

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The μPA2754GR is Dual N-channel MOS Field Effect Transistor designed for Li-ion battery protection circuit and power management application.

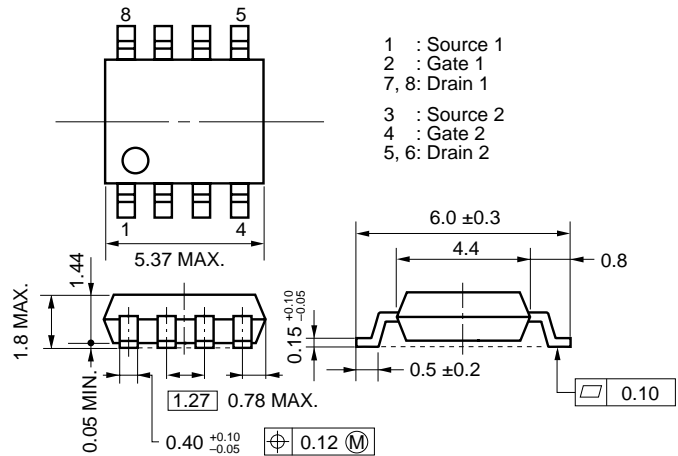
FEATURES

- Dual chip type
- Low on-state resistance
 $R_{DS(on)1} = 14.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 5.5 \text{ A)}$
 $R_{DS(on)2} = 15.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 5.5 \text{ A)}$
 $R_{DS(on)4} = 18.6 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 5.5 \text{ A)}$
- Low C_{iss} : $C_{iss} = 1940 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA2754GR	Power SOP8

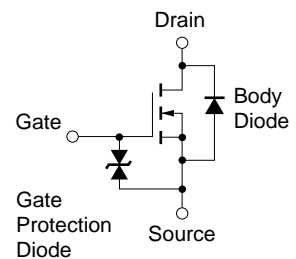
PACKAGE DRAWING (Unit: mm)



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

Parameter	Symbol	Value	Unit
Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	30	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±12	V
Drain Current (DC) ^{Note2}	I _{D(DC)}	±11	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±88	A
Total Power Dissipation (2 units) ^{Note2}	P _T	2.0	W
Total Power Dissipation (1 unit) ^{Note2}	P _T	1.7	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C
Single Avalanche Current ^{Note3}	I _{AS}	11	A
Single Avalanche Energy ^{Note3}	E _{AS}	12.1	mJ

EQUIVALENT CIRCUIT (1/2 circuit)



- Notes**
1. $PW \leq 10 \mu s$, Duty cycle $\leq 1\%$
 2. $T_A = 25^\circ C$, Mounted on ceramic substrate of $2000 \text{ mm}^2 \times 2.2 \text{ mm}$
 3. Starting $T_{ch} = 25^\circ C$, $V_{DD} = 15 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 12 \rightarrow 0 \text{ V}$

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.

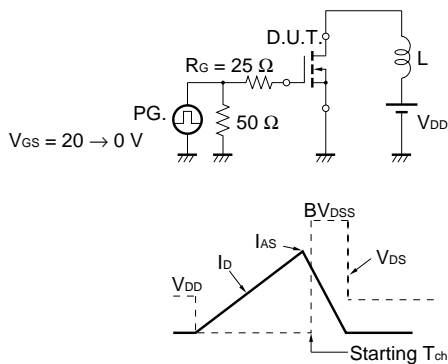
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ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

