DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR

μPA1727

SWITCHING
N-CHANNEL POWER MOS FET

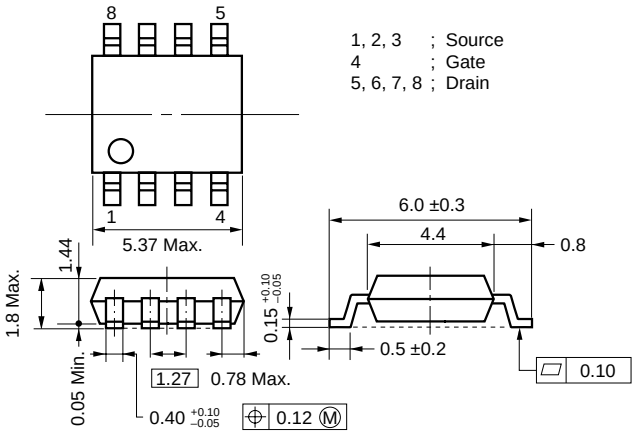
DESCRIPTION

The μPA1727 is N-Channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Single chip type
- Low on-state resistance
  $R_{DS(on)1}$ = 14 mΩ TYP. (V_{GS} = 10 V, I_D = 5.0 A)
  $R_{DS(on)2}$ = 17 mΩ TYP. (V_{GS} = 4.5 V, I_D = 5.0 A)
  $R_{DS(on)3}$ = 19 mΩ TYP. (V_{GS} = 4.0 V, I_D = 5.0 A)
- Low C_{iss}: C_{iss} = 2400 pF TYP.
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit: mm)



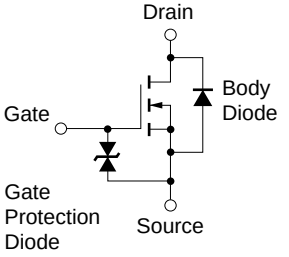
★ ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1727G	Power SOP8

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

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	60	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 (T_A = 25°C) Note2	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to + 150	°C
Single Avalanche Current Note3	I_{AS}	10	A
Single Avalanche Energy Note3	E_{AS}	200	mJ

EQUIVALENT CIRCUIT



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on ceramic substrate of 1200 mm^2 x 2.2 mm
3. Starting T_{ch} = 25°C, V_{DD} = 30 V, R_G = 25 Ω, V_{GS} = 20 → 0 V

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.

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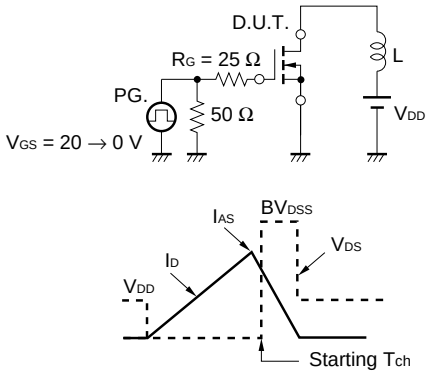
The mark ★ shows major revised points.

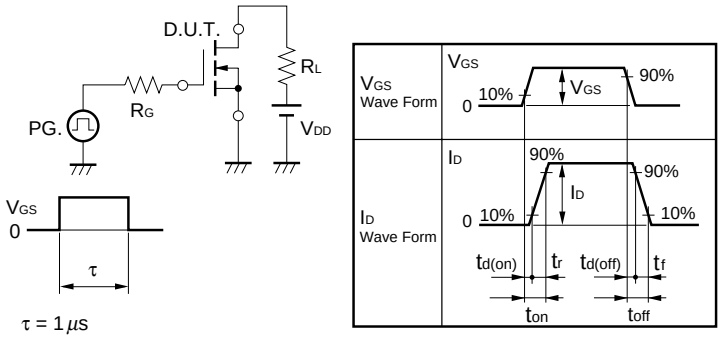
ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 5.0 A	8.0	14		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 10 V, I_D = 5.0 A		14	19	mΩ
	$R_{DS(on)2}$	V_{GS} = 4.5 V, I_D = 5.0 A		17	22	mΩ
	$R_{DS(on)3}$	V_{GS} = 4.0 V, I_D = 5.0 A		19	25	mΩ
Input Capacitance	C_{iss}	V_{DS} = 10 V		2400		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		400		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		200		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 30 V, I_D = 5.0 A		24		ns
Rise Time	t_r	V_{GS} = 10 V		120		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		120		ns
Fall Time	t_f			70		ns
Total Gate Charge	Q_G	V_{DD} = 48 V		45		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 10 V		6		nC
Gate to Drain Charge	Q_{GD}	I_D = 10 A		13		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 10 A, V_{GS} = 0 V		0.8		V
Reverse Recovery Time	t_{rr}	I_F = 10 A, V_{GS} = 0 V		45		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/ μs		84		nC

