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

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DATA SHEET

RENESAS

MOS FIELD EFFECT TRANSISTOR

μPA2712GR

SWITCHING
P-CHANNEL POWER MOS FET

DESCRIPTION

The μPA2712GR is P-Channel MOS Field Effect Transistor designed for power management applications of notebook computers and Li-ion battery protection circuit.

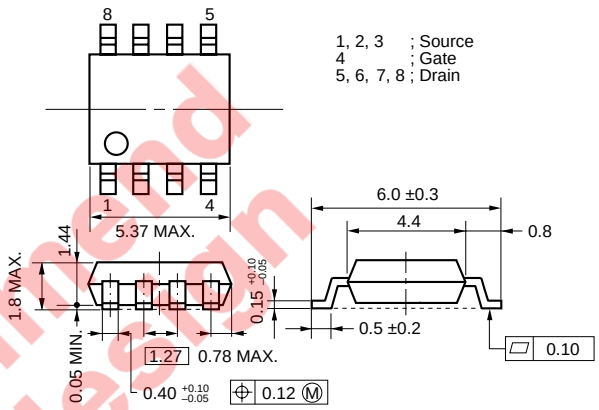
FEATURES

- Low on-state resistance
  $R_{DS(on)1}$ = 13 mΩ MAX. (V_{GS} = –10 V, I_D = –5.0 A)
  $R_{DS(on)2}$ = 21 mΩ MAX. (V_{GS} = –4.5 V, I_D = –5.0 A)
  $R_{DS(on)3}$ = 26 mΩ MAX. (V_{GS} = –4.0 V, I_D = –5.0 A)
- Low C_{iss}: C_{iss} = 2000 pF TYP.
- Small and surface mount package (Power SOP8)

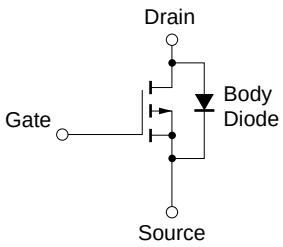
ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA2712GR	Power SOP8

PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected.)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	–30	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	∓20	V
Drain Current (DC)	$I_{D(DC)}$	∓10	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	∓40	A
Total Power Dissipation Note2	P_{T1}	2	W
Total Power Dissipation Note3	P_{T2}	2	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current Note4	I_{AS}	–10	A
Single Avalanche Energy Note4	E_{AS}	10	mJ

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on ceramic substrate of 1200 mm^2 x 2.2 mm
3. Mounted on a glass epoxy board (1 inch x 1 inch x 0.8 mm), PW = 10 sec
4. Starting T_{ch} = 25°C, V_{DD} = –15 V, R_G = 25 Ω, L = 100 μH, V_{GS} = –20 → 0 V

Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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Date Published November 2002 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

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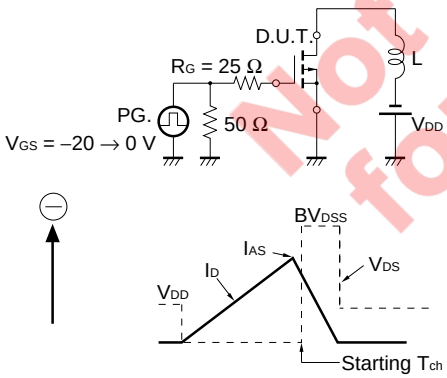
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ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

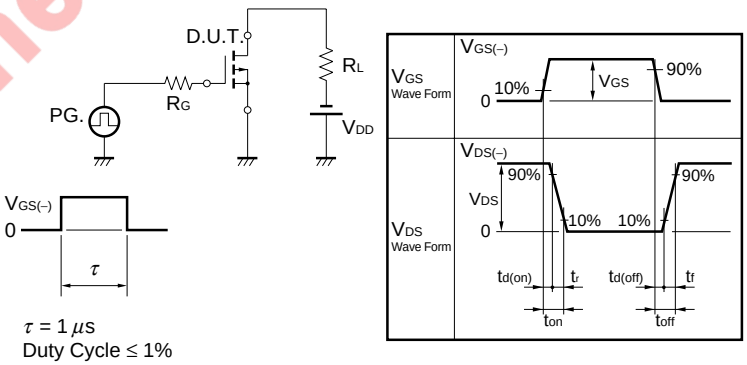
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –30 V, V_{GS} = 0 V			–1	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ∓20 V, V_{DS} = 0 V			∓100	nA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = –1 mA	–1.0		–2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –5.0 A	7	15		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = –10 V, I_D = –5.0 A		10	13	mΩ
	$R_{DS(on)2}$	V_{GS} = –4.5 V, I_D = –5.0 A		15	21	mΩ
	$R_{DS(on)3}$	V_{GS} = –4.0 V, I_D = –5.0 A		19	26	mΩ
Input Capacitance	C_{iss}	V_{DS} = –10 V		2000		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		550		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		340		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = –15 V, I_D = –5.0 A		10		ns
Rise Time	t_r	V_{GS} = –10 V		16		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		92		ns
Fall Time	t_f			51		ns
Total Gate Charge	Q_G	V_{DD} = –24 V		42		nC
Gate to Source Charge	Q_{GS}	V_{GS} = –10 V		6		nC
Gate to Drain Charge	Q_{GD}	I_D = 10 A		12		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 10 A, V_{GS} = 0 V		0.82		V
Reverse Recovery Time	t_{rr}	I_F = 10 A, V_{GS} = 0 V		46		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		33		nC

