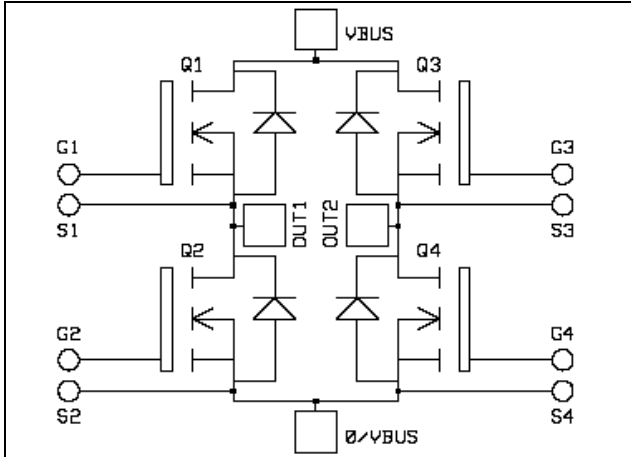


**Full - Bridge
MOSFET Power Module**

**$V_{DSS} = 500V$
 $R_{DSon} = 35m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 99A \text{ @ } T_c = 25^\circ C$**

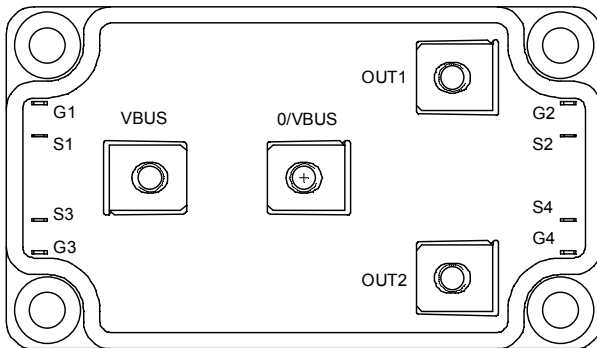


Application

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

Features

- Power MOS 7[®] FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration



Benefits

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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	99
		$T_c = 80^\circ C$	74
I_{DM}	Pulsed Drain current	396	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	35	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	781
I_{AR}	Avalanche current (repetitive and non repetitive)	51	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	

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

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain - Source Breakdown Voltage	$V_{GS} = 0V, I_D = 375\mu A$	500			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 500V$			375	μA
		$V_{GS} = 0V, V_{DS} = 400V$			1500	
$R_{DS(on)}$	Drain - Source on Resistance	$V_{GS} = 10V, I_D = 49.5A$			35	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5mA$	3		5	V
I_{GSS}	Gate - Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$		14		nF
C_{oss}	Output Capacitance			2.8		
C_{rss}	Reverse Transfer Capacitance			0.18		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 250V$ $I_D = 99A$		280		nC
Q_{gs}	Gate - Source Charge			80		
Q_{gd}	Gate - Drain Charge			140		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 99A$ $R_G = 1\Omega$		21		ns
T_r	Rise Time			38		
$T_{d(off)}$	Turn-off Delay Time			75		
T_f	Fall Time			93		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 99A, R_G = 1\Omega$		2070		μJ
E_{off}	Turn-off Switching Energy ❷			1690		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 99A, R_G = 1\Omega$		3112		μJ
E_{off}	Turn-off Switching Energy ❷			2026		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			99	A	
		$T_c = 80^\circ\text{C}$			74		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -99A$			1.3	V	
dv/dt	Peak Diode Recovery ❸				15	V/ns	
t_{rr}	Reverse Recovery Time	$I_S = -99A$ $V_R = 250V$ $di_S/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$			270	ns
			$T_j = 125^\circ\text{C}$			540	
Q_{rr}	Reverse Recovery Charge	$I_S = -99A$ $V_R = 250V$ $di_S/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$		5.2	μC	
			$T_j = 125^\circ\text{C}$		19.2		

❶ E_{on} includes diode reverse recovery.

