

SWITCHING  
 N-CHANNEL POWER MOS FET

DESCRIPTION

The  $\mu$  PA2756GR is Dual N-channel MOS Field Effect Transistor designed for switching applications.

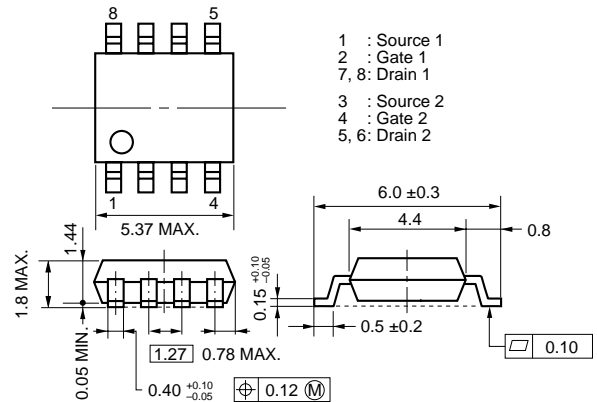
FEATURES

- Low on-state resistance  
 $R_{DS(on)1} = 105 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 2.0 \text{ A)}$   
 $R_{DS(on)2} = 150 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 2.0 \text{ A)}$
- Low  $C_{iss}$ :  $C_{iss} = 260 \text{ pF TYP.}$
- Built-in G-S protection diode against ESD
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA2756GR	Power SOP8

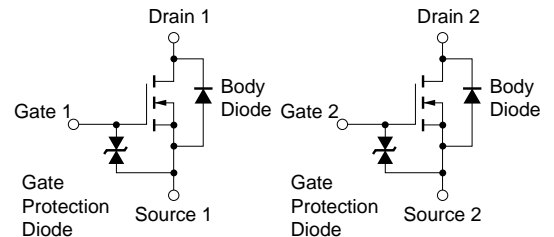
PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	60	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC) <sup>Note1</sup>	$I_{D(DC)}$	$\pm 4.0$	A
Drain Current (pulse) <sup>Note2</sup>	$I_{D(pulse)}$	$\pm 16$	A
Total Power Dissipation (1 unit) <sup>Note1</sup>	$P_{T1}$	1.6	W
Total Power Dissipation (2 units) <sup>Note1</sup>	$P_{T2}$	2.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \text{ to } +150$	$^\circ\text{C}$
Single Avalanche Current <sup>Note3</sup>	$I_{AS}$	4.0	A
Single Avalanche Energy <sup>Note3</sup>	$E_{AS}$	1.6	mJ
Repetitive Avalanche Energy <sup>Note4</sup>	$E_{AR}$	1.6	mJ

EQUIVALENT CIRCUIT



- Notes**
1. Mounted on ceramic substrate of  $2000 \text{ mm}^2 \times 2.2 \text{ mm}$
  2.  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$
  3. Starting  $T_{ch} = 25^\circ\text{C}$ ,  $V_{DD} = 30 \text{ V}$ ,  $R_G = 25 \Omega$ ,  $V_{GS} = 20 \rightarrow 0 \text{ V}$
  4.  $I_{AR} \leq 4.0 \text{ A}$ ,  $T_{ch} \leq 150^\circ\text{C}$

**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.

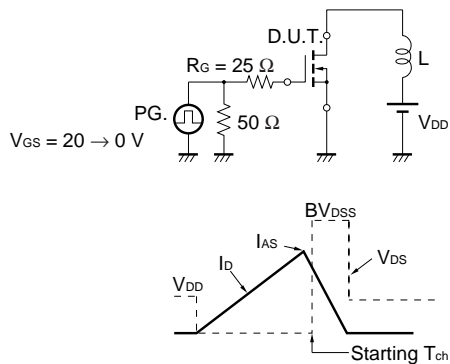
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**ELECTRICAL CHARACTERISTICS (TA = 25°C)**