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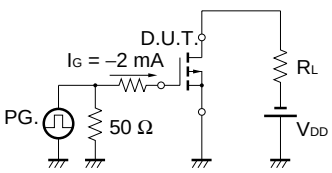
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME



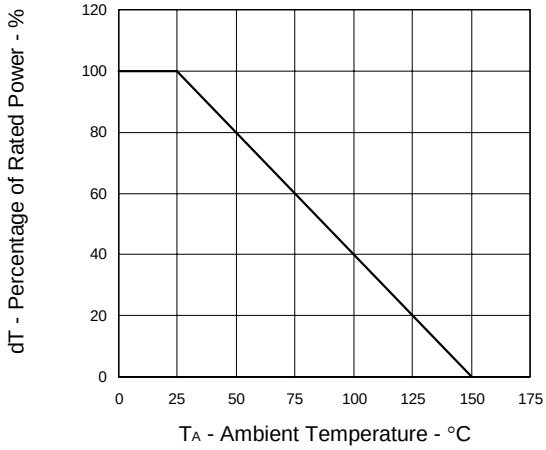
TEST CIRCUIT 3 GATE CHARGE



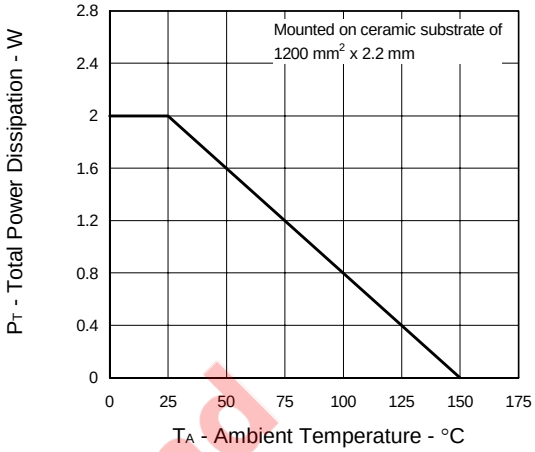
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TYPICAL CHARACTERISTICS (T_A = 25°C)

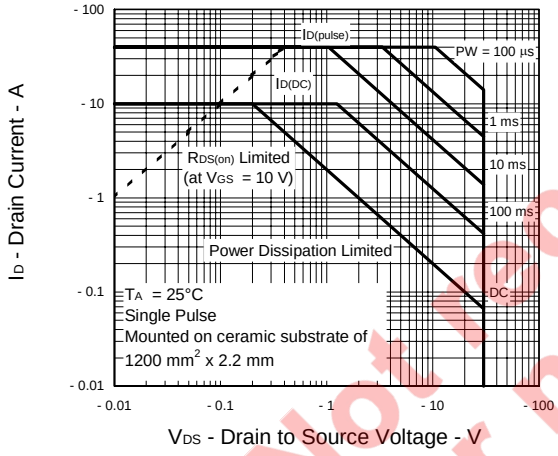
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