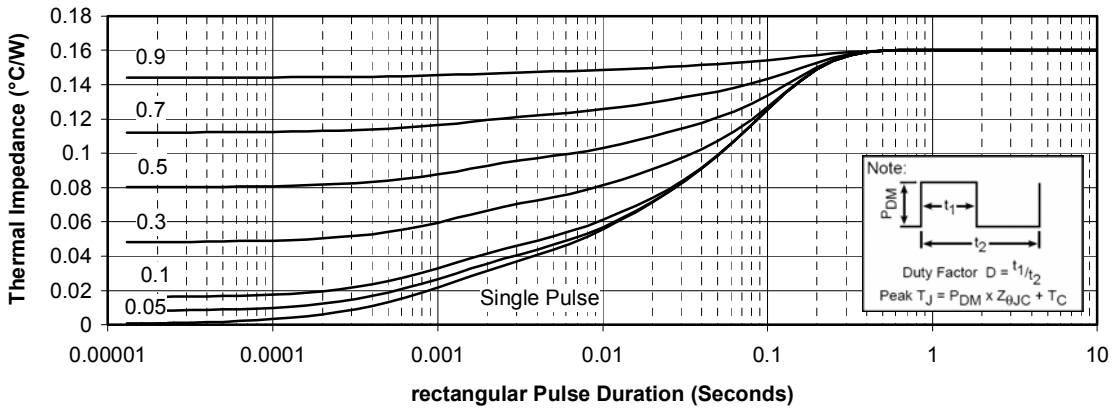
❷ In accordance with JEDEC standard JESD24-1.

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

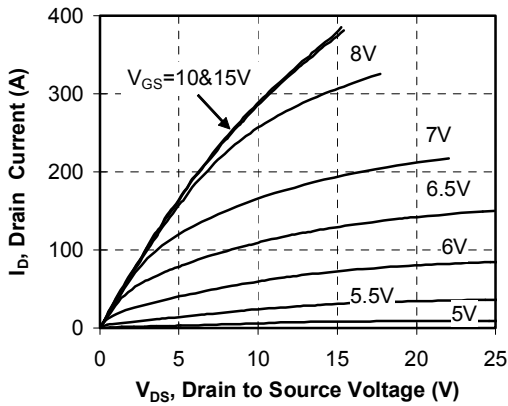
$$I_S \leq -99A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

Typical Performance Curve

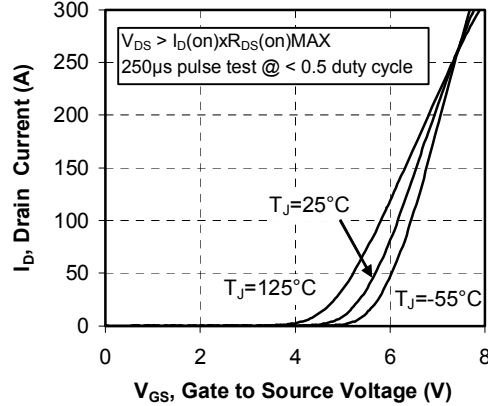
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