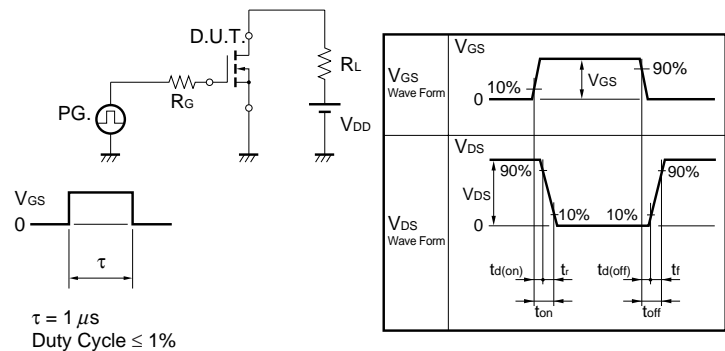
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			10	$\mu\text{A}$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 18\text{ V}, V_{DS} = 0\text{ V}$			$\pm 10$	$\mu\text{A}$
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.5	2.0	2.5	V
Forward Transfer Admittance <b>Note</b>	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 2.0\text{ A}$	2.0			S
Drain to Source On-state Resistance <b>Note</b>	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 2.0\text{ A}$		85	105	$\text{m}\Omega$
	$R_{DS(on)2}$	$V_{GS} = 4.0\text{ V}, I_D = 2.0\text{ A}$		106	150	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = 10\text{ V}$		260		pF
Output Capacitance	$C_{oss}$	$V_{GS} = 0\text{ V}$		65		pF
Reverse Transfer Capacitance	$C_{rss}$	$f = 1\text{ MHz}$		20		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, I_D = 2.0\text{ A}$		14		ns
Rise Time	$t_r$	$V_{GS} = 10\text{ V}$		5		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		80		ns
Fall Time	$t_f$			30		ns
Total Gate Charge	$Q_G$	$V_{DD} = 48\text{ V}$		6		nC
Gate to Source Charge	$Q_{GS}$	$V_{GS} = 10\text{ V}$		1		nC
Gate to Drain Charge	$Q_{GD}$	$I_D = 4.0\text{ A}$		1.5		nC
Body Diode Forward Voltage <b>Note</b>	$V_{F(S-D)}$	$I_F = 4.0\text{ A}, V_{GS} = 0\text{ V}$		0.9		V
Reverse Recovery Time	$t_{rr}$	$I_F = 4.0\text{ A}, V_{GS} = 0\text{ V}$		24		ns
Reverse Recovery Charge	$Q_{rr}$	$di/dt = 100\text{ A}/\mu\text{s}$		22		nC

**Note** Pulsed

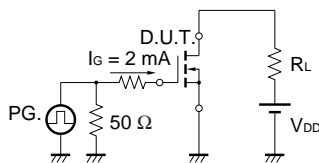
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