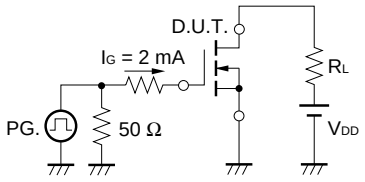
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

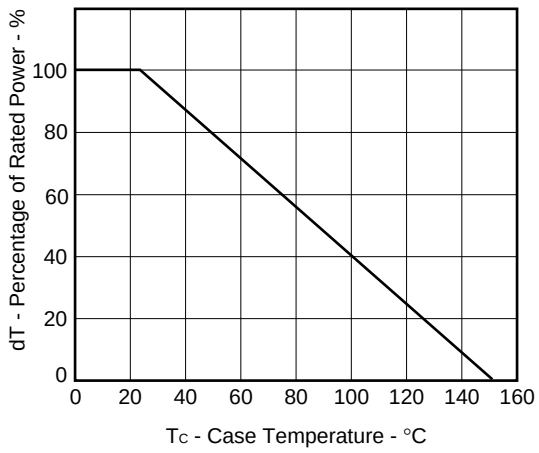


TEST CIRCUIT 3 GATE CHARGE

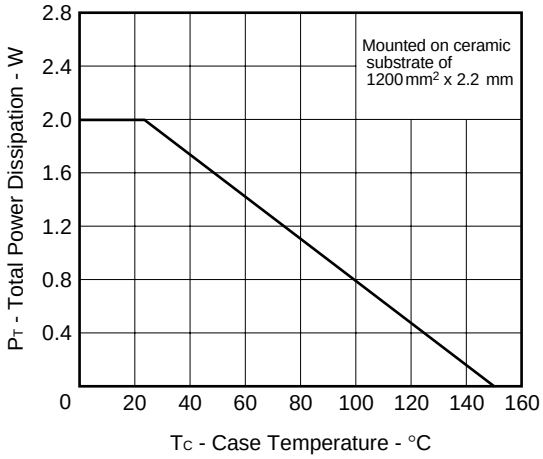


TYPICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

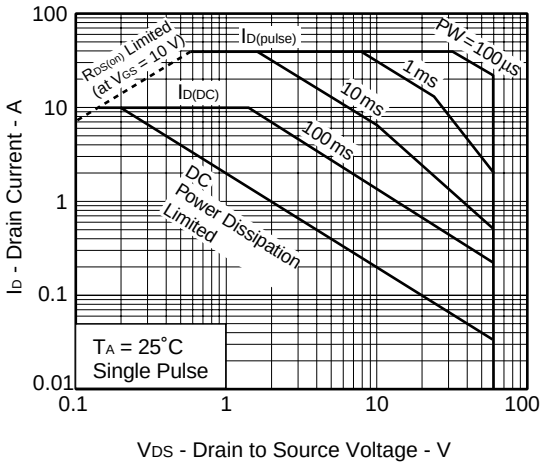
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



