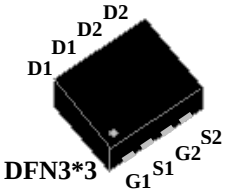
Preliminary

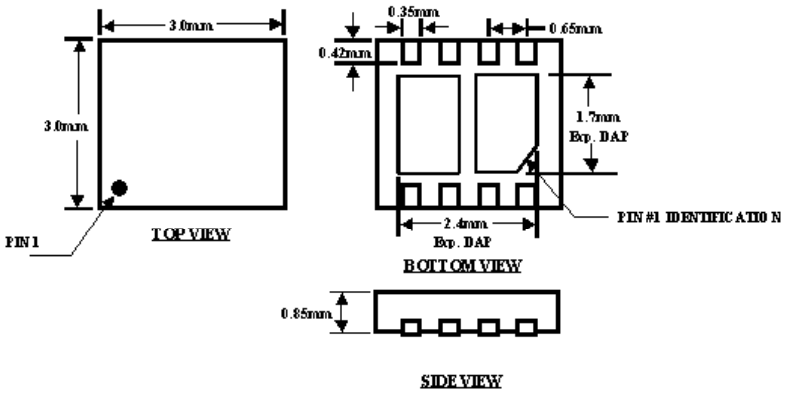
Advanced Power Electronics Corp.

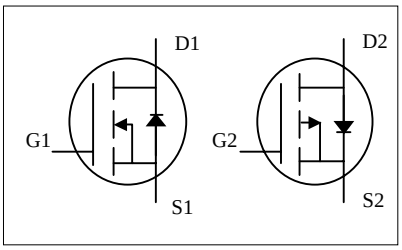
N AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ Bottom Exposed DFN
- ▼ Low On-resistance
- ▼ Lower Profile
- ▼ RoHS Compliant



N-CH	BV_{DSS}	20V
	$R_{DS(ON)}$	35mΩ
	I_D	4.7A
P-CH	BV_{DSS}	-20V
	$R_{DS(ON)}$	65mΩ
	I_D	-3.3A





Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±12	±12	V
I_D@T_A=25℃	Continuous Drain Current[3]	4.7	-3.3	A
I_D@T_A=70℃	Continuous Drain Current[3]	3.8	-2.7	A
I_{DM}	Pulsed Drain Current[1]	20	-20	A
P_D@T_A=25℃	Total Power Dissipation	1.25		W
	Linear Derating Factor	0.01		W/℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Data

Symbol	Parameter		Value	Unit
Rthj-a	Thermal Resistance Junction-ambient[3]	Max.	100	℃/W

N-CH Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	20	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.1	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V, I_D=3.5A	-	-	35	mΩ
		V_{GS}=2.5V, I_D=2A	-	-	52	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	0.3	-	1.2	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=3.5A	-	3.5	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=20V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=70°C)	V_{DS}=16V, V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±12V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=3.5A	-	9.5	15	nC
Q_{gs}	Gate-Source Charge	V_{DS}=16V	-	1.2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	4	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=10V	-	8	-	ns
t_r	Rise Time	I_D=1A	-	10	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=10V	-	17	-	ns
t_f	Fall Time	R_D=10Ω	-	6	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	600	960	pF
C_{oss}	Output Capacitance	V_{DS}=15V	-	140	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	110	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=1.2A, V_{GS}=0V	-	-	1.2	V
trr	Reverse Recovery Time	I_S=3.5A, V_{GS}=0V,	-	20	-	ns
Qrr	Reverse Recovery Charge	dI/dt=100A/μs	-	14	-	nC

