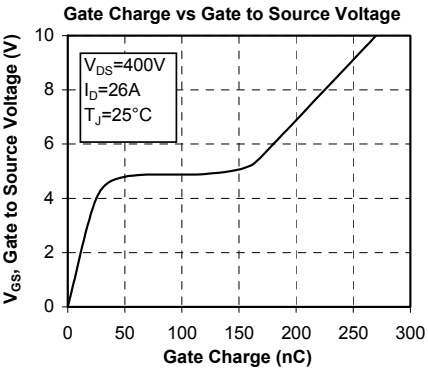


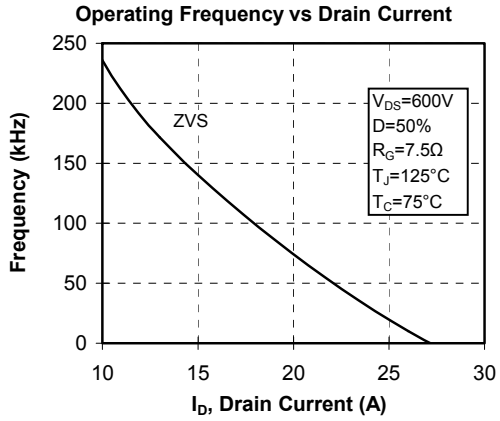


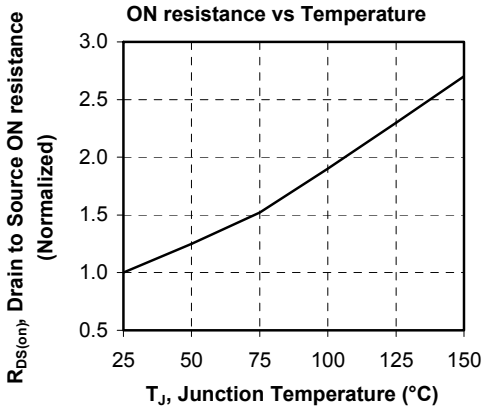


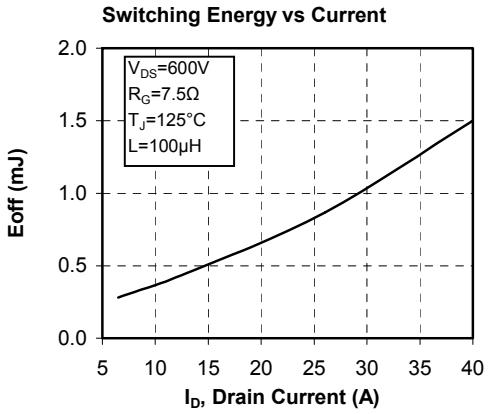


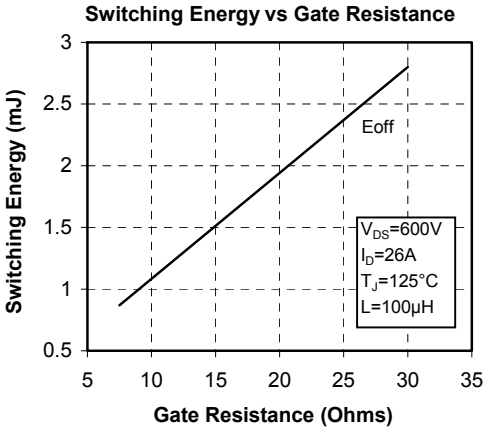












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