

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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MOS FIELD EFFECT TRANSISTOR

μ PA2803

SWITCHING

N-CHANNEL POWER MOSFET

DESCRIPTION

The μ PA2803 is N-channel MOSFET designed for DC/DC converter and power management applications of portable equipments.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 5.8 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 20 \text{ A)}$
 $R_{DS(on)2} = 9.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 10 \text{ A)}$
- Built-in gate protection diode
- Thin type surface mount package with heat spreader
- RoHS Compliant

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	20	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 12	V
Drain Current (DC)	$I_{D(DC)}$	± 20	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 80	A
Total Power Dissipation ^{Note2}	P_{T1}	1.5	W
Total Power Dissipation ($PW = 10 \text{ sec}$) ^{Note2}	P_{T2}	3.8	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \text{ to } +150$	$^\circ\text{C}$
Single Avalanche Current ^{Note3}	I_{AS}	20	A
Single Avalanche Energy ^{Note3}	E_{AS}	40	mJ

THERMAL RESISTANCE

Channel to Ambient Thermal Resistance ^{Note2}	$R_{th(ch-A)}$	83.3	$^\circ\text{C/W}$
Channel to Case (Drain) Thermal Resistance	$R_{th(ch-C)}$	2.4	$^\circ\text{C/W}$

Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

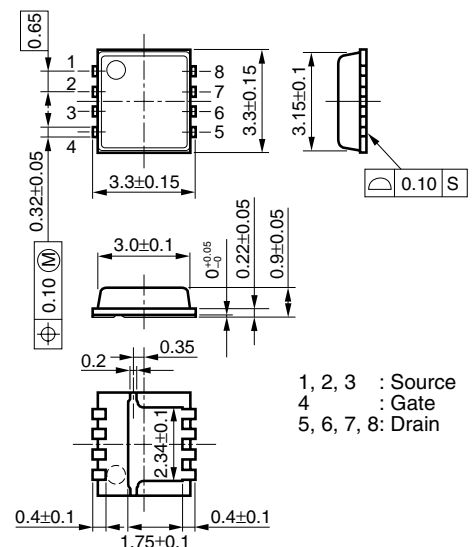
2. Mounted on FR-4 board of 25.4 mm x 25.4 mm x 0.8 mm

3. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 10 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 12 \rightarrow 0 \text{ V}$, $L = 100 \mu\text{H}$

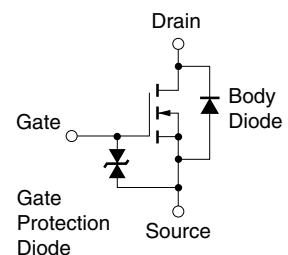
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD.

When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT



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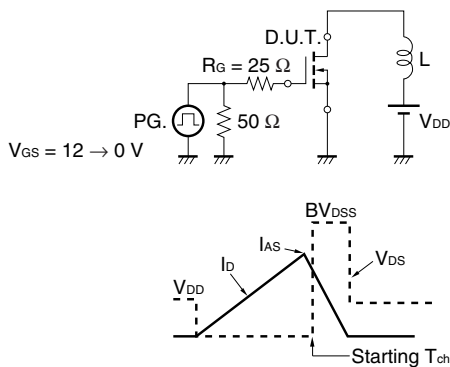
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ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

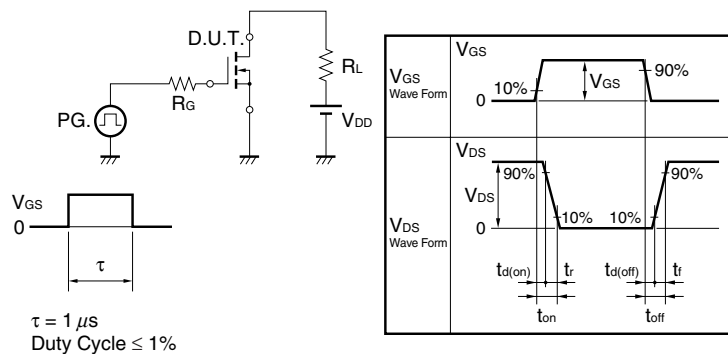
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	0.5		1.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10 V, I _D = 10 A	10			S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 20 A		4.7	5.8	mΩ
	R _{DS(on)2}	V _{GS} = 2.5 V, I _D = 10 A		7.1	9.5	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V,		2450		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		390		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		245		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V, I _D = 10 A,		20		ns
Rise Time	t _r	V _{GS} = 4 V,		60		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		58		ns
Fall Time	t _f			26		ns
Total Gate Charge	Q _G	V _{DD} = 10 V,		20		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 4 V,		5		nC
Gate to Drain Charge	Q _{GD}	I _D = 20 A		7		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 20 A, V _{GS} = 0 V		0.82	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 20 A, V _{GS} = 0 V,		31		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		25		nC
Gate Resistance	R _G	f = 1 MHz		1.4		Ω