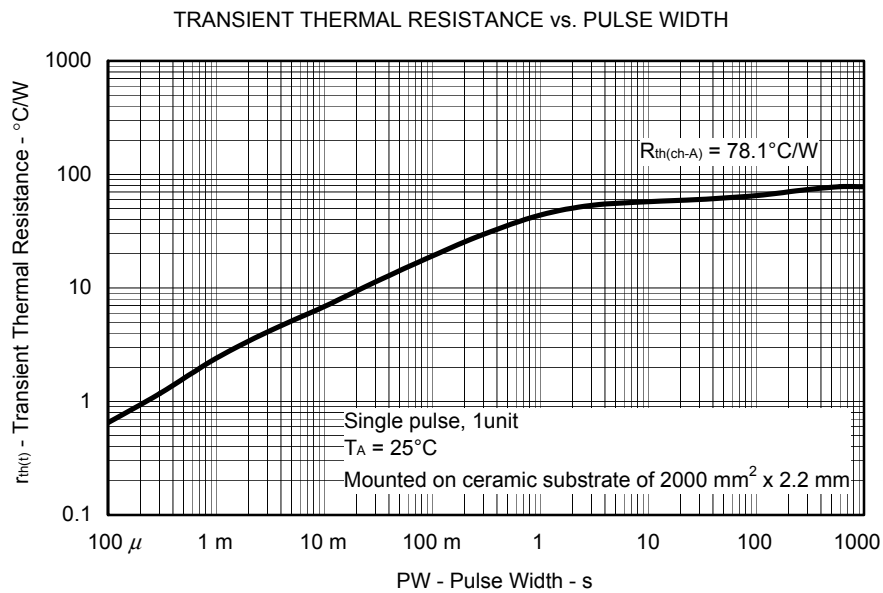
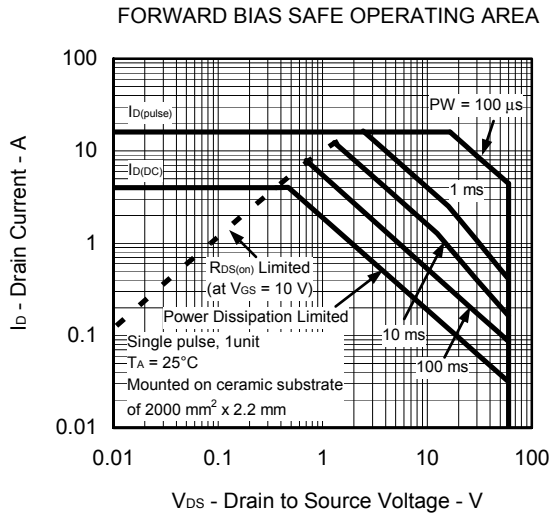
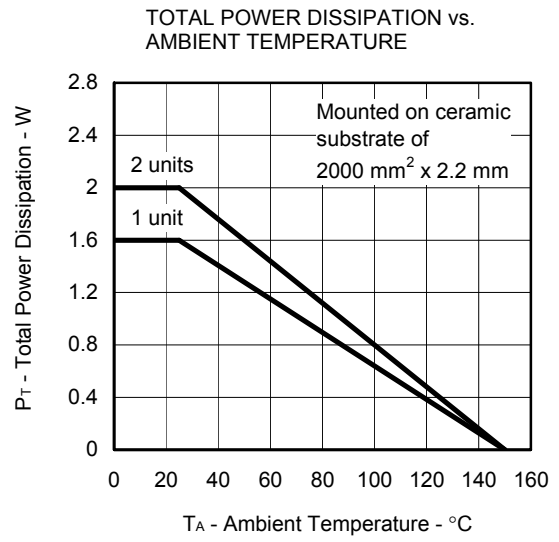
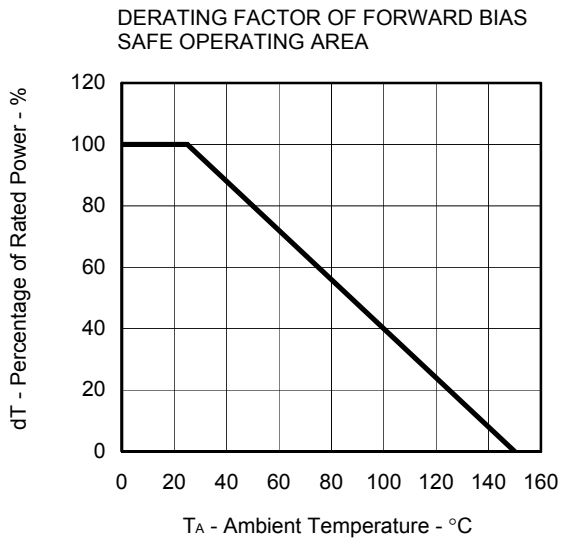
**TEST CIRCUIT 2 SWITCHING TIME**