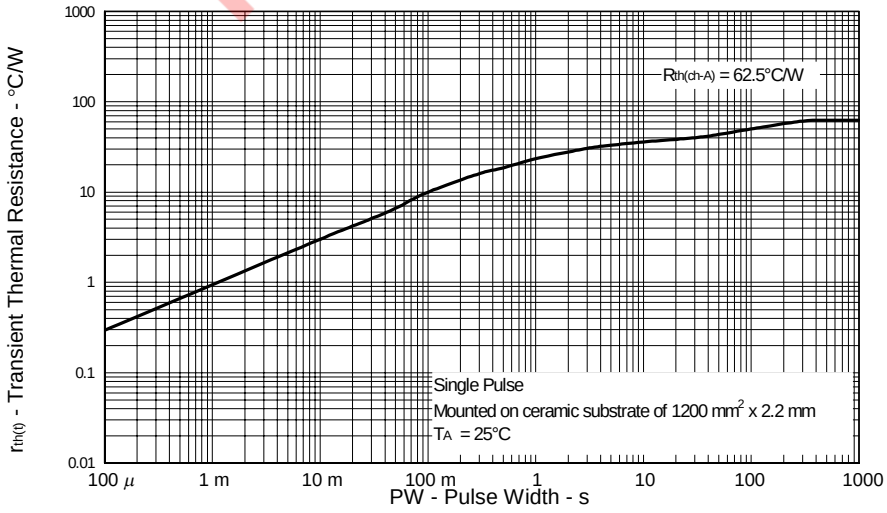


FORWARD BIAS SAFE OPERATING AREA



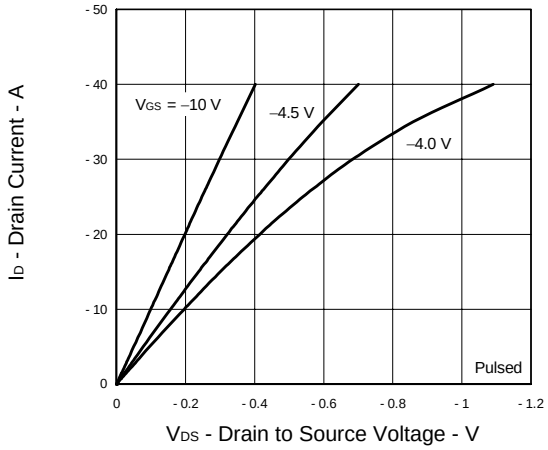
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★ TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

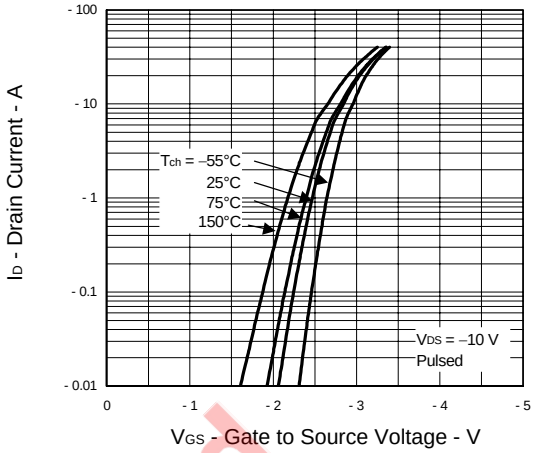


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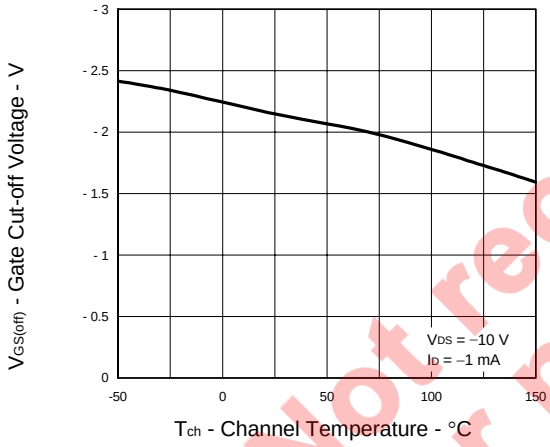
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