Note Pulsed

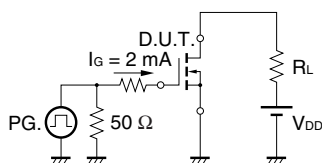
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

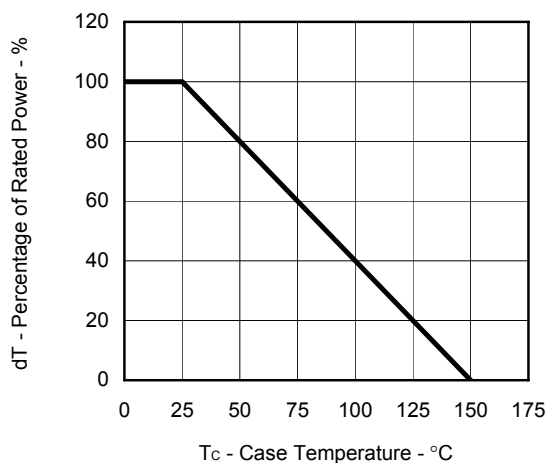


TEST CIRCUIT 3 GATE CHARGE

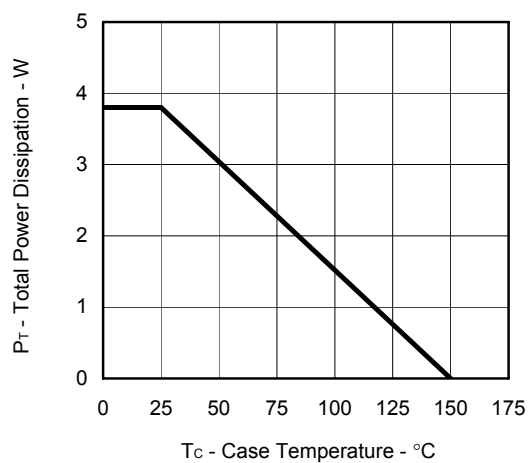


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

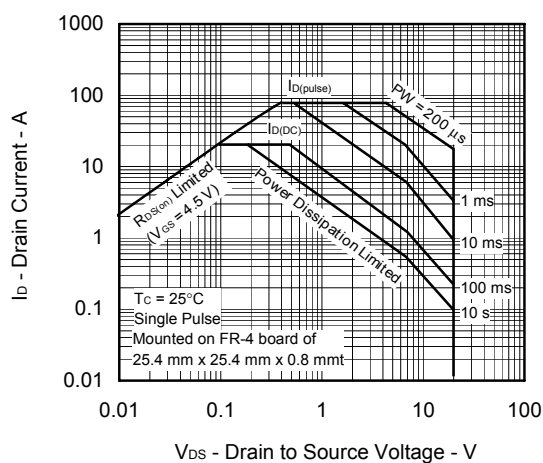
DERATING FACTOR OF FORWARD BIAS
SAFE OPERATING AREA



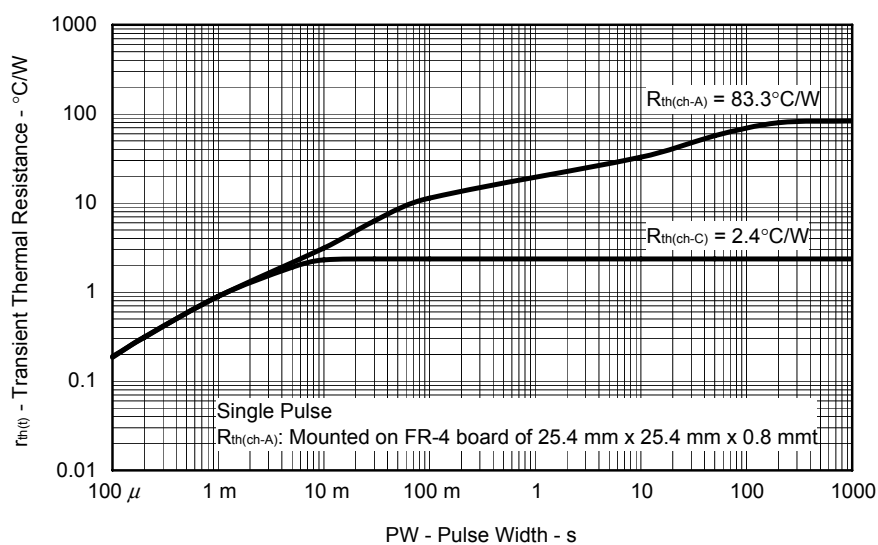
TOTAL POWER DISSIPATION vs.
CASE TEMPERATURE