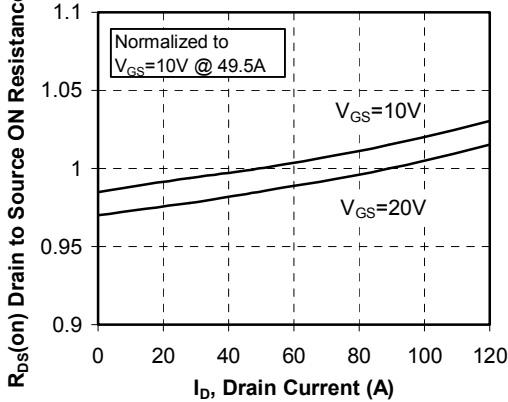
Low Voltage Output Characteristics



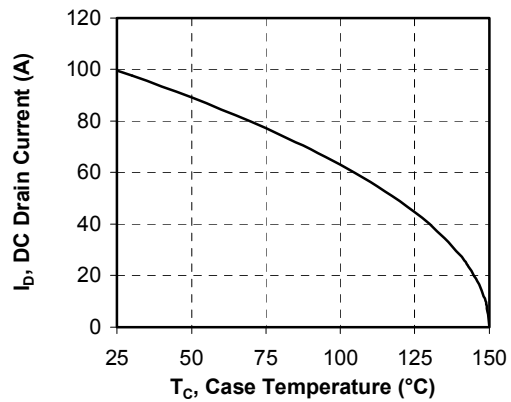
Transfer Characteristics

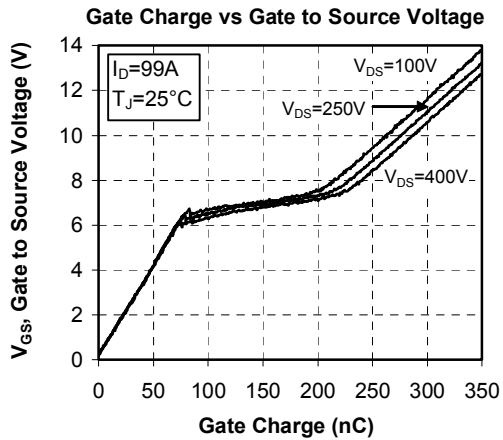
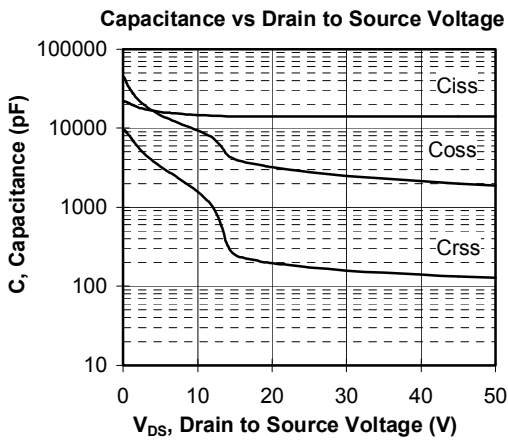
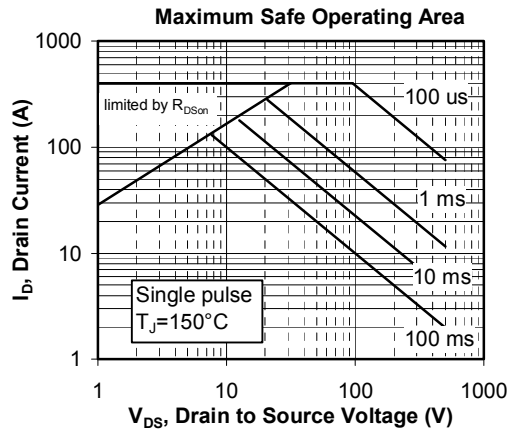
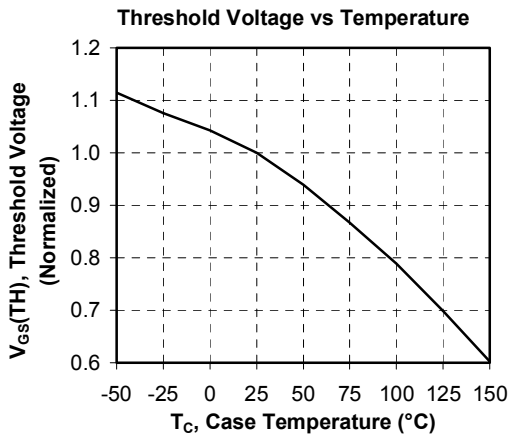
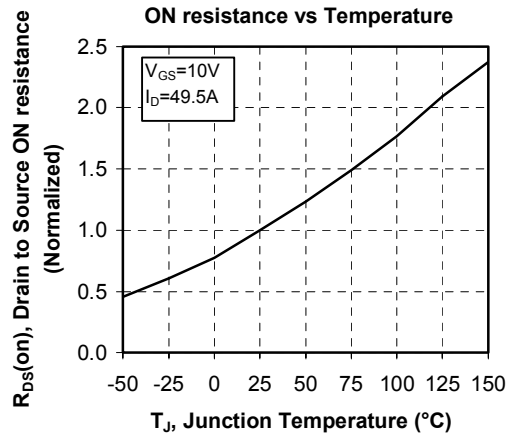
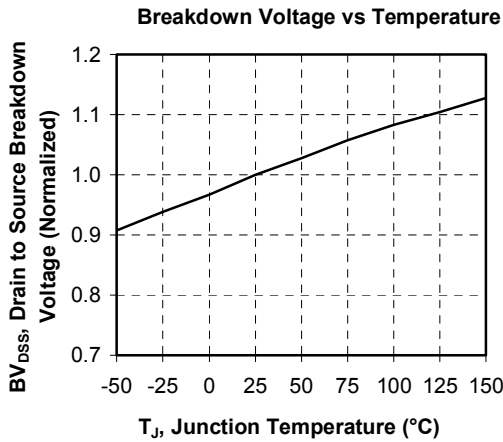