P-CH Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-20	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=-1mA	-	-0.1	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-2.5A	-	-	65	mΩ
		V_{GS}=-2.5V, I_D=-1.5A	-	-	100	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.3	-	-1.2	V
g_{fs}	Forward Transconductance	V_{DS}=-5V, I_D=-2.5A	-	2.5	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=-20V, V_{GS}=0V	-	-	-1	uA
	Drain-Source Leakage Current (T_j=70°C)	V_{DS}=-16V ,V_{GS}=0V	-	-	-10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±12V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=-2.5A	-	10.7	17	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-16V	-	1.8	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	4.7	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=-10V	-	9	-	ns
t_r	Rise Time	I_D=-1A	-	8	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=-10V	-	32	-	ns
t_f	Fall Time	R_D=10Ω	-	10	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	740	1180	pF
C_{oss}	Output Capacitance	V_{DS}=-15V	-	170	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	130	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Forward On Voltage[2]	I_S=-1.2A, V_{GS}=0V	-	-	-1.2	V
trr	Reverse Recovery Time	I_S=-2.5A, V_{GS}=0V,	-	28	-	ns
Qrr	Reverse Recovery Charge	dI/dt=100A/μs	-	19	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse width ≤300us , duty cycle ≤2%.

3.Surface mounted FR4 board, t≦5s.

