To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

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DATA SHEET

RENESAS

MOS FIELD EFFECT TRANSISTOR

2SK2415,2415-Z

SWITCHING
N-CHANNEL POWER MOS FET

Description

The 2SK2415 is N-Channel MOS Field Effect Transistor designed for high voltage switching applications.

Features

- Low on-state resistance
  $R_{DS(on)1}$ = 0.10 Ω MAX. (V_{GS} = 10 V, I_D = 4.0 A)
  $R_{DS(on)2}$ = 0.15 Ω MAX. (V_{GS} = 4 V, I_D = 4.0 A)
- Low C_{iss}: C_{iss} = 570 pF TYP.

ABSOLUTE MAXIMUM RATINGS (T_A = 25˚C)

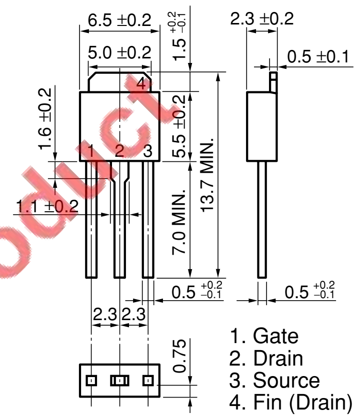
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±8.0	A
Drain Current (pulse) Note 1	$I_{D(pulse)}$	±32	A
Total Power Dissipation (T_C = 25˚C)	P_{T1}	20	W
Total Power Dissipation (T_A = 25˚C)	P_{T2}	1.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current Note 2	I_{AS}	8.0	A
Single Avalanche Energy Note 2	E_{AS}	6.4	mJ

Notes 1 PW ≤ 10 μs, Duty Cycle ≤ 1%

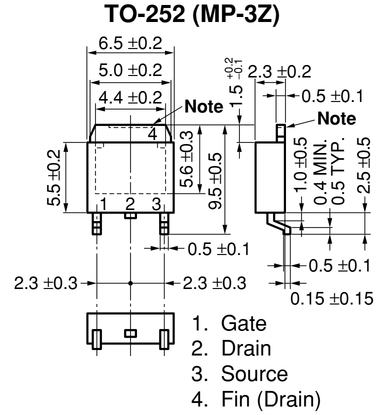
2 Starting T_{ch} = 25°C, R_G = 25 Ω, V_{GS} = 20 → 0 V

PACKAGE DRAWINGS (Unit: mm)

TO-251 (MP-3)

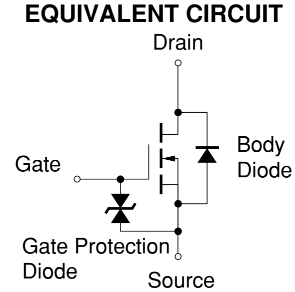


<R> **TO-252 (MP-3Z)**



Note The depth of notch at the top of the fin is from 0 to 0.2 mm.

EQUIVALENT CIRCUIT



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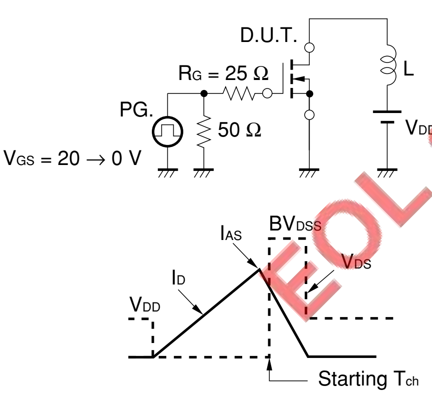
Date Published August 2006 N CP(K)
Printed in Japan

The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what." field.