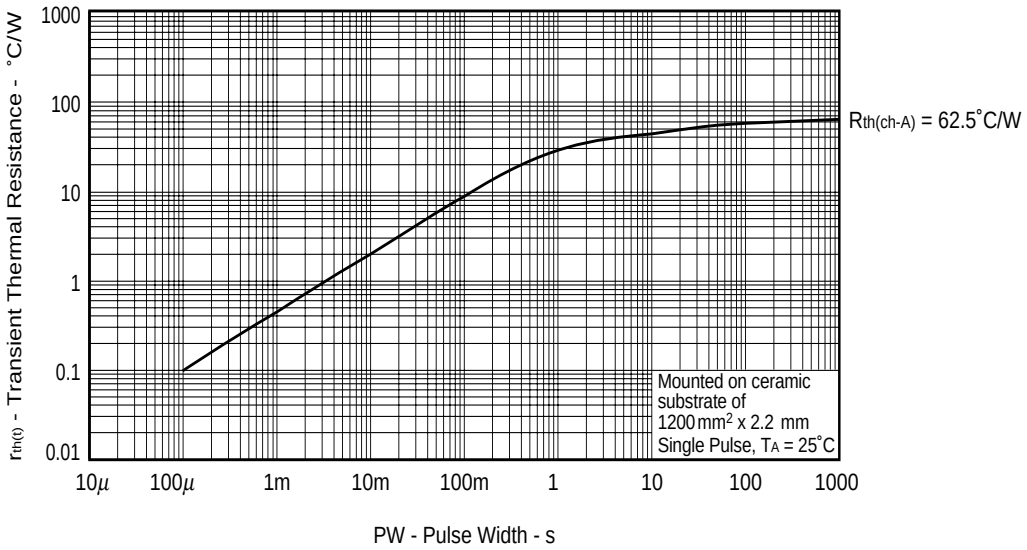
FORWARD BIAS SAFE OPERATING AREA



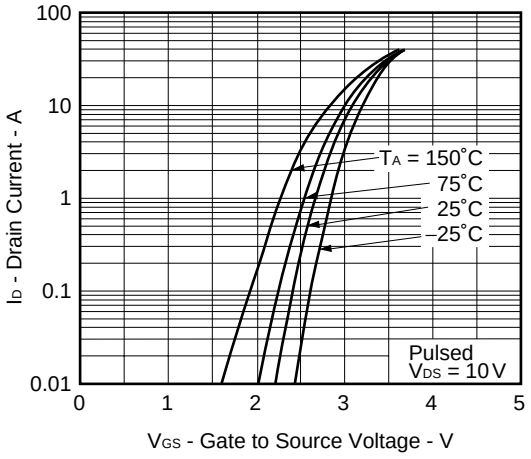
Remark

Mounted on ceramic substrate of 1200 mm^2 × 2.2 mm

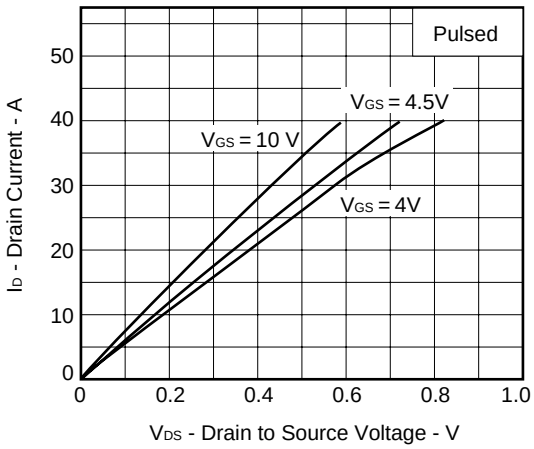
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



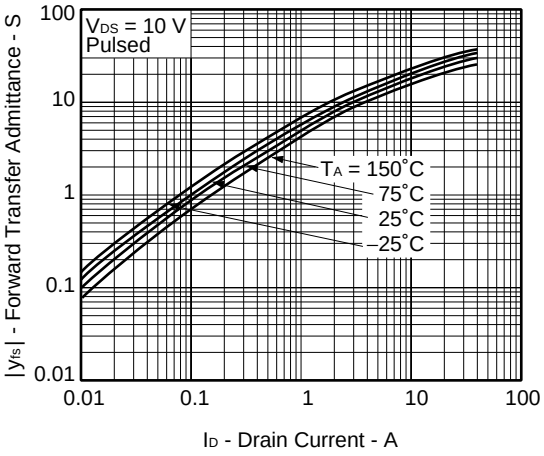
FORWARD TRANSFER CHARACTERISTICS



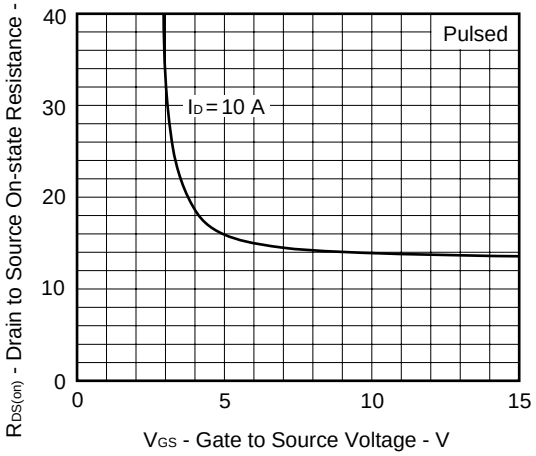
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