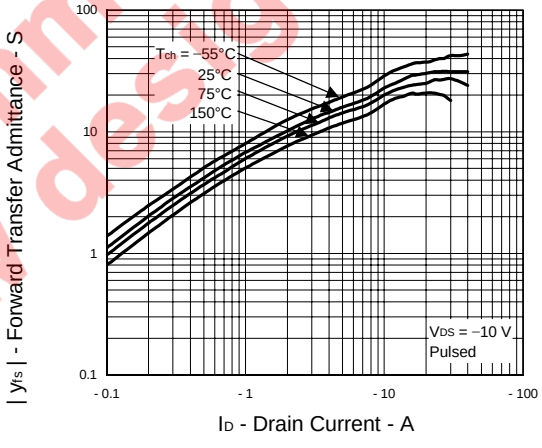
FORWARD TRANSFER CHARACTERISTICS



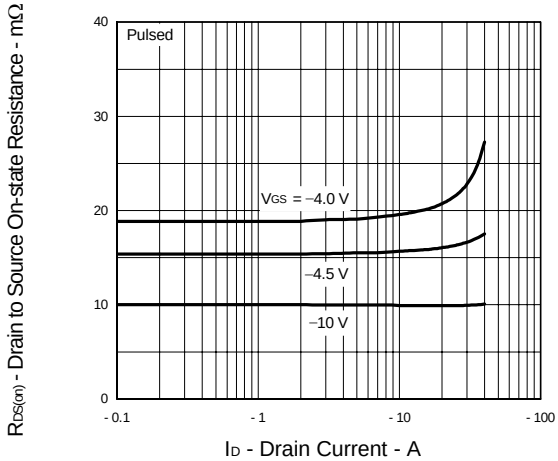
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



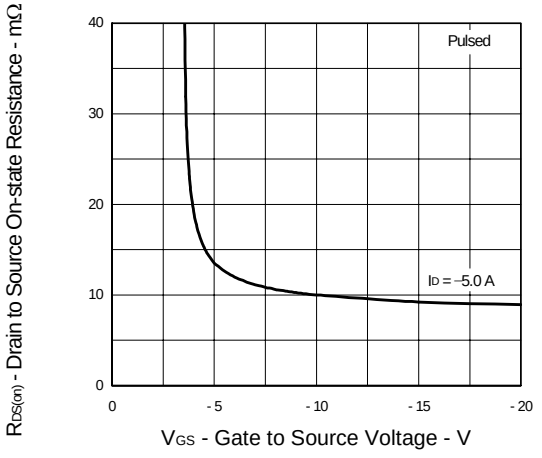
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



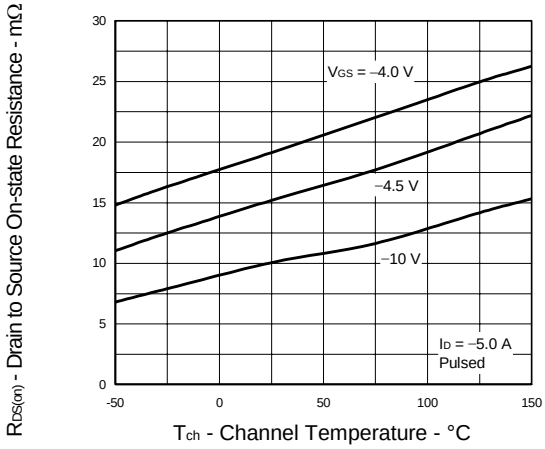
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



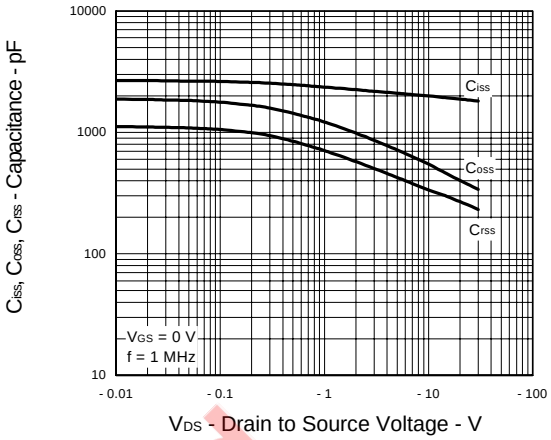
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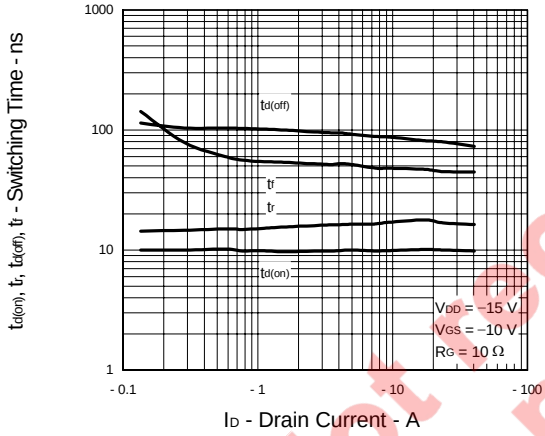
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



