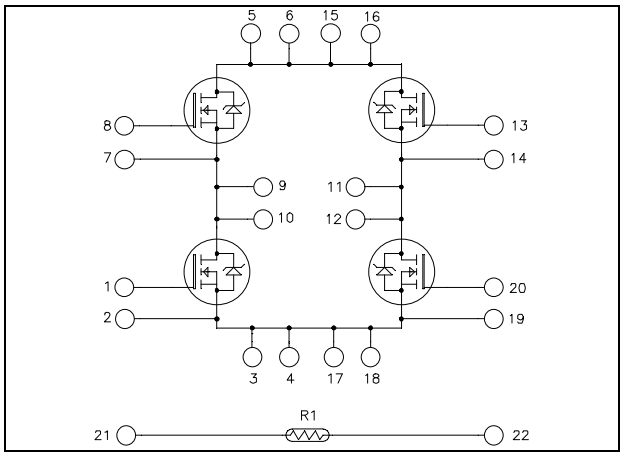
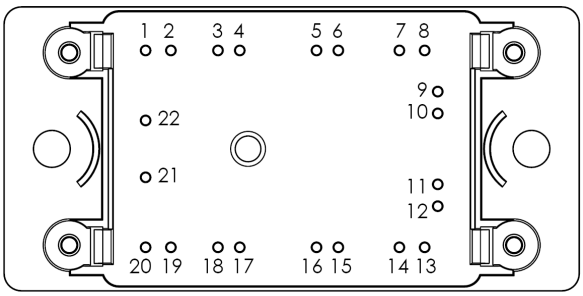
APTC60HM83FT2G

Full bridge
Super Junction MOSFET
Power Module

V_{DSS} = 600V
R_{DSon} = 83mΩ max @ Tj = 25°C
I_D = 36A @ 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
  - Fast intrinsic diode
  - 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		600	V
I_D	Continuous Drain Current	T_c = 25°C	36	A
		T_c = 80°C	27	
I_{DM}	Pulsed Drain current		100	
V_{GS}	Gate - Source Voltage		±20	V
R_{DSon}	Drain - Source ON Resistance		83	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	250	W
I_{AR}	Avalanche current (repetitive and non repetitive)		20	A
E_{AR}	Repetitive Avalanche Energy		1	mJ
E_{AS}	Single Pulse Avalanche Energy		1800	

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} = 600V	T_j = 25°C			50	µA
		V_{GS} = 0V, V_{DS} = 600V	T_j = 125°C			5	mA
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 18A				83	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 3mA		3	4	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} = 25V f = 1MHz			7290		pF
C_{oss}	Output Capacitance				1735		
C_{rss}	Reverse Transfer Capacitance				41		
Q_g	Total gate Charge	V_{GS} = 10V V_{Bus} = 300V I_D = 36A			255		nC
Q_{gs}	Gate – Source Charge				43		
Q_{gd}	Gate – Drain Charge				135		
$T_{d(on)}$	Turn-on Delay Time	**Inductive Switching @ 125°C** V_{GS} = 15V V_{Bus} = 400V I_D = 36A R_G = 5Ω			21		ns
T_r	Rise Time				30		
$T_{d(off)}$	Turn-off Delay Time				240		
T_f	Fall Time				52		
E_{off}	Turn-off Switching Energy	**Inductive switching** V_{GS} = 15V, I_D = 36A R_G = 5Ω, V_{Bus} = 400V	T_J=25°C		590		µJ
E_{off}	Turn-off Switching Energy		T_J=125°C		725		
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		36		A
			Tc = 80°C		27		
V_{SD}	Diode Forward Voltage	V_{GS} = 0V, I_S = - 36A				1.2	V
dv/dt	Peak Diode Recovery					40	V/ns
t_{rr}	Reverse Recovery Time	I_S = - 36A V_R = 400V di_S/dt = 200A/µs	T_j = 125°C		350		ns
Q_{rr}	Reverse Recovery Charge		T_j =125°C		5.4		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