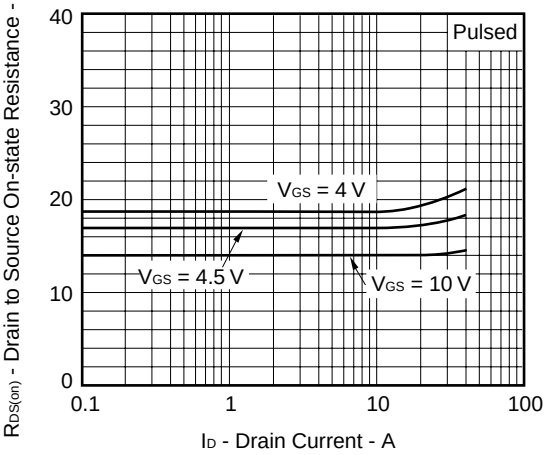
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



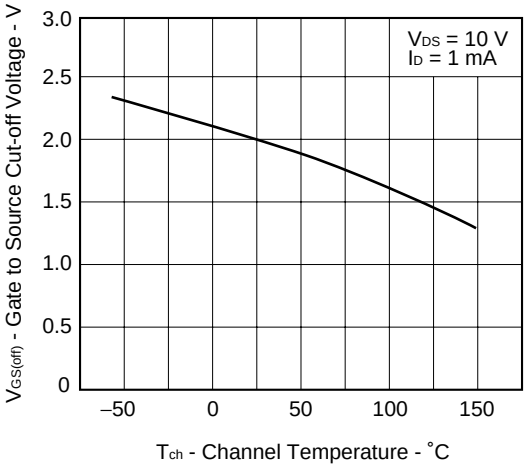
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



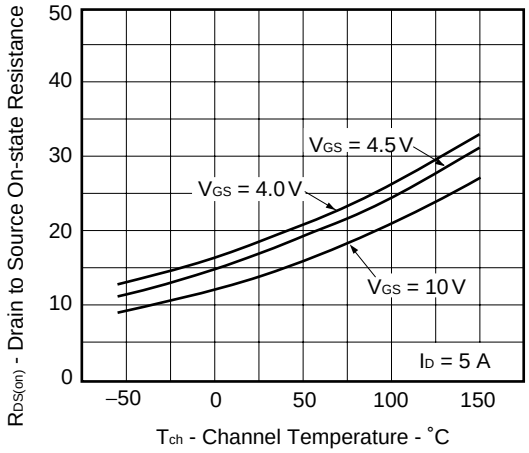
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



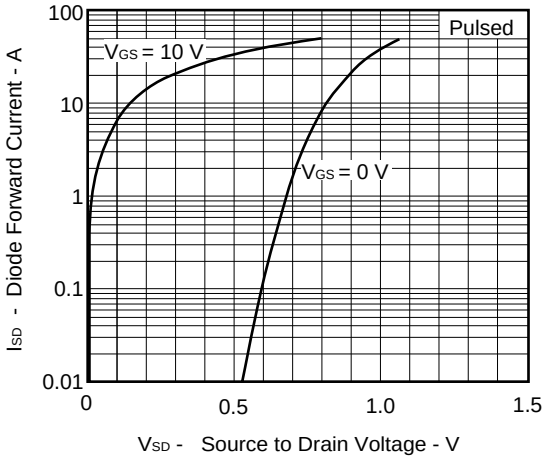
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



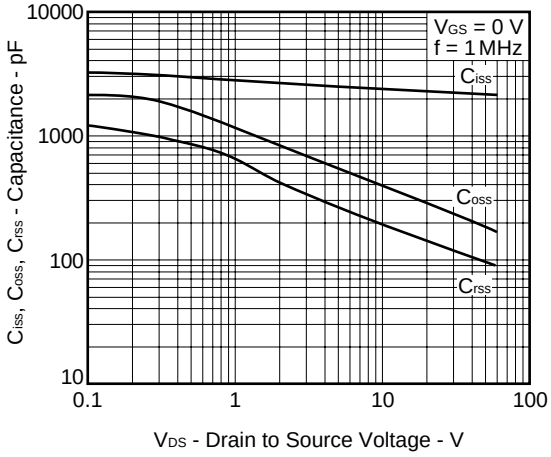
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