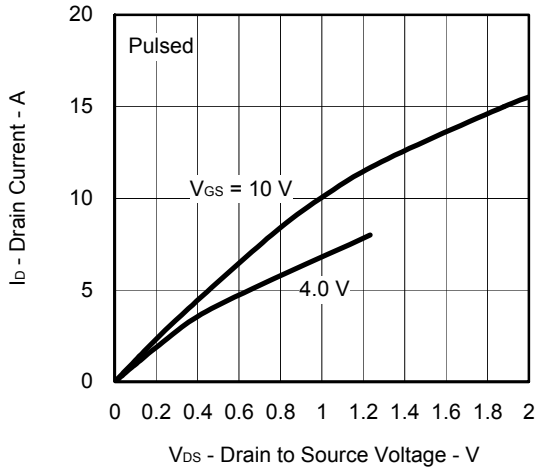
**TEST CIRCUIT 3 GATE CHARGE**



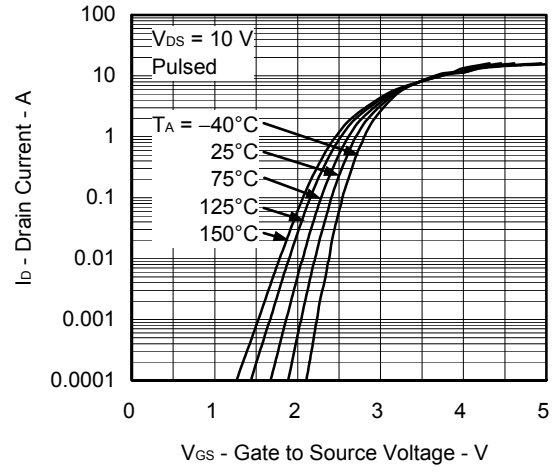
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



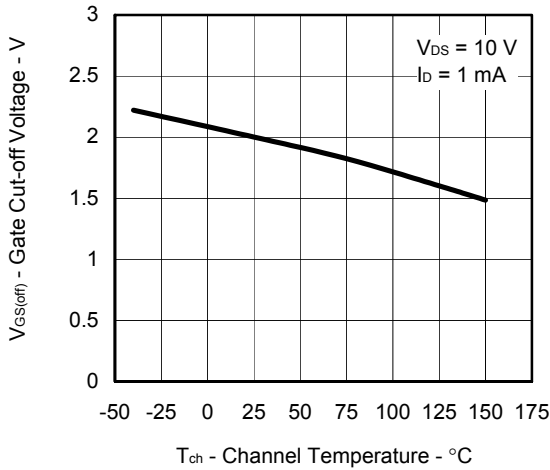
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



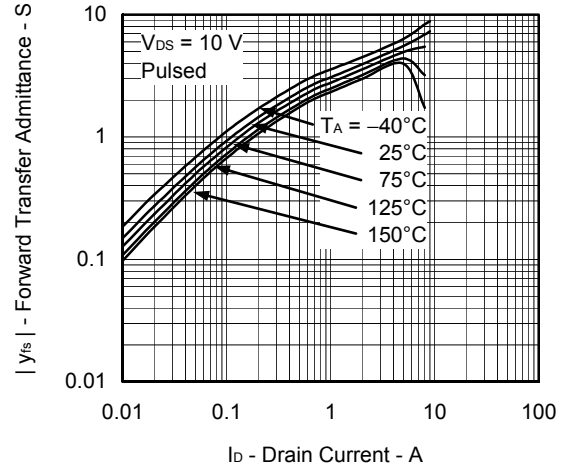
FORWARD TRANSFER CHARACTERISTICS



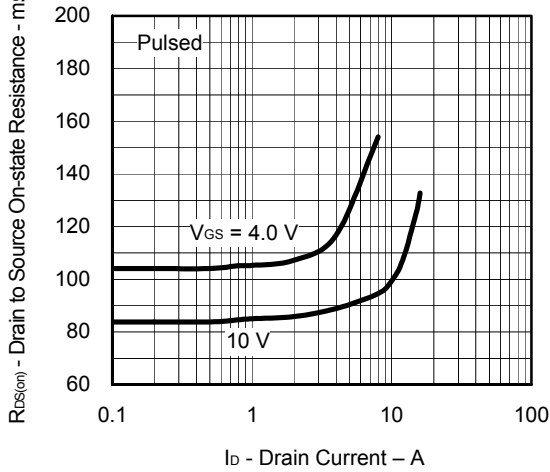
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