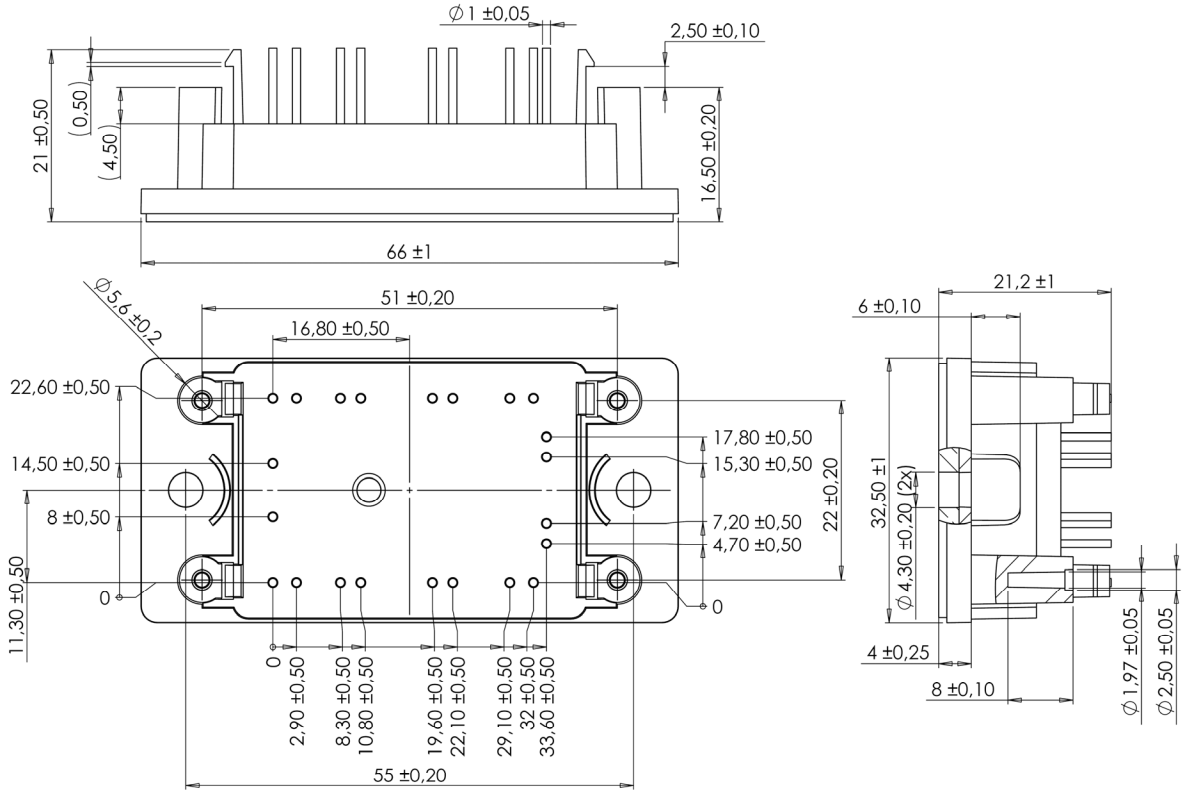
$$R_T = \frac{R_{25}}{\exp\left[B_{25/100}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

