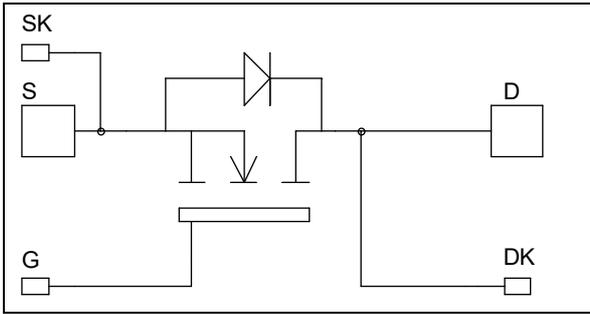


## Single Switch MOSFET Power Module

$V_{DSS} = 500V$   
 $R_{DSon} = 9\ m\Omega\ typ\ @\ T_j = 25^\circ C$   
 $I_D = 497A\ @\ T_c = 25^\circ C$

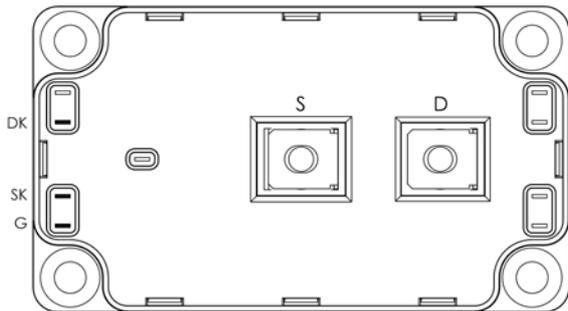


### Application

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

### Features

- Power MOS 7<sup>®</sup> 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
- M5 power connectors
- High level of integration
- AlN substrate for improved thermal performance



### Benefits

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

**All ratings @  $T_j = 25^\circ C$  unless otherwise specified**

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Voltage	500	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	497
		$T_c = 80^\circ C$	371
$I_{DM}$	Pulsed Drain current	1988	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	10	$m\Omega$
$P_D$	Power Dissipation	$T_c = 25^\circ C$	5000
$I_{AR}$	Avalanche current (repetitive and non repetitive)	71	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.

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 500V			600	μA
R <sub>DS(on)</sub>	Drain – Source on Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 248.5A		9	10	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 30mA	3		5	V
I <sub>GSS</sub>	Gate – Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0V			±450	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		63.3		nF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		12.4		
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1MHz		0.63		
Q <sub>g</sub>	Total gate Charge	V <sub>GS</sub> = 10V		1200		nC
Q <sub>gs</sub>	Gate – Source Charge	V <sub>Bus</sub> = 250V		300		
Q <sub>gd</sub>	Gate – Drain Charge	I <sub>D</sub> = 497A		630		
T <sub>d(on)</sub>	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V V <sub>Bus</sub> = 333V I <sub>D</sub> = 497A R <sub>G</sub> = 0.5Ω		21		ns
T <sub>r</sub>	Rise Time			42		
T <sub>d(off)</sub>	Turn-off Delay Time			96		
T <sub>f</sub>	Fall Time			100		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 333V I <sub>D</sub> = 497A, R <sub>G</sub> = 0.5Ω		6		mJ
E <sub>off</sub>	Turn-off Switching Energy			6.2		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 333V I <sub>D</sub> = 497A, R <sub>G</sub> = 0.5Ω		9.48		mJ
E <sub>off</sub>	Turn-off Switching Energy			6.96		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.025	°C/W