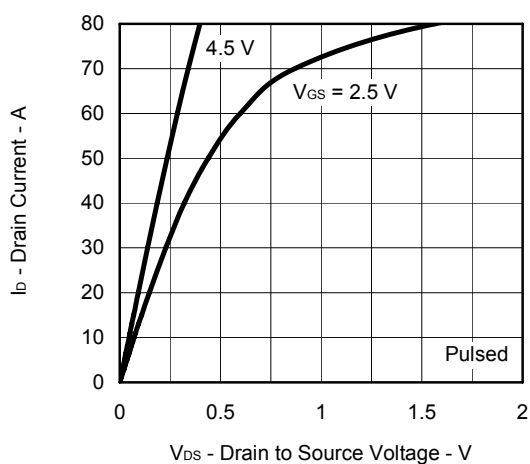
FORWARD BIAS SAFE OPERATING AREA



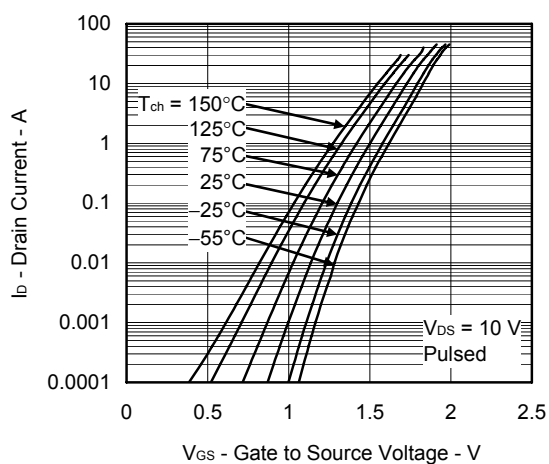
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



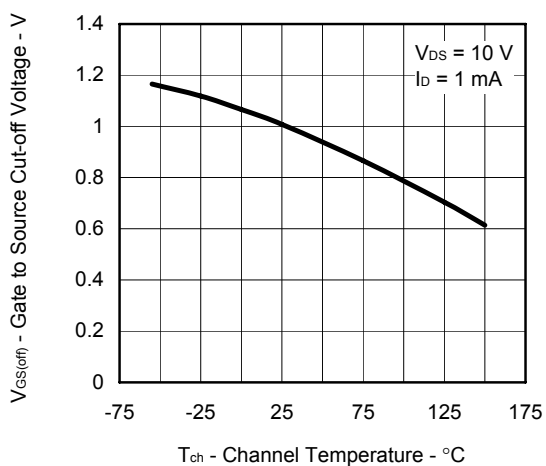
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



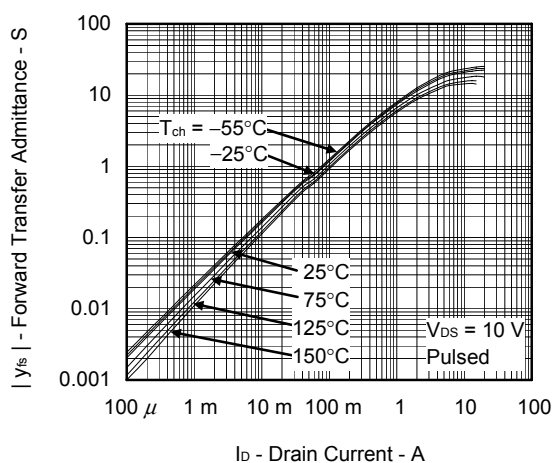
FORWARD TRANSFER CHARACTERISTICS



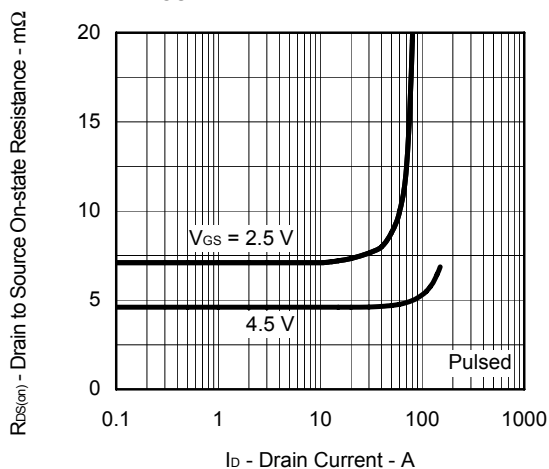
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