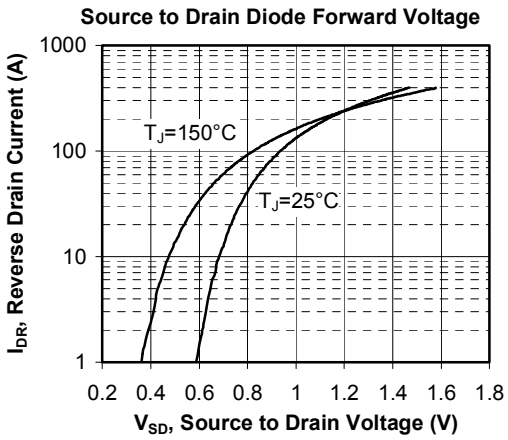
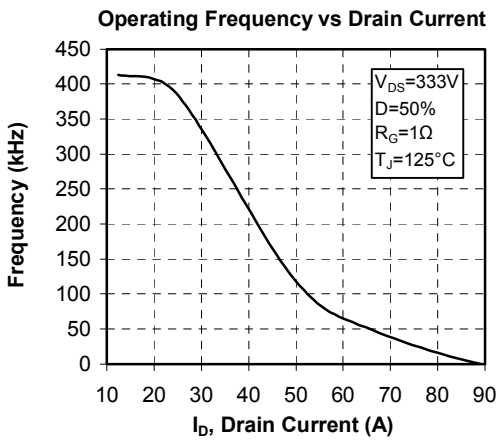
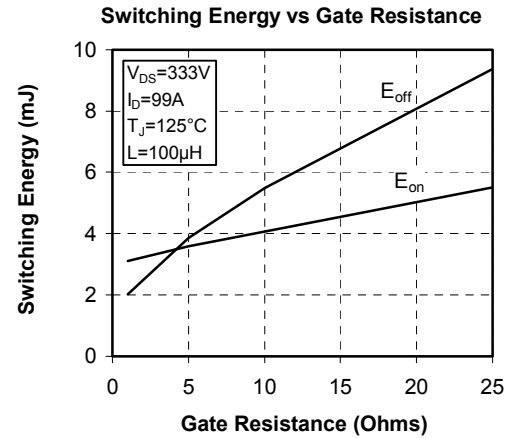
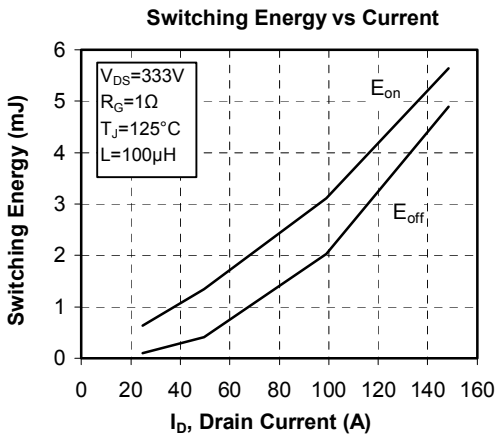
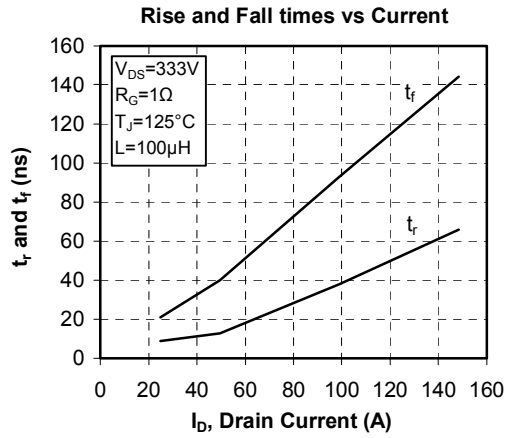
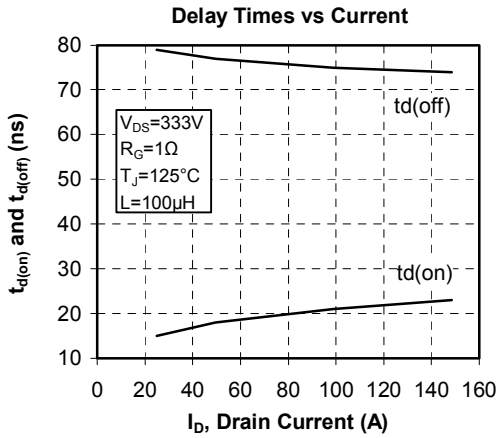
$R_{DS(on)}$ vs Drain Current



DC Drain Current vs Case Temperature







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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.