**Source - Drain diode ratings and characteristics**

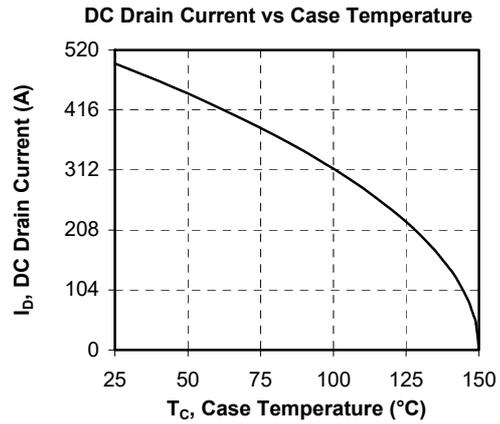
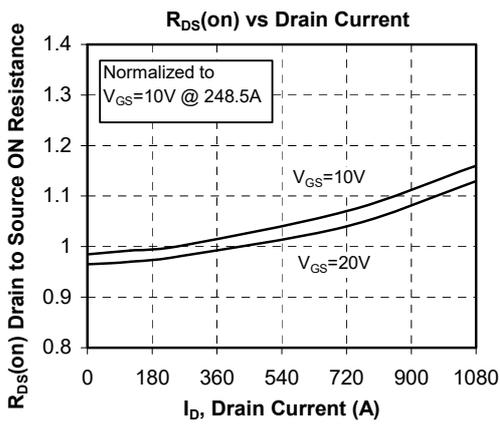
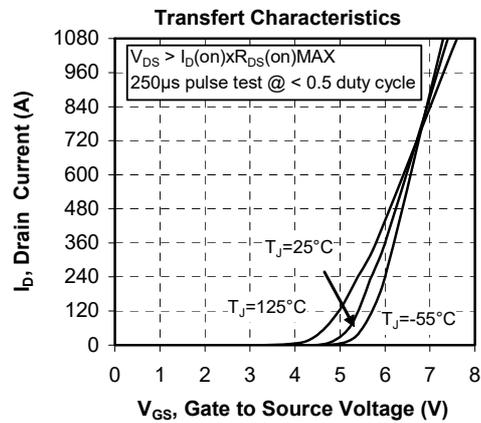
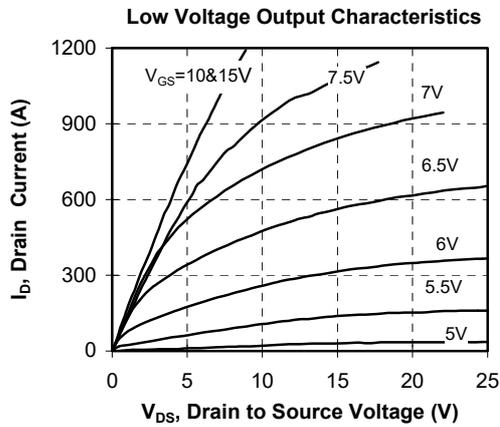
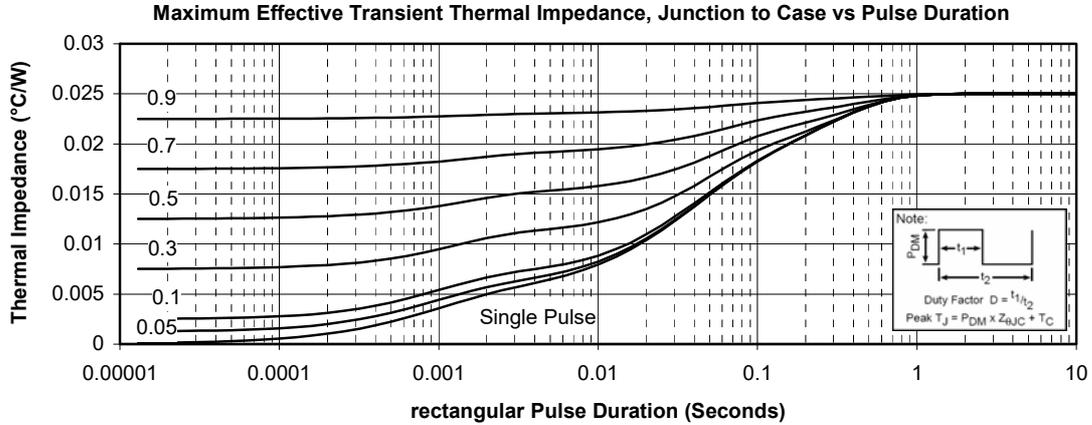
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I <sub>S</sub>	Continuous Source current (Body diode)	T <sub>C</sub> = 25°C			497	A
		T <sub>C</sub> = 80°C			371	
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = - 497A			1.3	V
dv/dt	Peak Diode Recovery ❶				18	V/ns
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> = - 497A V <sub>R</sub> = 333V	T <sub>J</sub> = 25°C		300	ns
			T <sub>J</sub> = 125°C		600	
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt = 600A/μs	T <sub>J</sub> = 25°C	15.6		μC
			T <sub>J</sub> = 125°C	60		