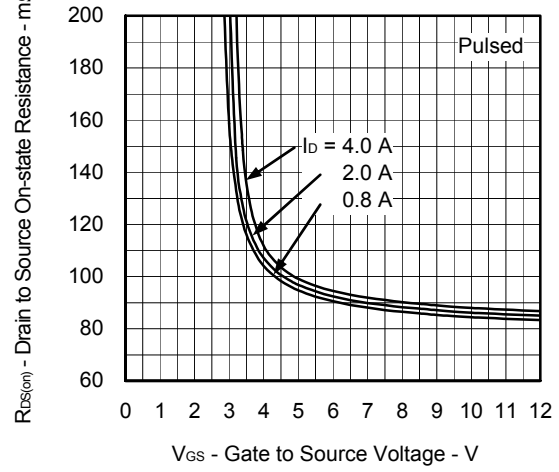
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



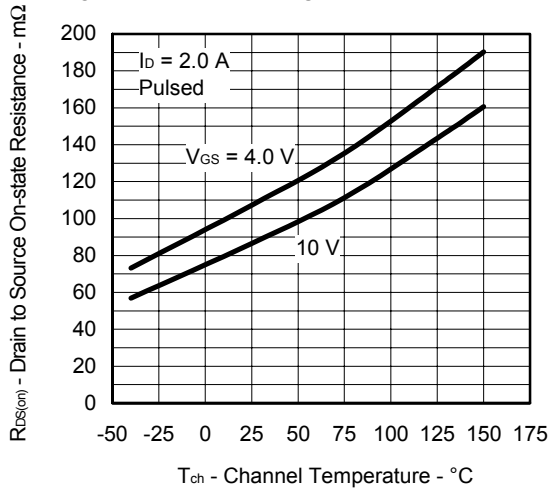
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



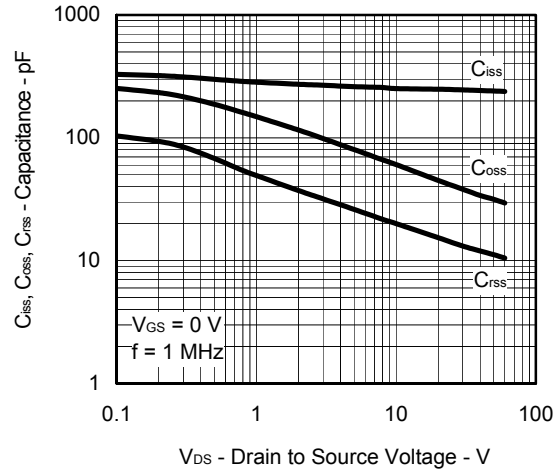
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



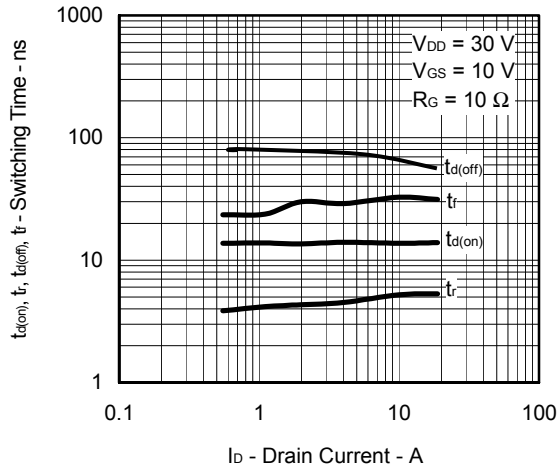
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



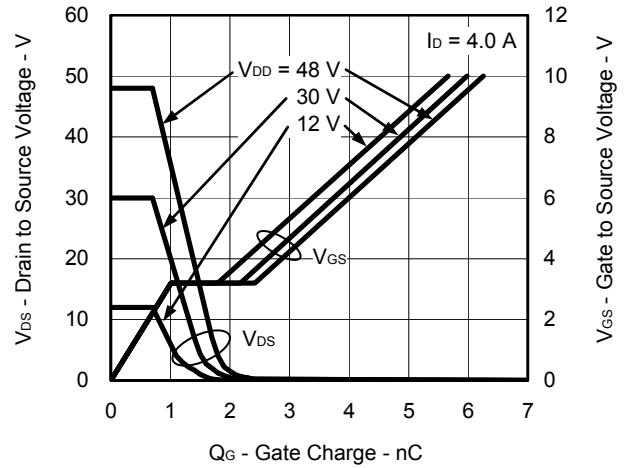
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