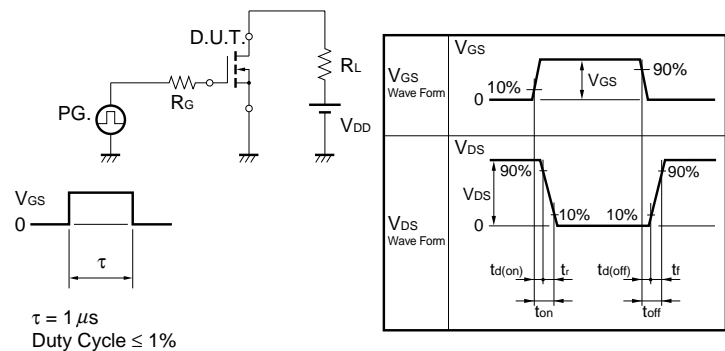
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate Cut-off Voltage ^{Note}	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	0.5		1.5	V
Forward Transfer Admittance ^{Note}	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 5.5\text{ A}$	8	16		S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = 4.5\text{ V}, I_D = 5.5\text{ A}$		11.5	14.5	mΩ
	$R_{DS(on)2}$	$V_{GS} = 4.0\text{ V}, I_D = 5.5\text{ A}$		11.8	15.0	mΩ
	$R_{DS(on)3}$	$V_{GS} = 3.1\text{ V}, I_D = 5.5\text{ A}$		12.7	16.9	mΩ
	$R_{DS(on)4}$	$V_{GS} = 2.5\text{ V}, I_D = 5.5\text{ A}$		13.9	18.6	mΩ
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V}$		1940		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V}$		385		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		270		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, I_D = 5.5\text{ A}$		21		ns
Rise Time	t_r	$V_{GS} = 4.5\text{ V}$		45		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		75		ns
Fall Time	t_f			30		ns
Total Gate Charge	Q_G	$V_{DD} = 24\text{ V}$		25		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 4.5\text{ V}$		3		nC
Gate to Drain Charge	Q_{GD}	$I_D = 11\text{ A}$		10		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	$I_F = 11\text{ A}, V_{GS} = 0\text{ V}$		0.81	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 11\text{ A}, V_{GS} = 0\text{ V}$		47		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		41		nC