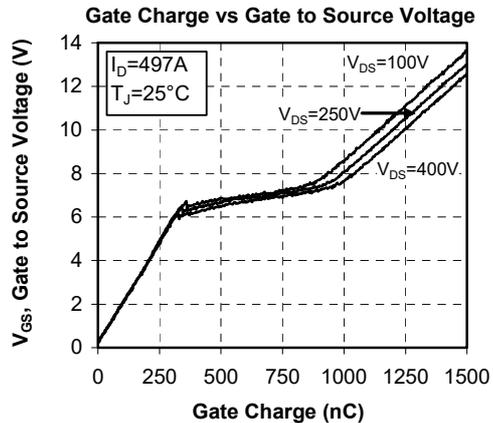
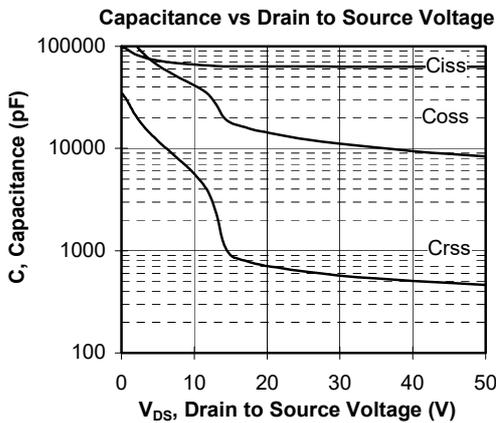
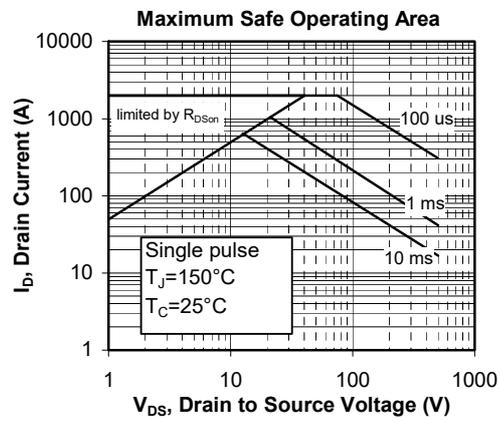
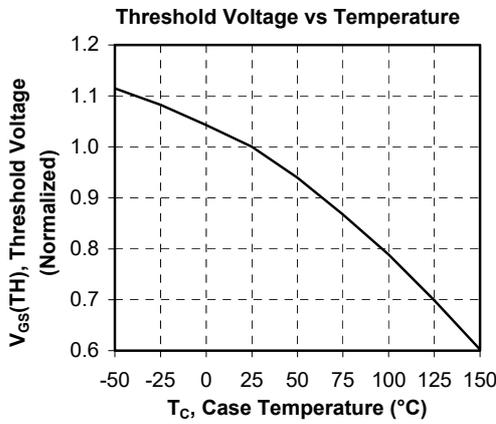
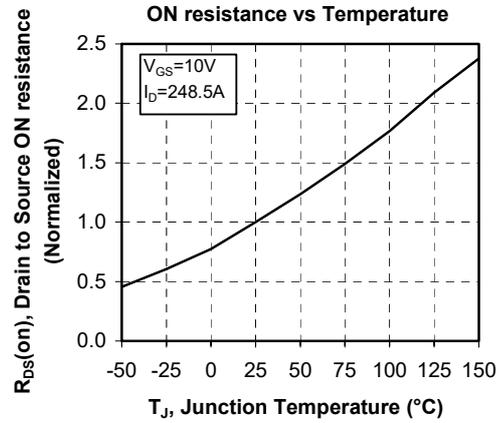
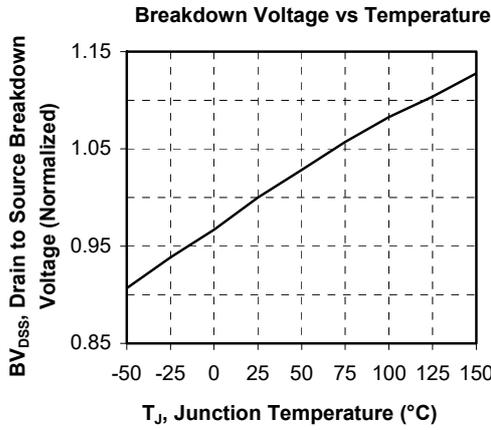
❶ dv/dt numbers reflect the limitations of the circuit rather than the device itself.