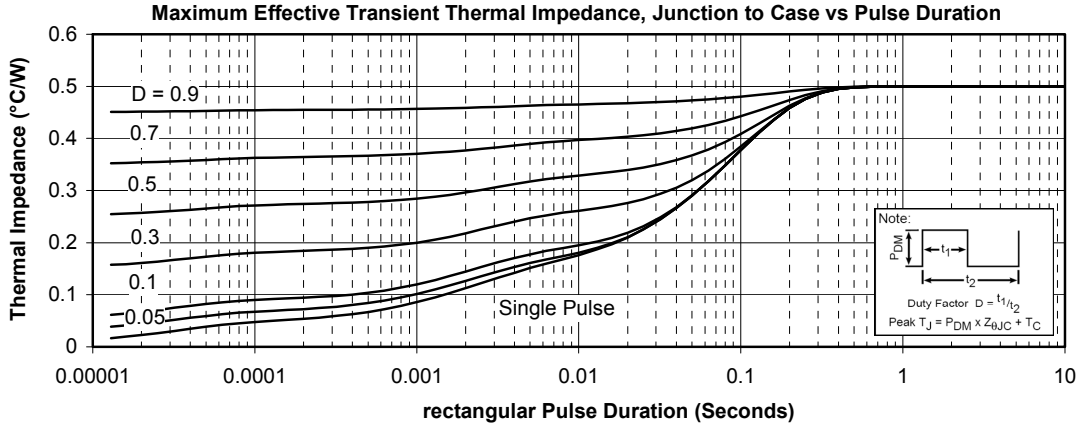
Thermal and package characteristics

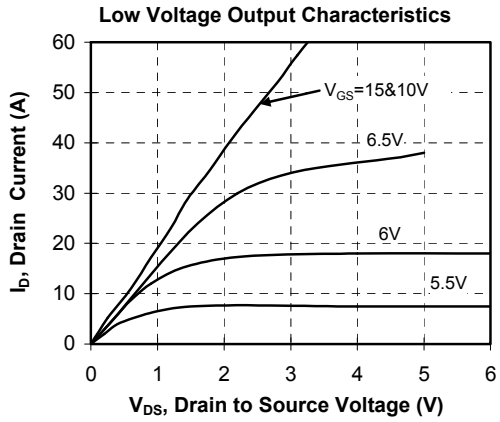
Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		150	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To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

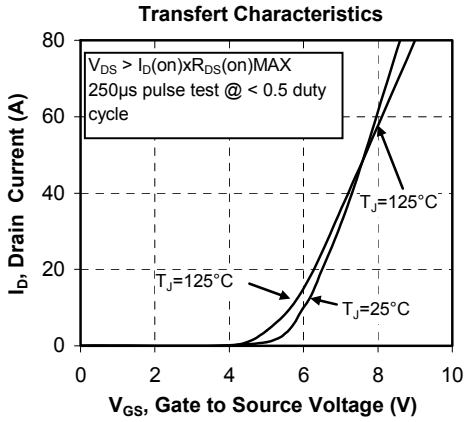
Package outline (dimensions in mm)

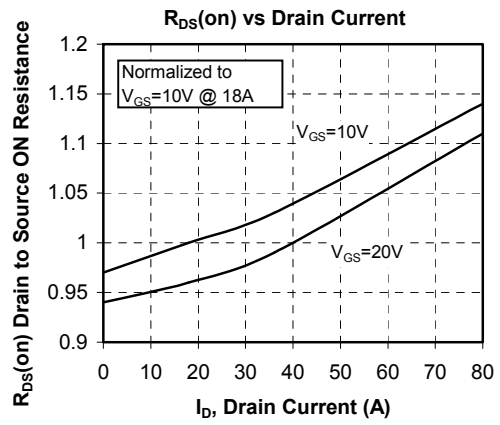


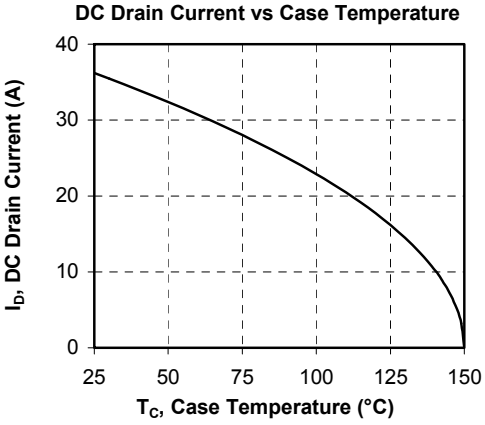
Typical Performance Curve (per CoolMOS™)