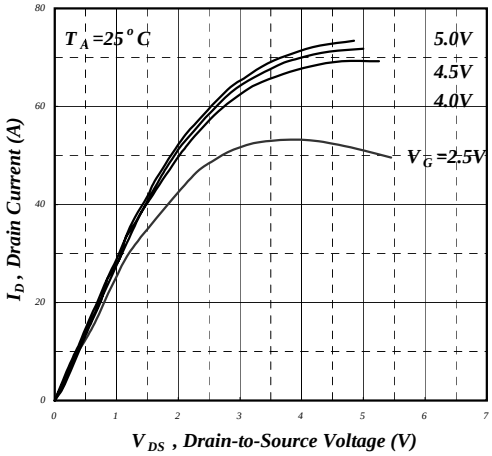


Fig 1. Typical Output Characteristics

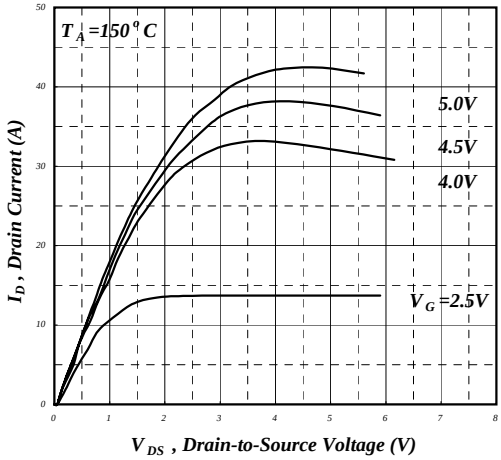


Fig 2. Typical Output Characteristics

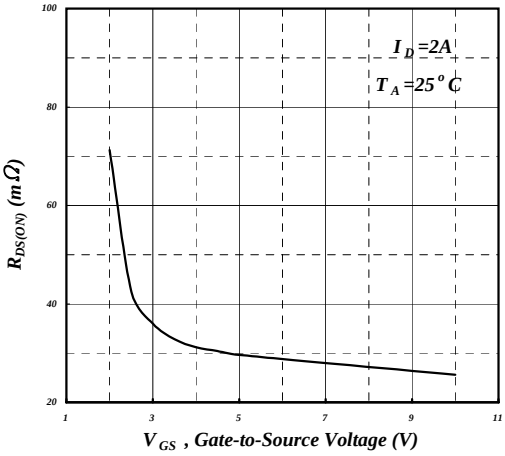


Fig 3. On-Resistance v.s. Gate Voltage

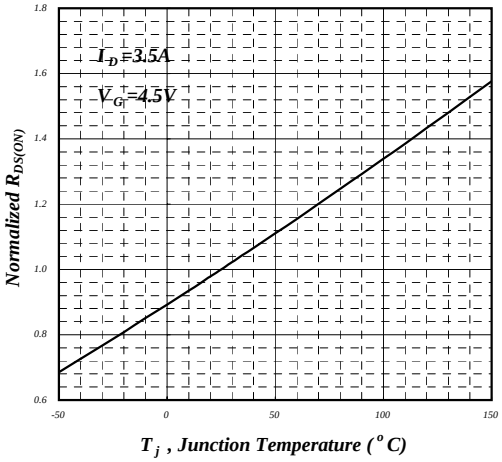


Fig 4. Normalized On-Resistance v.s. Junction Temperature

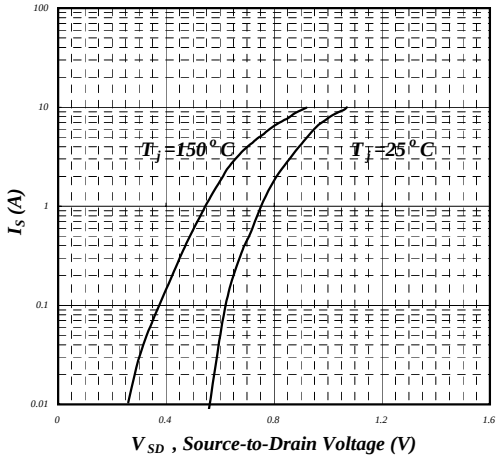


Fig 5. Forward Characteristic of Reverse Diode

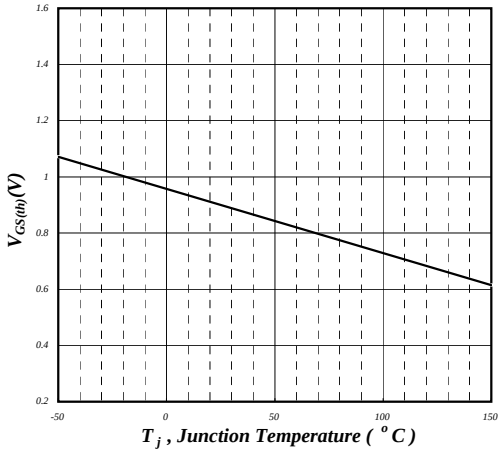


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