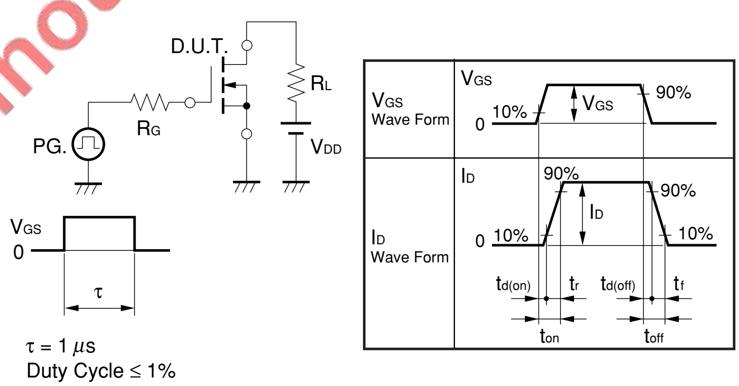
ELECTRICAL CHARACTERISTICS (T_A = 25˚C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	$R_{DS(on)1}$		0.07	0.10	Ω	V_{GS} = 10 V, I_D = 4.0 A
	$R_{DS(on)2}$		0.10	0.15	Ω	V_{GS} = 4 V, I_D = 4.0 A
Gate Cut-off Voltage	$V_{GS(off)}$	1.0	1.6	2.0	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance	| y_{fs} |	5.0	8.4		S	V_{DS} = 10 V, I_D = 4.0 A
Zero Gate Voltage Drain Current	I_{DSS}			10	μA	V_{DS} = 60 V, V_{GS} = 0 V
Gate Leakage Current	I_{GSS}			±10	μA	V_{GS} = ±20 V, V_{DS} = 0 V
Input Capacitance	C_{iss}		570		pF	V_{DS} = 10 V
Output Capacitance	C_{oss}		290		pF	V_{GS} = 0 V
Reverse Transfer Capacitance	C_{rss}		75		pF	f = 1 MHz
Turn-On Delay Time	$t_{d(on)}$		5		ns	I_D = 4.0 A
Rise Time	t_r		60		ns	V_{GS} = 10 V
Turn-Off Delay Time	$t_{d(off)}$		75		ns	V_{DD} = 30 V
Fall Time	t_f		40		ns	R_G = 10 Ω
Total Gate Charge	Q_G		21		nC	I_D = 8.0 A
Gate to Source Charge	Q_{GS}		2.0		nC	V_{DD} = 48 V
Gate to Drain Charge	Q_{GD}		6.5		nC	V_{GS} = 10 V
Body Diode Forward Voltage	$V_{F(S-D)}$		1.0		V	I_F = 8.0 A, V_{GS} = 0 V
Reverse Recovery Time	t_{rr}		85		ns	I_F = 8.0 A, V_{GS} = 0 V
Reverse Recovery Charge	Q_{rr}		200		nC	di/dt = 100 A/μs

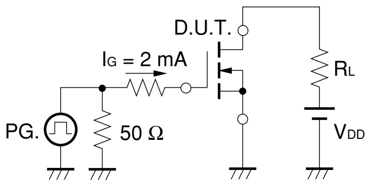
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