Note Pulsed: $PW \leq 350\ \mu\text{s}$, Duty Cycle $\leq 2\%$

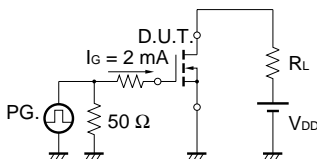
TEST CIRCUIT 1 AVALANCHE CAPABILITY



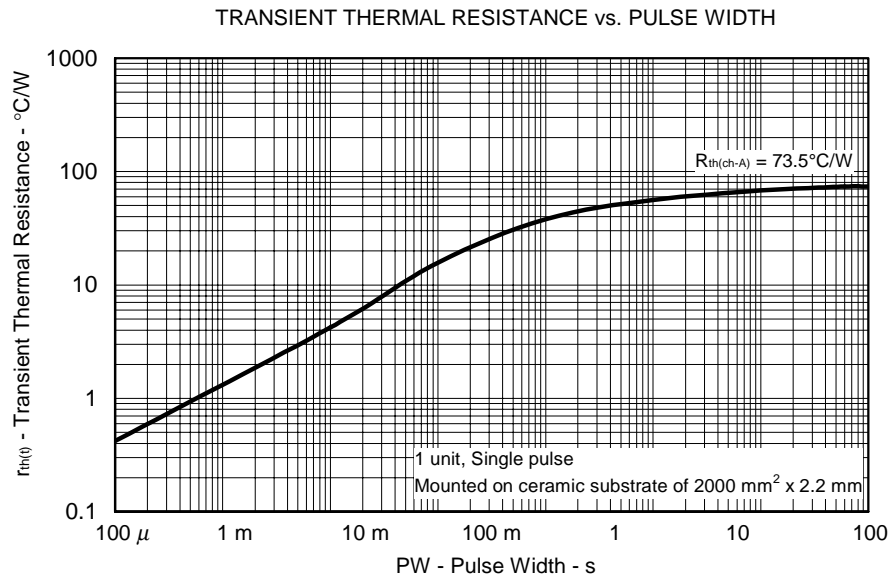
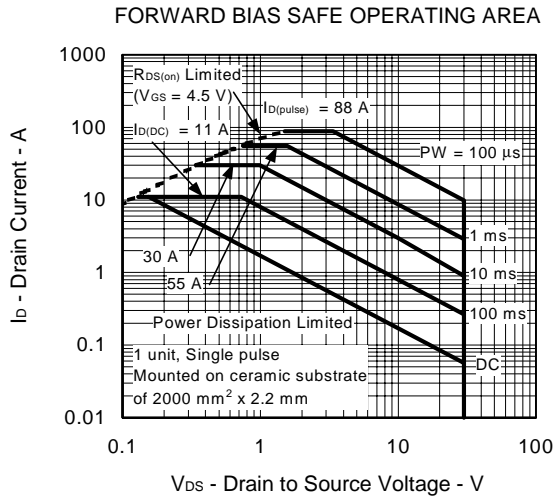
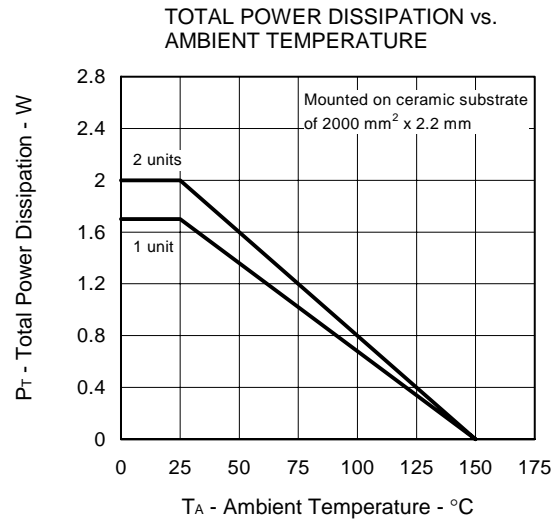
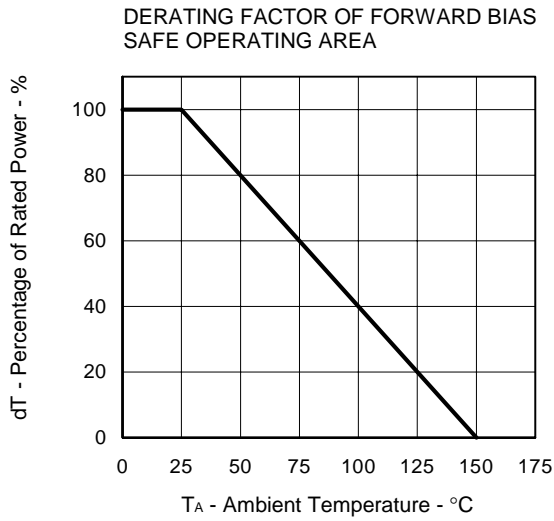
TEST CIRCUIT 2 SWITCHING TIME