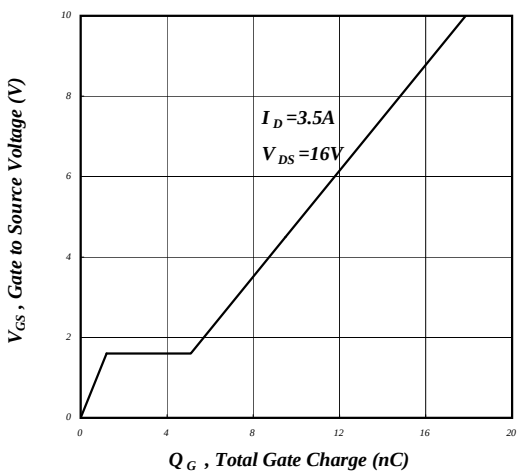


Fig 7. Gate Charge Characteristics

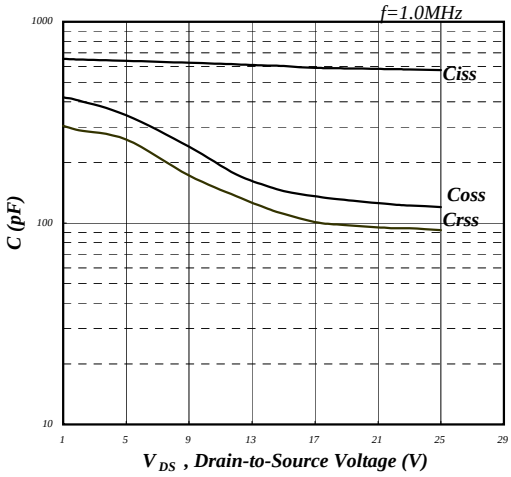


Fig 8. Typical Capacitance Characteristics

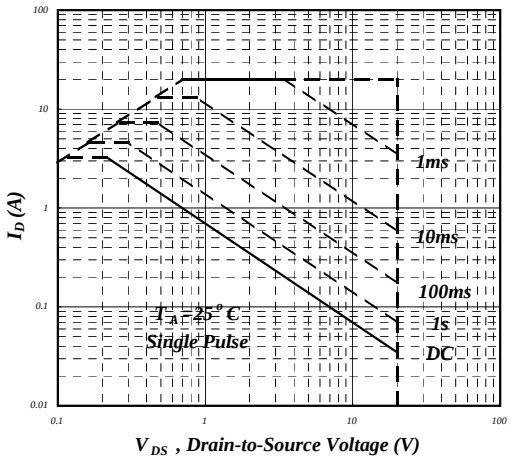


Fig 9. Maximum Safe Operating Area

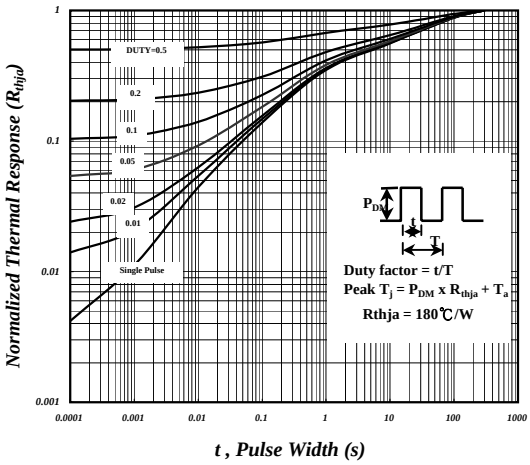


Fig 10. Effective Transient Thermal Impedance

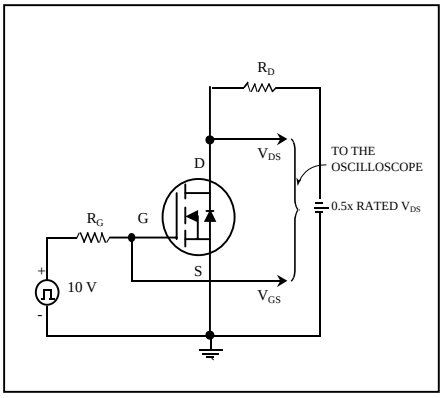


Fig 11. Switching Time Circuit

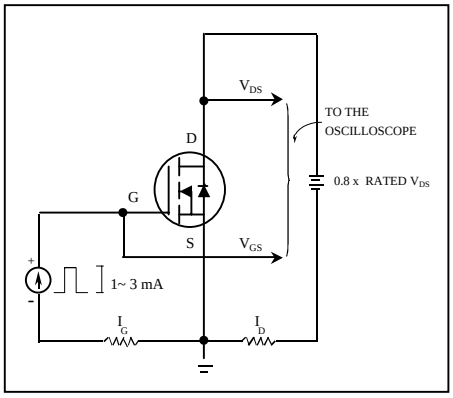


Fig 12. Gate Charge Circuit

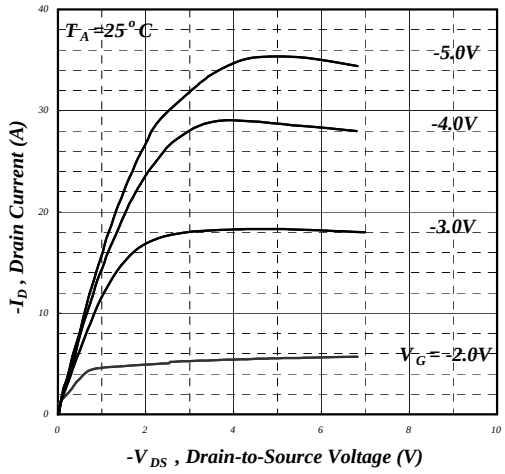