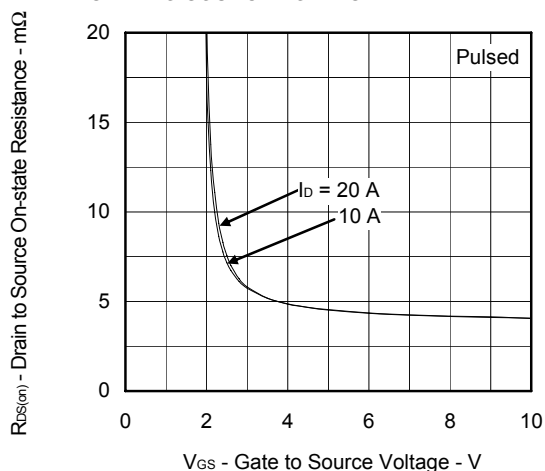
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



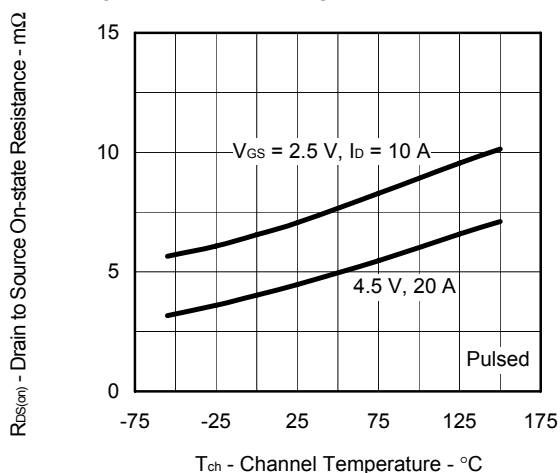
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



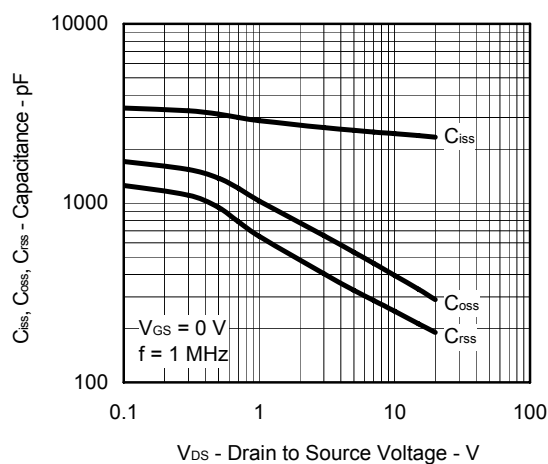
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



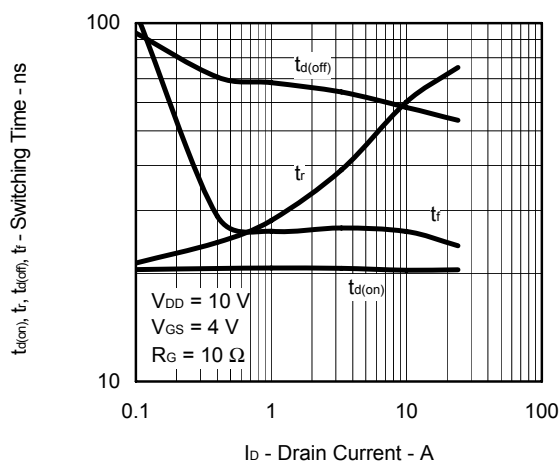
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



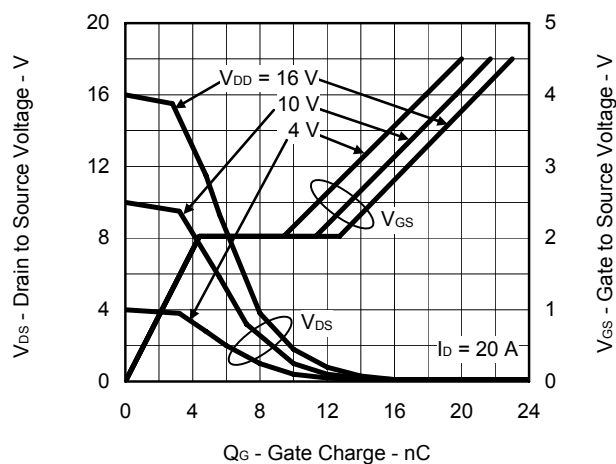
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