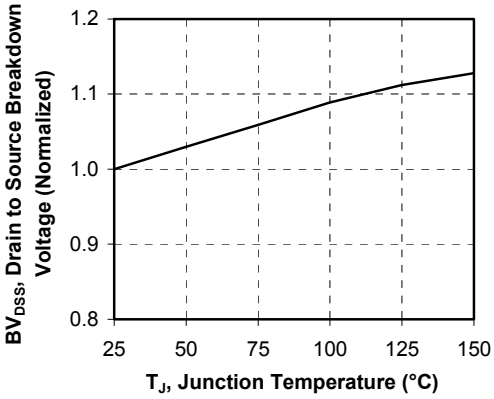




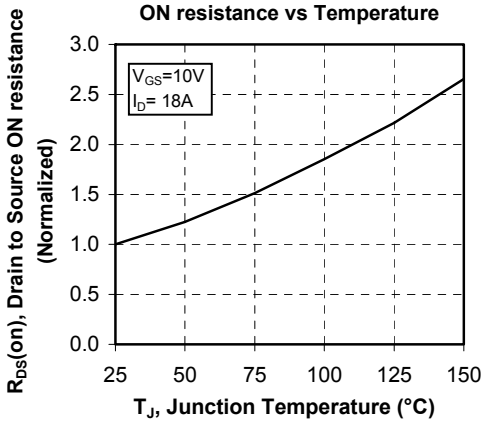




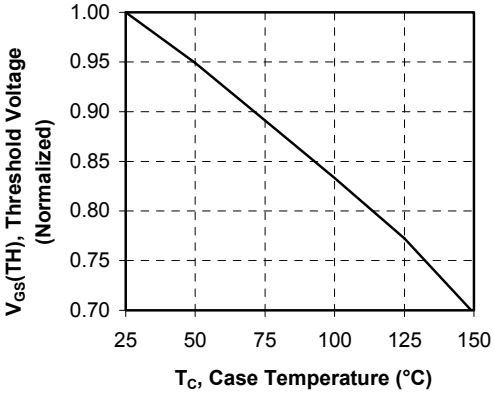
Breakdown Voltage vs Temperature



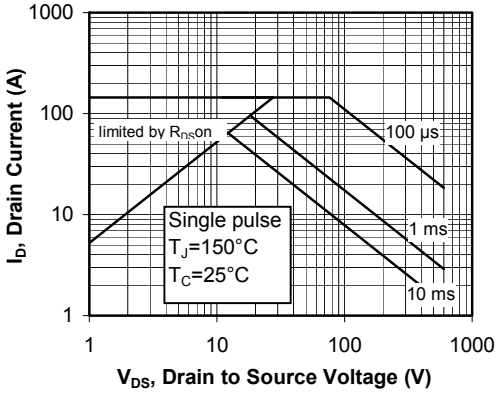
ON resistance vs Temperature



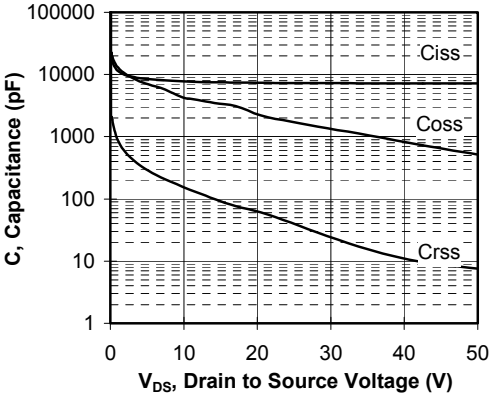
Threshold Voltage vs Temperature



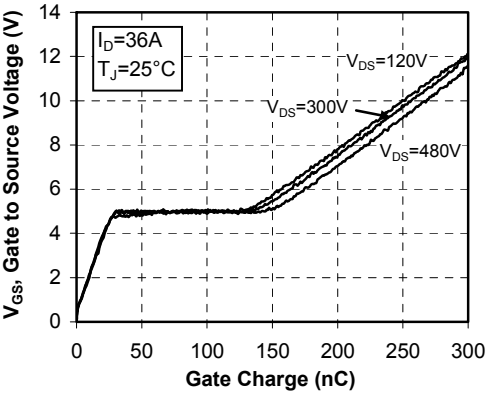
Maximum Safe Operating Area



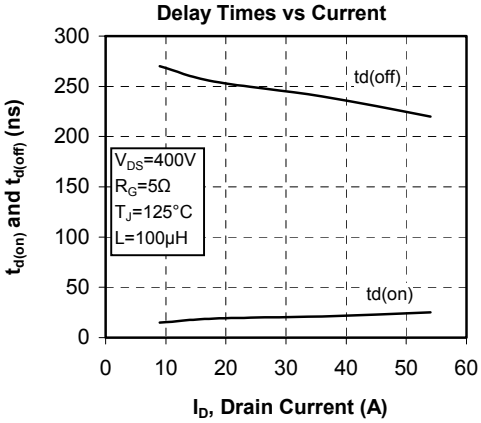
Capacitance vs Drain to Source Voltage