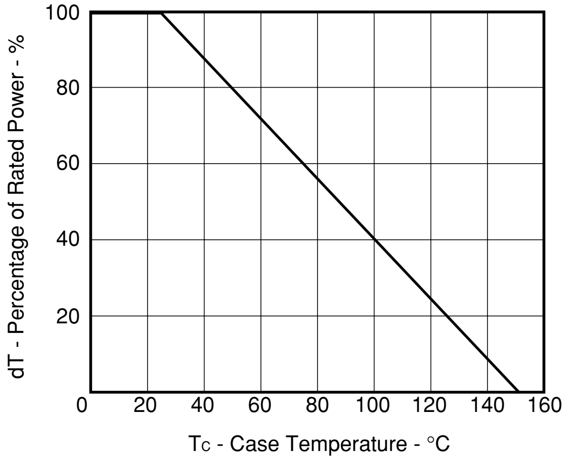


TEST CIRCUIT 3 GATE CHARGE

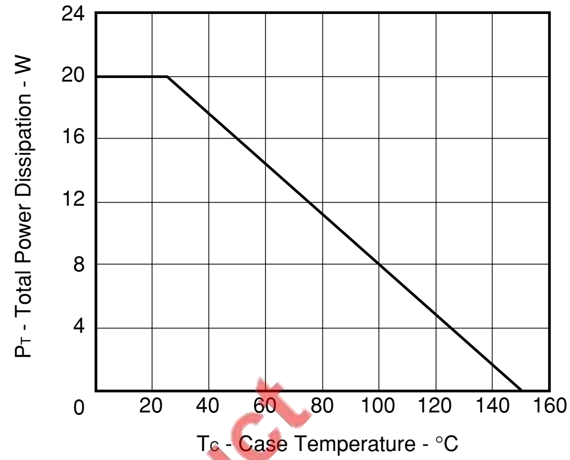


TYPICAL CHARACTERISTICS (T_A = 25°C)

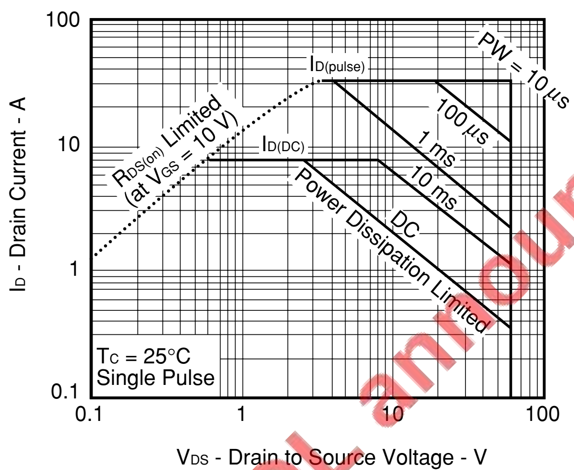
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



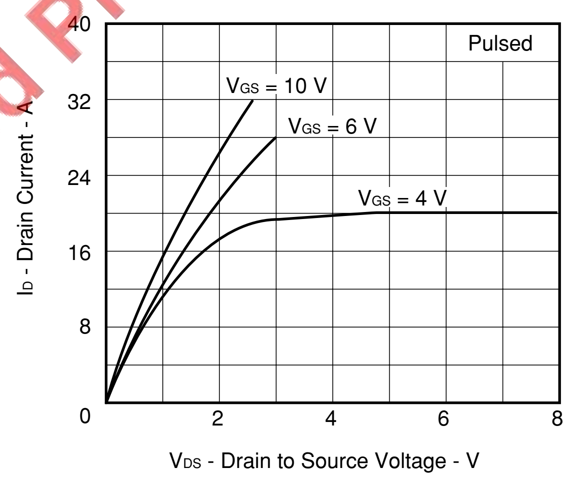
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