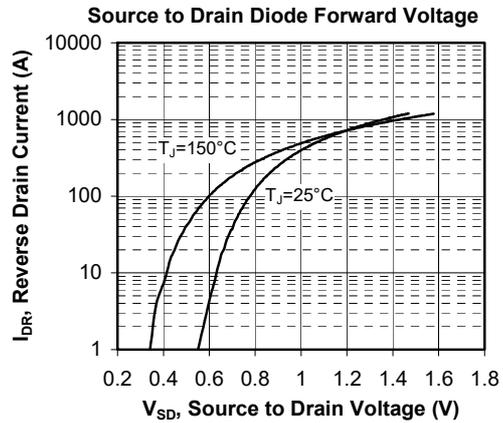
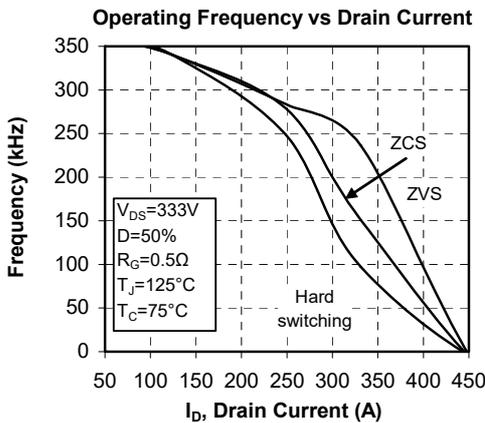
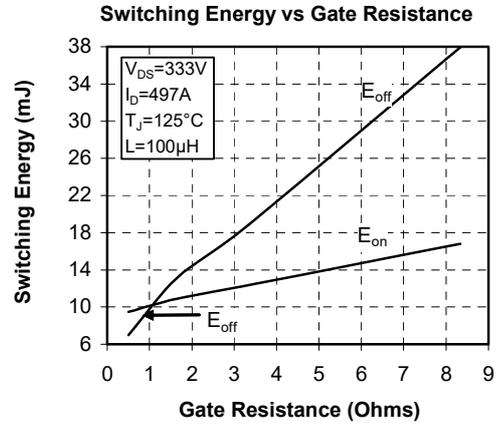
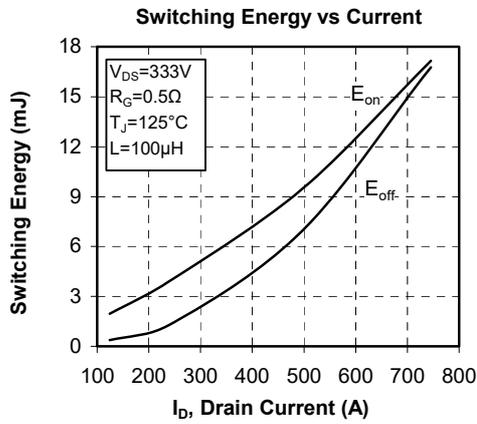
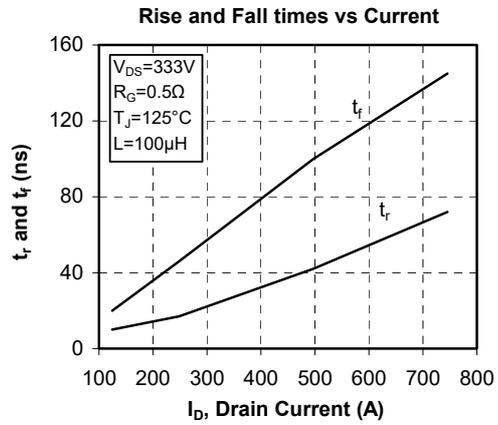
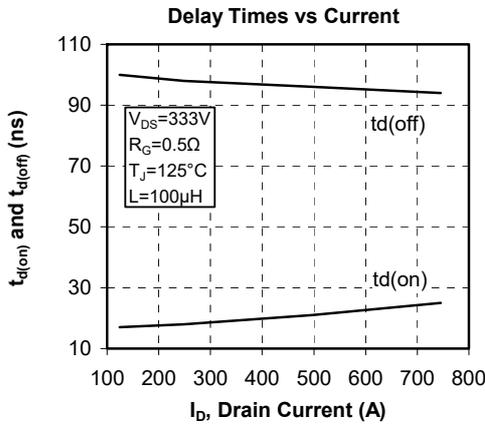
$$I_S \leq -497A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_J \leq 150^\circ C$$



## Typical Performance Curve







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