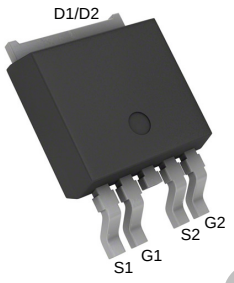
WGM3012D

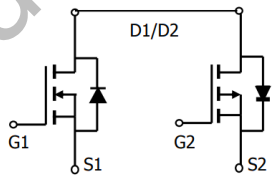
TO-252-4L

RoHS COMPLIANT



Features:

- ☐ Advanced Trench Technology.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ V_{DS} = 30V I_D =30 A
- ☐ $R_{DS(ON)}$ < 12mΩ @ V_{GS}=10V (Type: 9.0mΩ)
- ☐ V_{DS} = -30V I_D =-28A
- ☐ $R_{DS(ON)}$ < 17mΩ @ V_{GS}=10V (Type: 13m Ω)



Wildgoose Semiconductor

Absolute Maximum Ratings* (Tc=25℃ Unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±12	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	30	-28	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	15	-13	A
I_{DM}	Pulsed Drain Current L=0.5mH,VG=10V,VD=50V,Vds=30V	44		A
I_{DM}	Pulsed Drain Current L=0.5mH,VG=-10V,VD=-50V,Vds=-30V		-40	A
P_D@T_C=25℃	Total Power Dissipation[4]	25	25	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	62		℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	5		℃/W

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D =12A	-	9.0	12	mΩ
		V_{GS} = 4.5V, I_D =12A	-	13	21	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	860	-	pF
C_{oss}	Output Capacitance		-	89	-	pF
C_{rss}	Reverse Transfer Capacitance		-	54	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 15V, I_D = 3A	-	19	-	nC
Q_{gs}	Gate Source Charge		-	2	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	2.1	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V I_D= 3A, R_{GEN} = 3Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	11	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	24	-	ns
t_f	Turn-Off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	30	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	44	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 12A	-	-	1.4	V
trr	Body Diode Reverse Recovery Time	I_F = 12A, di/dt = 100A/us	-	22	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3.3	-	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

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Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -30V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.6	-2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = -10V, I_D =-10A	-	13	17	mΩ
		V_{GS} = -4.5V, I_D =-5A	-	17	40	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz	-	1388	-	pF
C_{oss}	Output Capacitance		-	96	-	pF
C_{rss}	Reverse Transfer Capacitance		-	61	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -4.5V V_{DS} = -15V, I_D = -3A	-	8	-	nC
Q_{gs}	Gate Source Charge		-	2	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -4.5V, V_{DD} = -15V I_D= -3A, R_{GEN} = 3Ω	-	8	-	ns
t_r	Turn-On Rise Time		-	16	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	46	-	ns
t_f	Turn-Off Fall Time		-	34	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-28	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-40	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S =-12A	-	-	-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -12A, di/dt = 100A/us	-	8	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3	-	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

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Typical Performance Characteristics