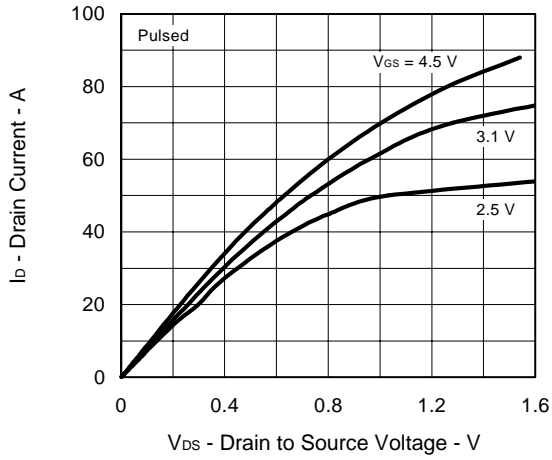
TEST CIRCUIT 3 GATE CHARGE



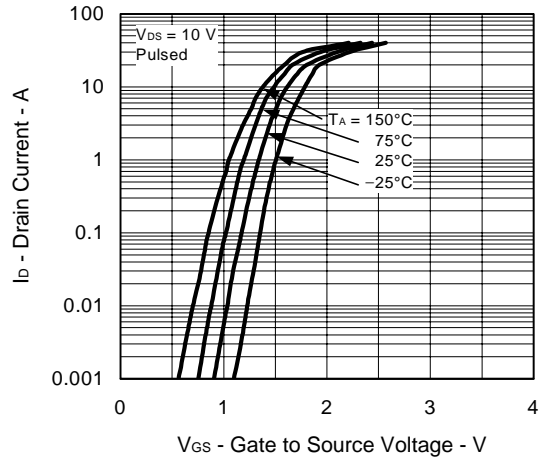
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, All terminals are connected.)



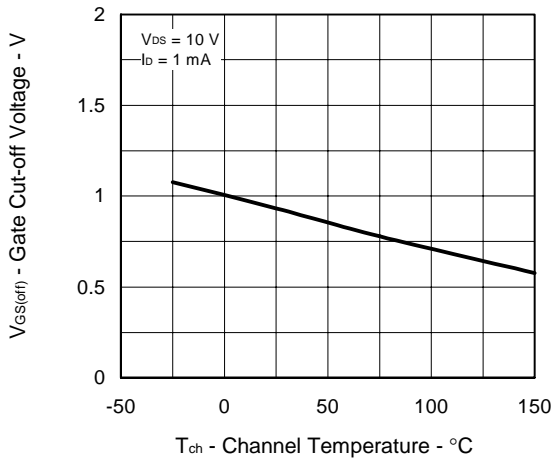
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



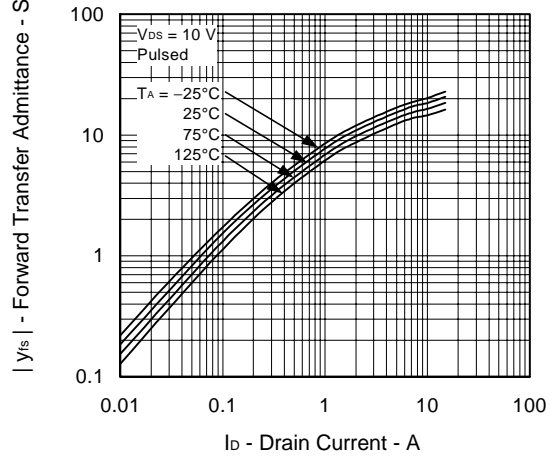
FORWARD TRANSFER CHARACTERISTICS



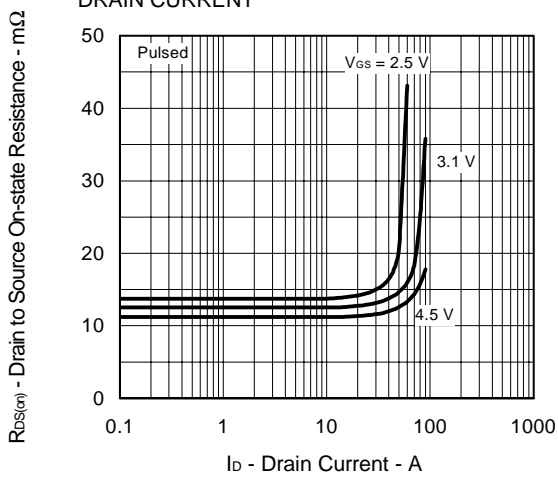
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



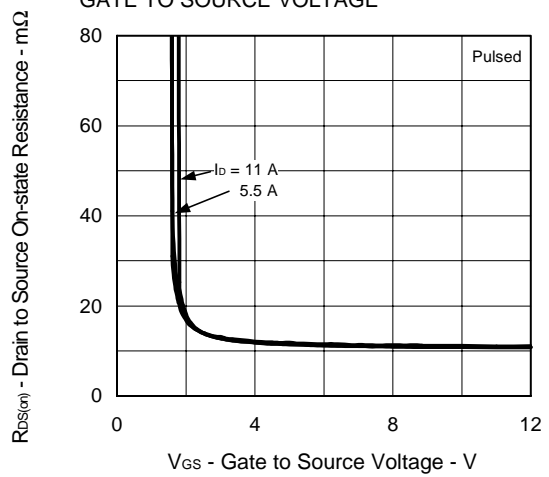
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