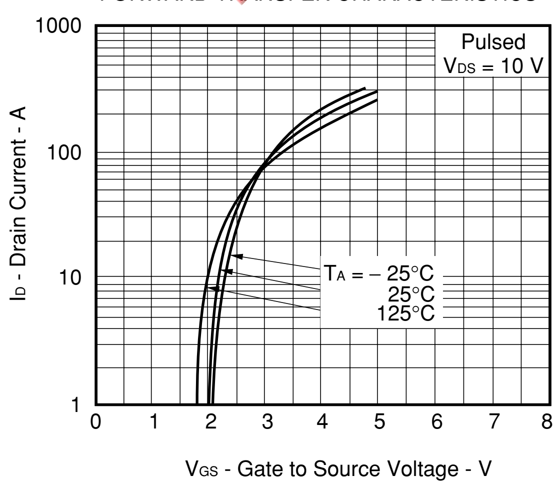
FORWARD BIAS SAFE OPERATING AREA



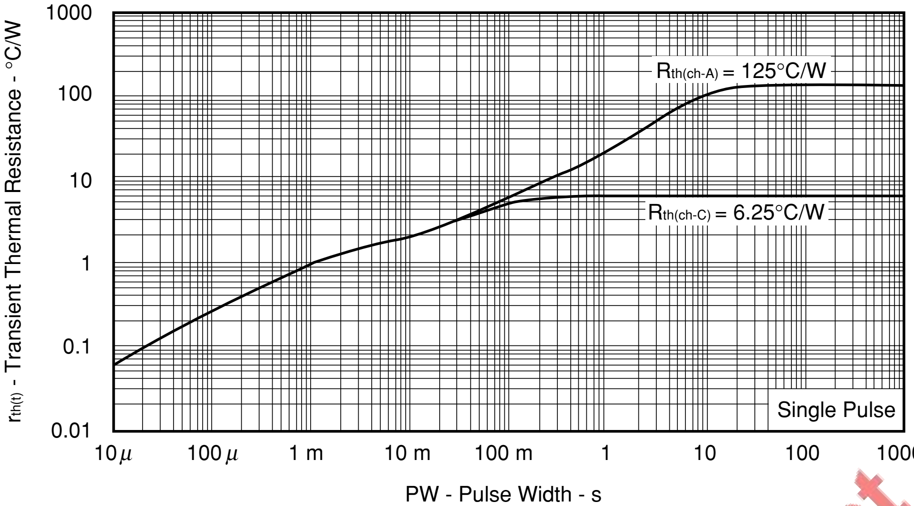
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



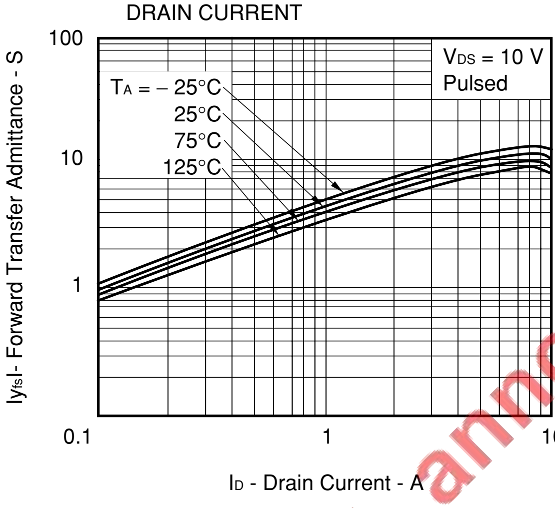
FORWARD TRANSFER CHARACTERISTICS



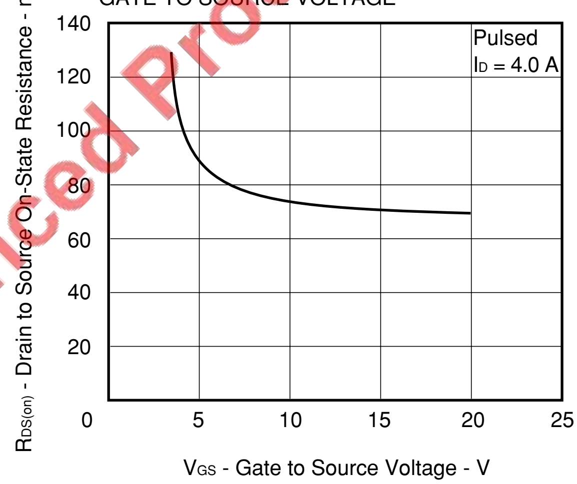
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



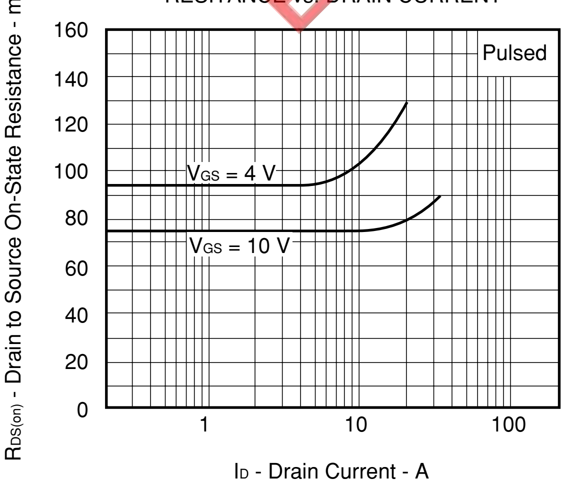
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