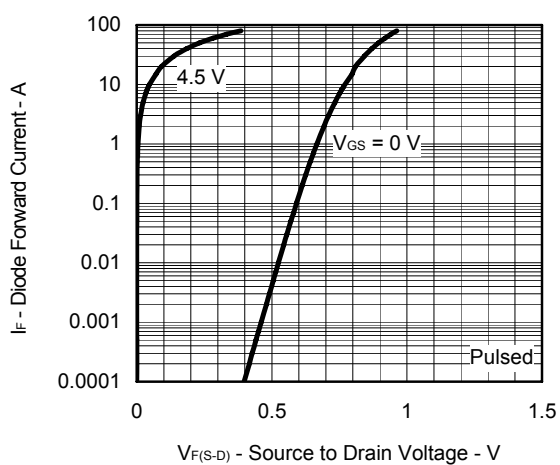
SWITCHING CHARACTERISTICS



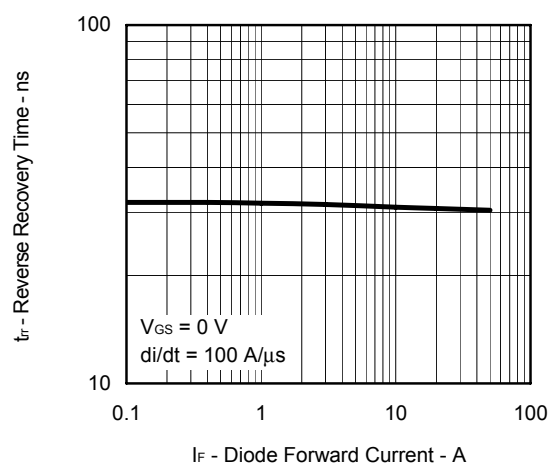
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

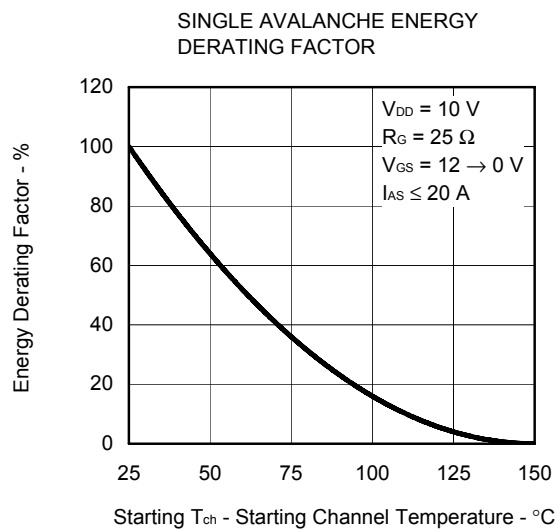
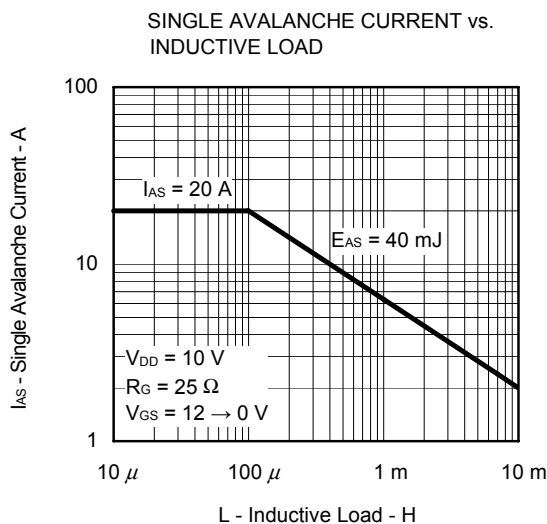


SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT





ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
μ PA2803T1L-E1-AY ^{Note}	Pure Sn	Tape 3000 p/reel	8-pin HVSON (3333)
μ PA2803T1L-E2-AY ^{Note}			0.028 g TYP.

Note Pb-free (This product does not contain Pb in the external electrode.)

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