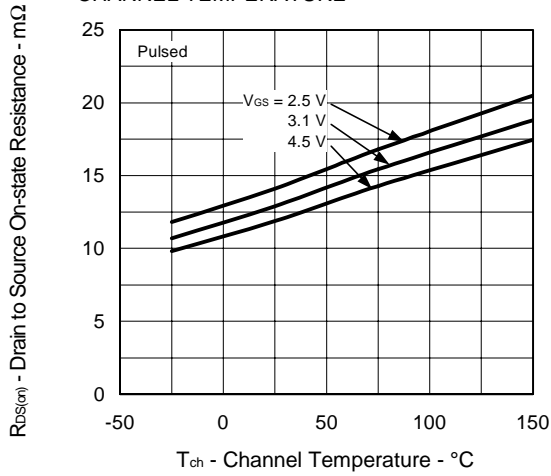
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



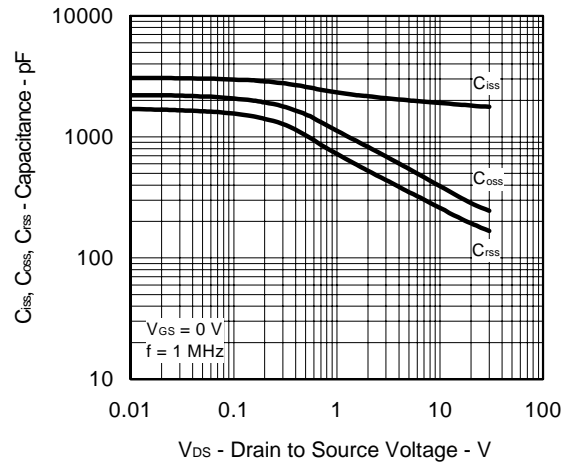
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



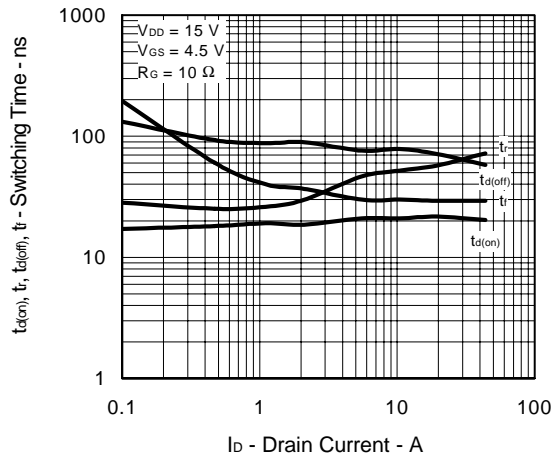
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



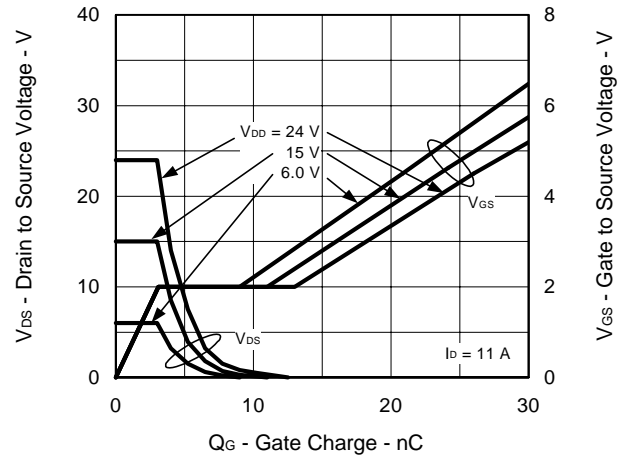
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