Fig 1. Typical Output Characteristics

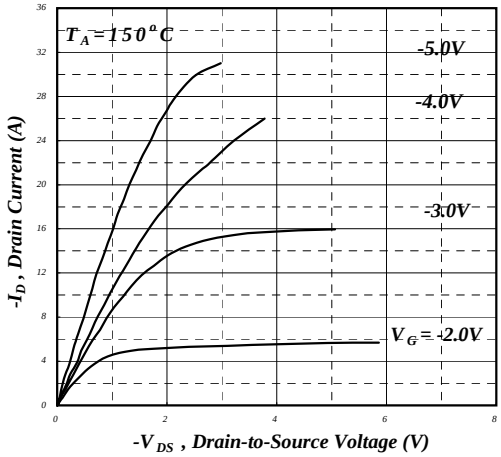


Fig 2. Typical Output Characteristics

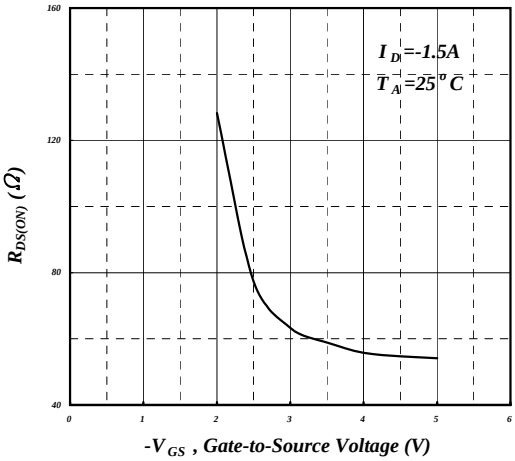


Fig 3. On-Resistance v.s. Gate Voltage

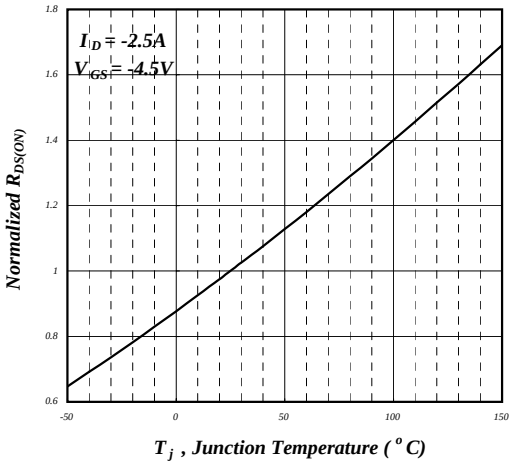
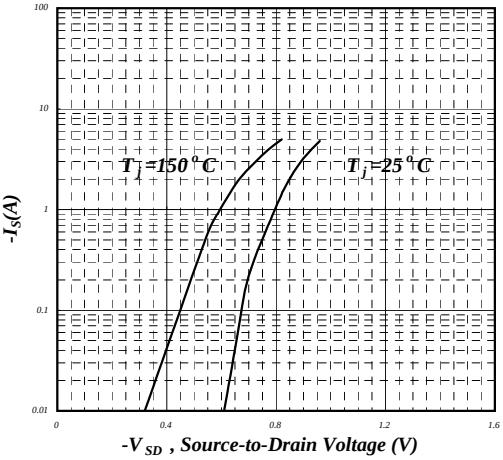


Fig 4. Normalized On-Resistance v.s. Junction Temperature



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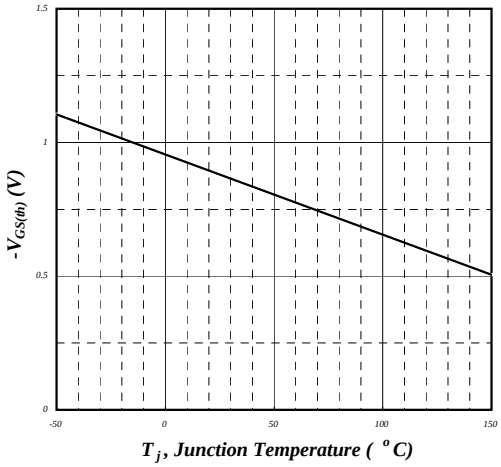

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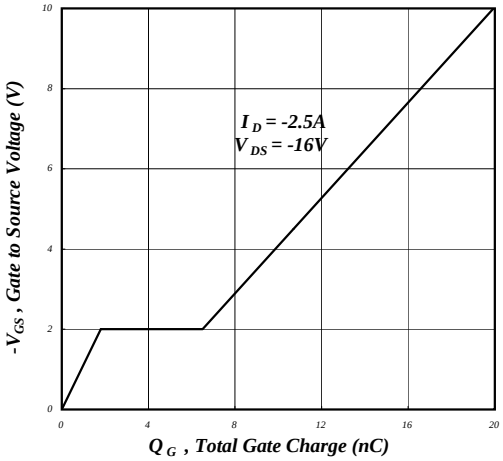