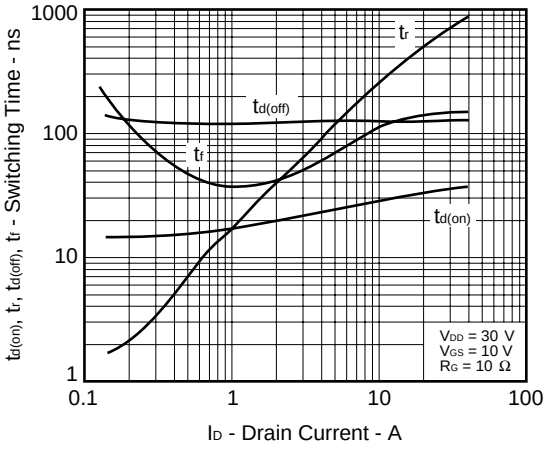
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



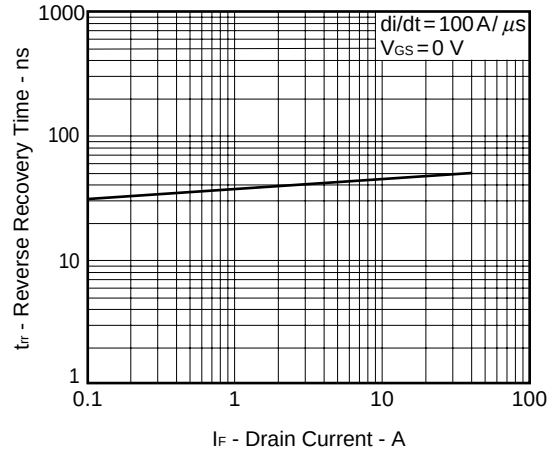
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



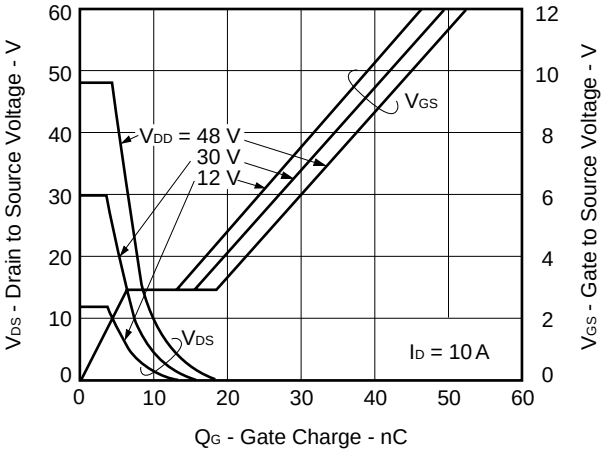
SWITCHING CHARACTERISTICS



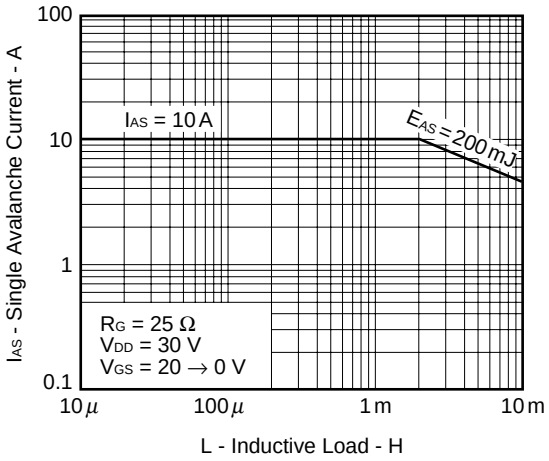
REVERSE RECOVERY TIME vs. DRAIN CURRENT



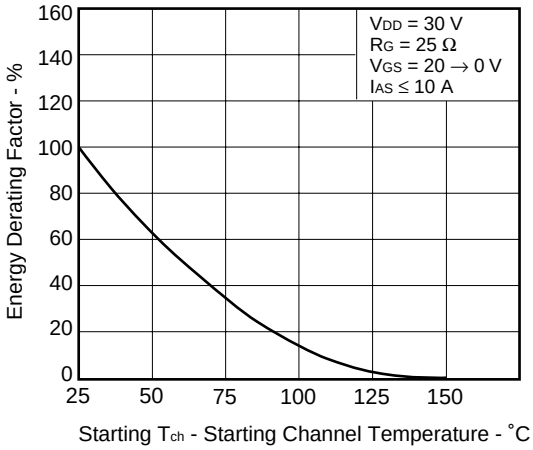
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SINGLE AVALANCHE CURRENT vs.
INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY
DERATING FACTOR



[MEMO]

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