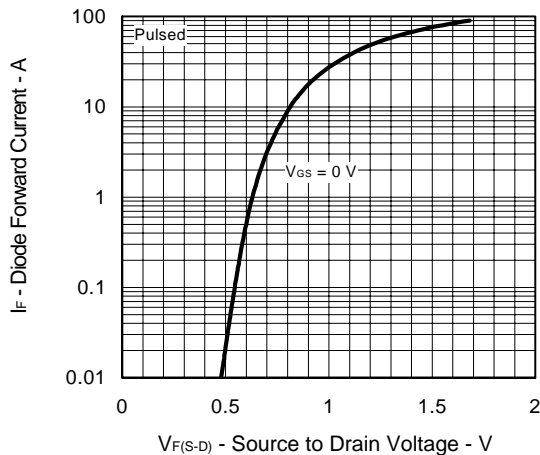
SWITCHING CHARACTERISTICS



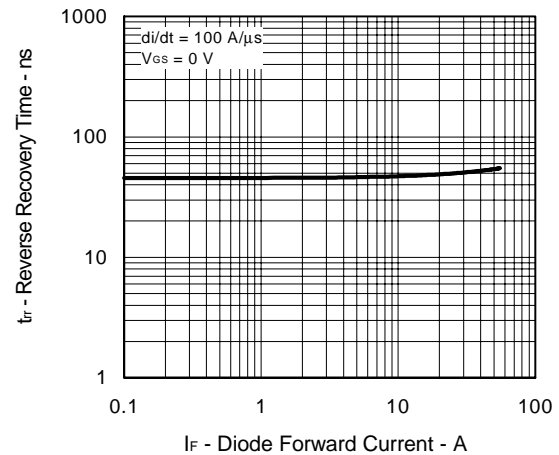
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

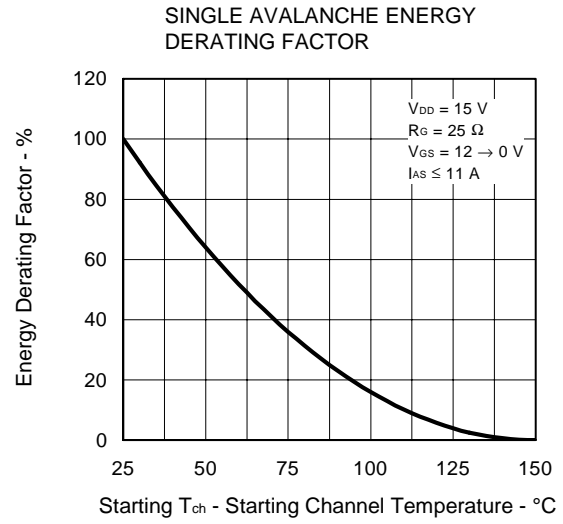
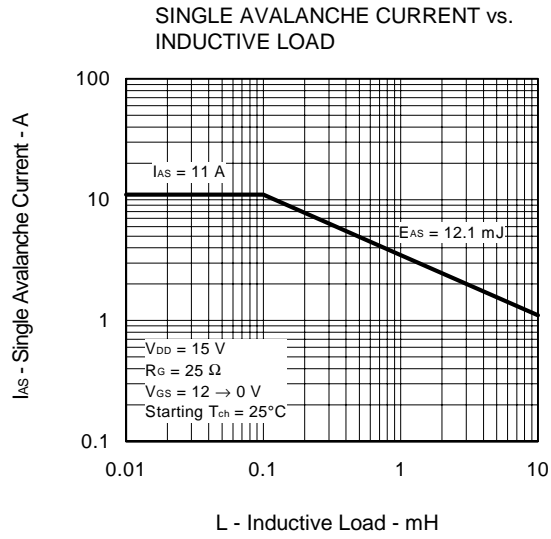


SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT





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