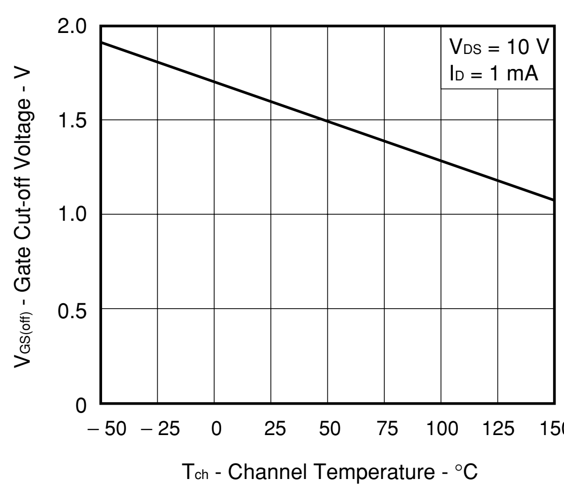
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



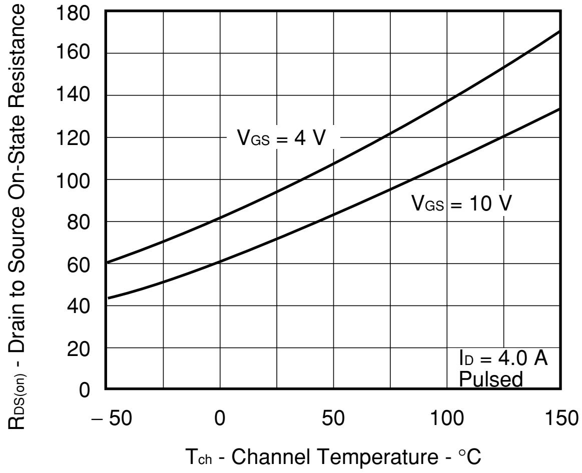
DRAIN TO SOURCE ON-STATE RESITANCE vs. DRAIN CURRENT



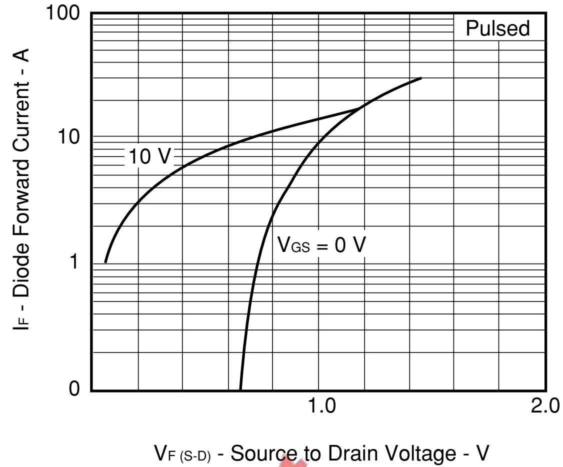
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



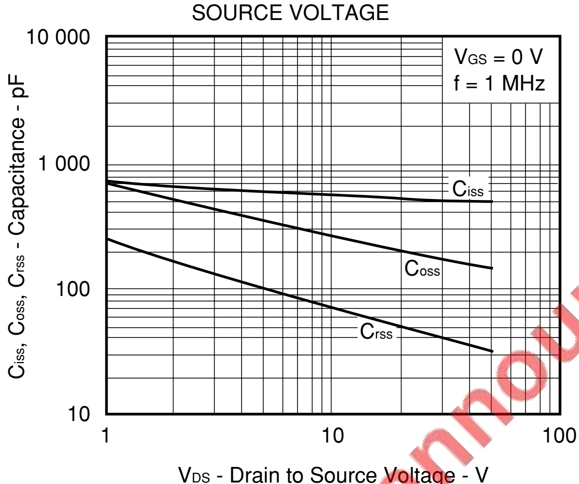
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