Figure 1: Output Characteristics

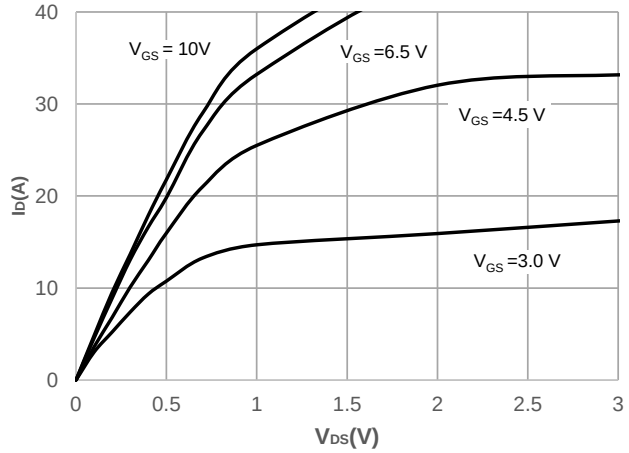


Figure 2: Typical Transfer Characteristics

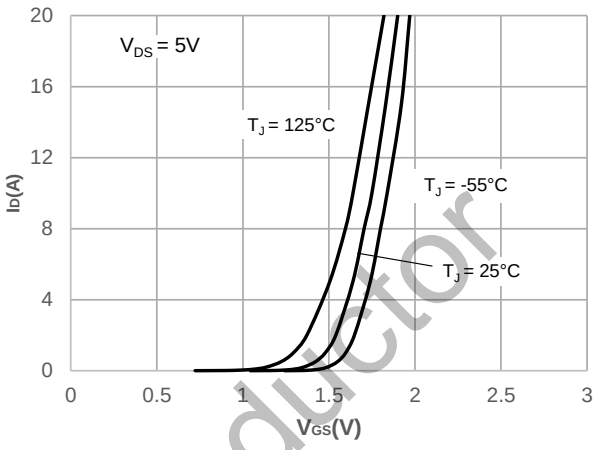


Figure 3: On-resistance vs. Drain Current

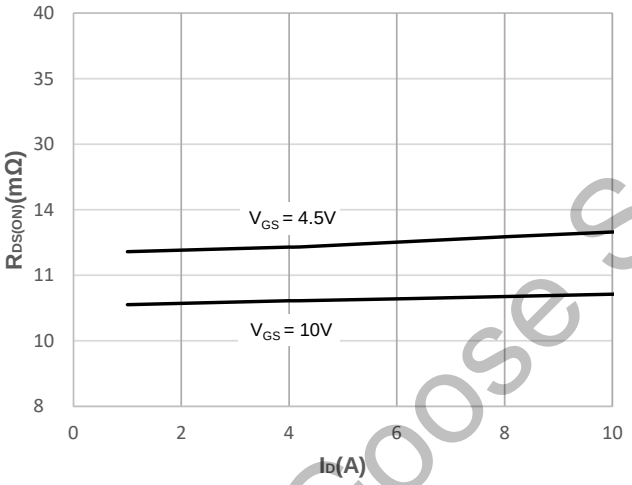


Figure 4: Body Diode Characteristics

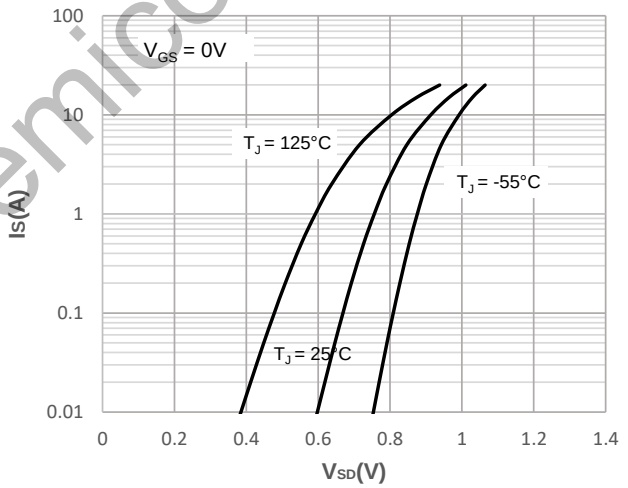


Figure 5: Gate Charge Characteristics

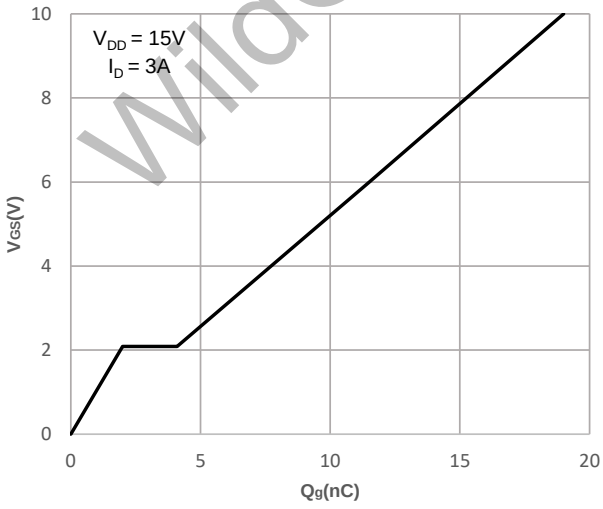
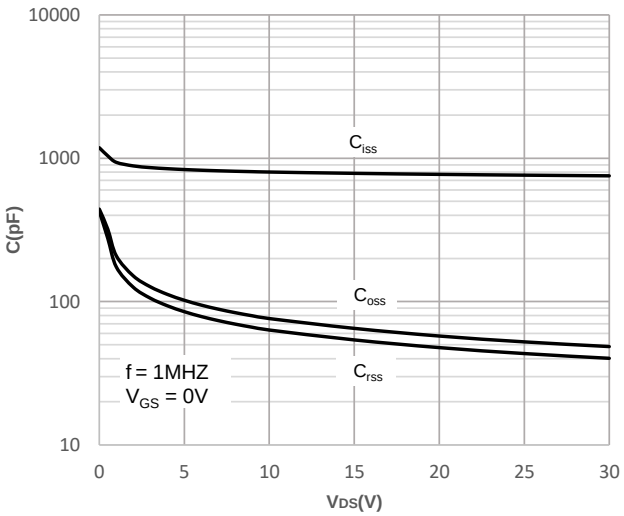