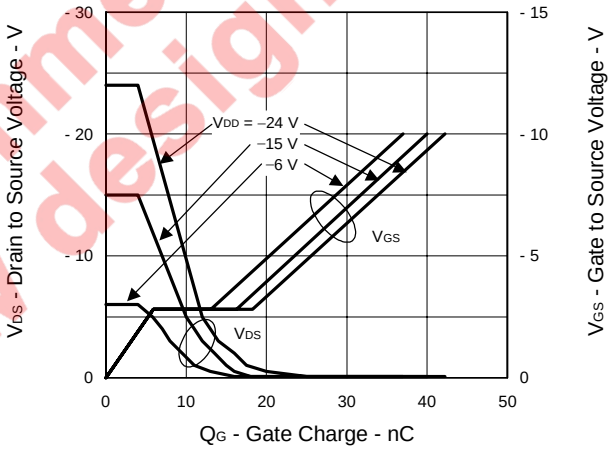
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



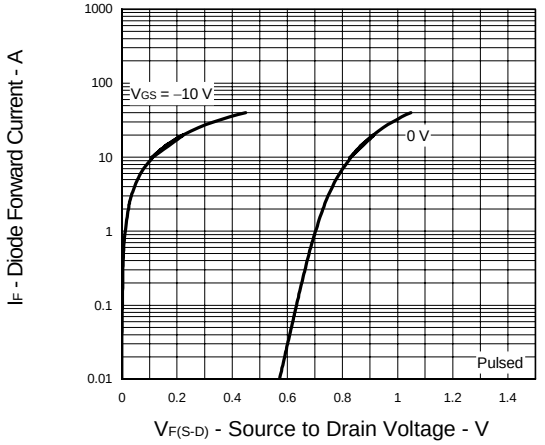
SWITCHING CHARACTERISTICS



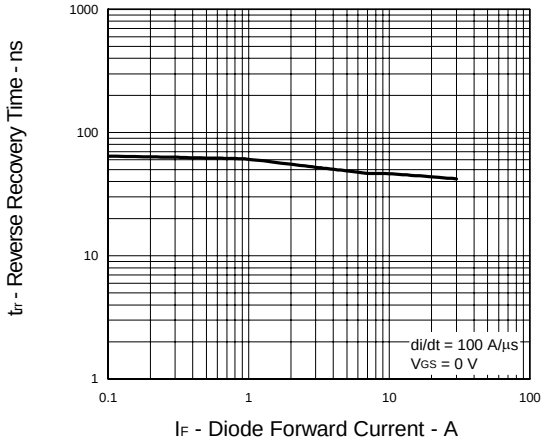
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



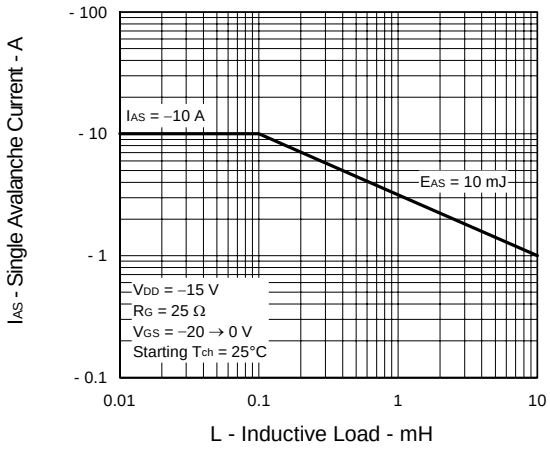
REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



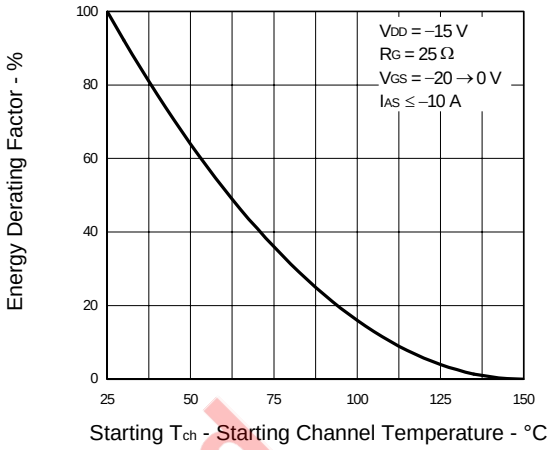
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SINGLE AVALANCHE CURRENT vs.
INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY
DERATING FACTOR



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