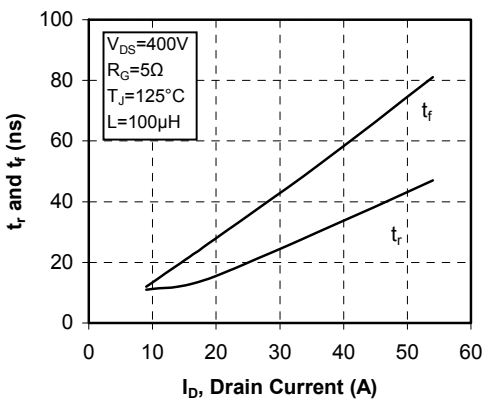
Gate Charge vs Gate to Source Voltage



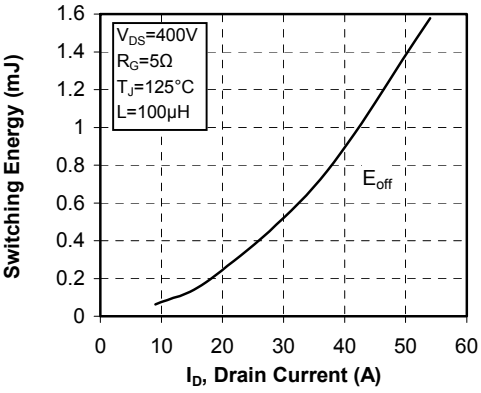
Delay Times vs Current



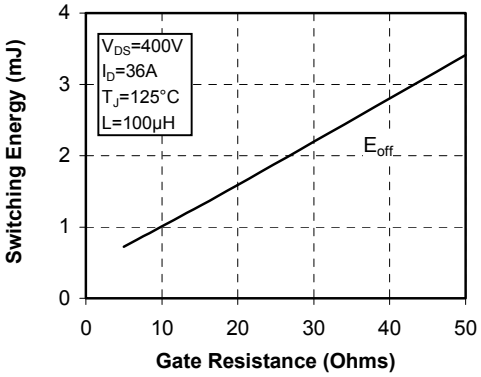
Rise and Fall times vs Current



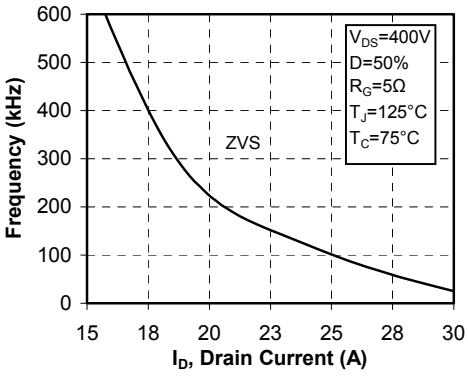
Switching Energy vs Current



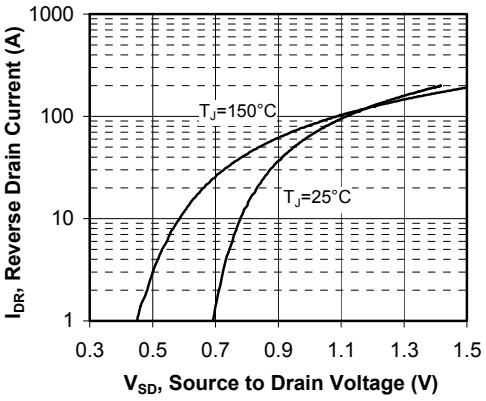
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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