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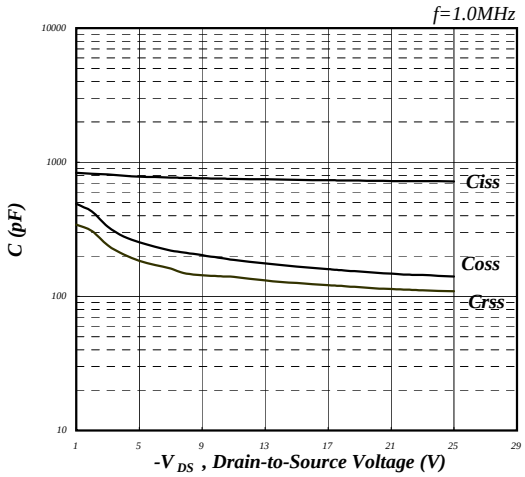

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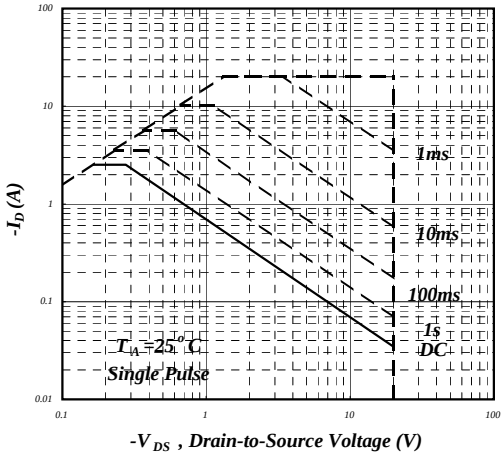

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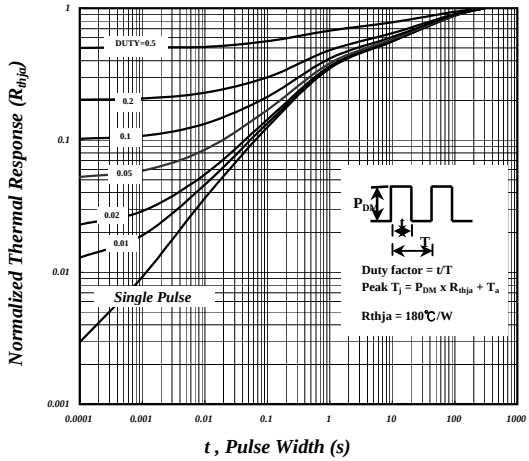

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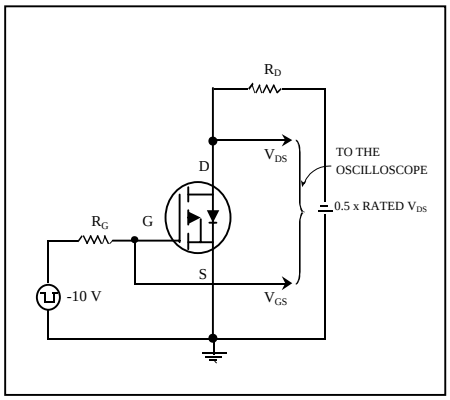

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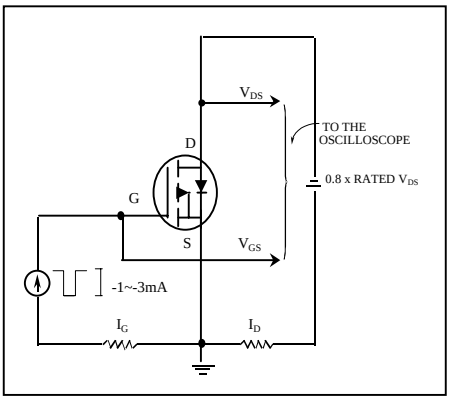

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