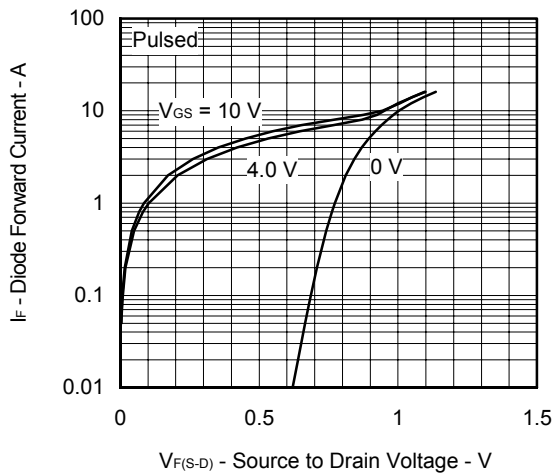
SWITCHING CHARACTERISTICS



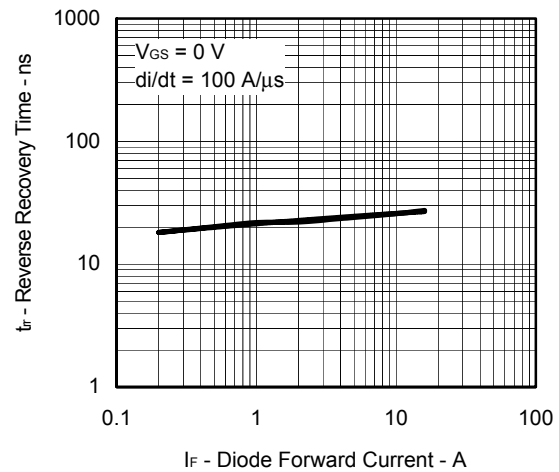
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



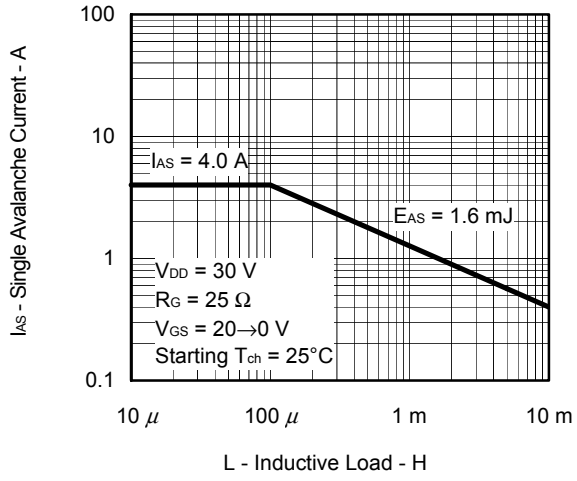
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



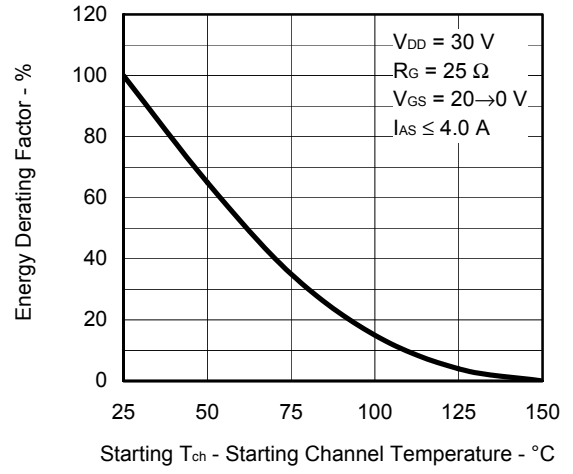
REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY DERATING FACTOR



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