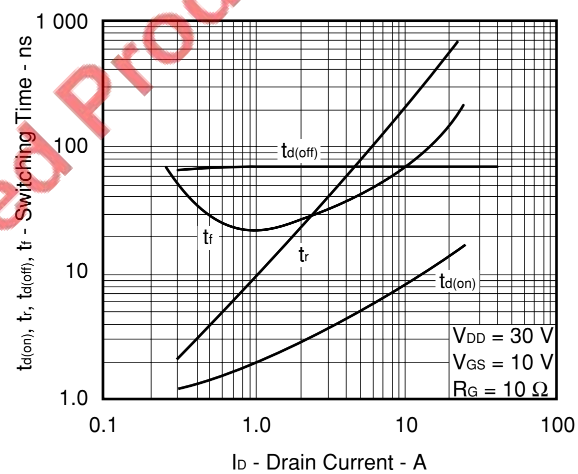
SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



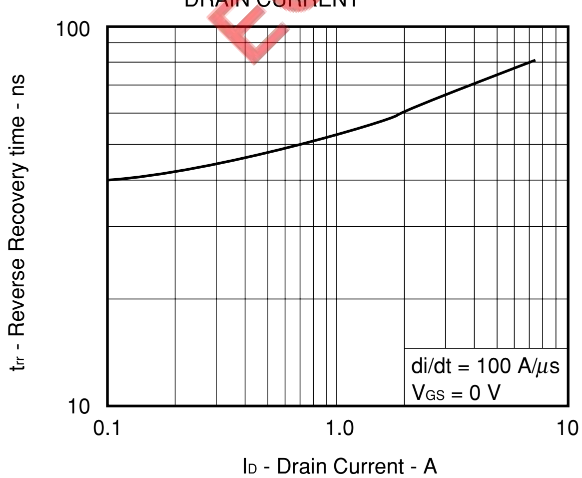
CAPACITANCE vs. DRAIN TO
SOURCE VOLTAGE



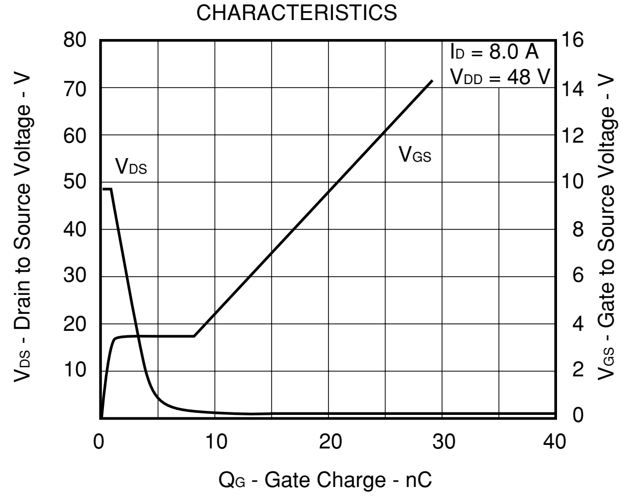
SWITCHING CHARACTERISTICS



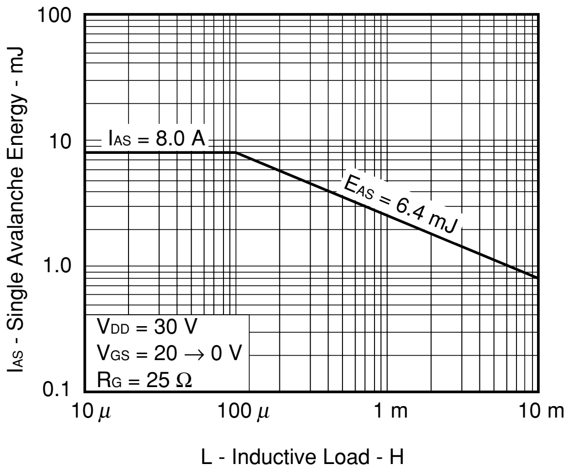
REVERSE RECOVERY TIME vs.
DRAIN CURRENT



DYNAMIC INPUT/OUTPUT
CHARACTERISTICS



SINGLE AVALANCHE ENERGY vs. INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY DERATING FACTOR