Figure 6: Capacitance Characteristics



WildGoose Semiconductor

Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

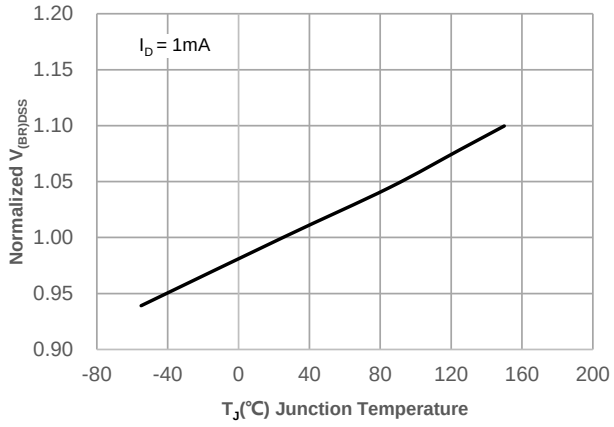


Figure 8: Normalized on Resistance vs. Junction Temperature

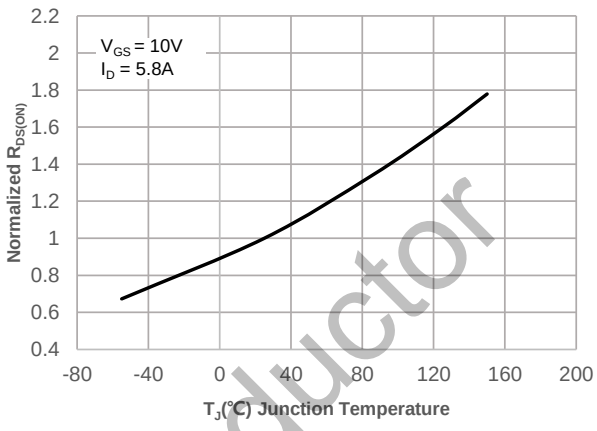


Figure 9: Maximum Safe Operating Area

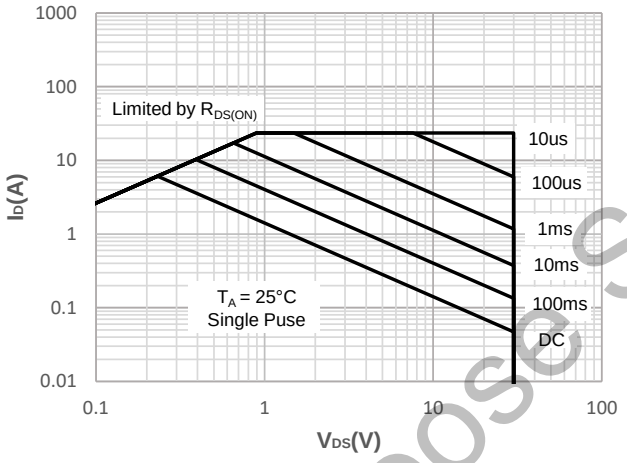


Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

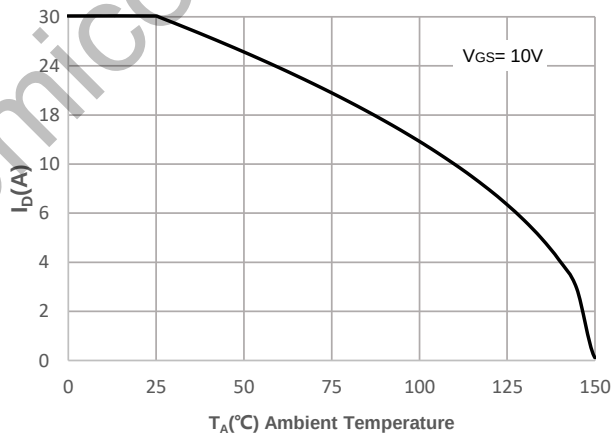


Figure 11: Normalized Maximum Transient Thermal Impedance

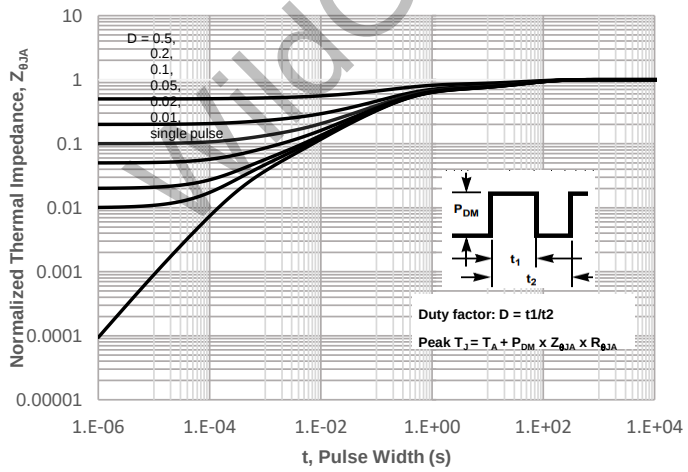
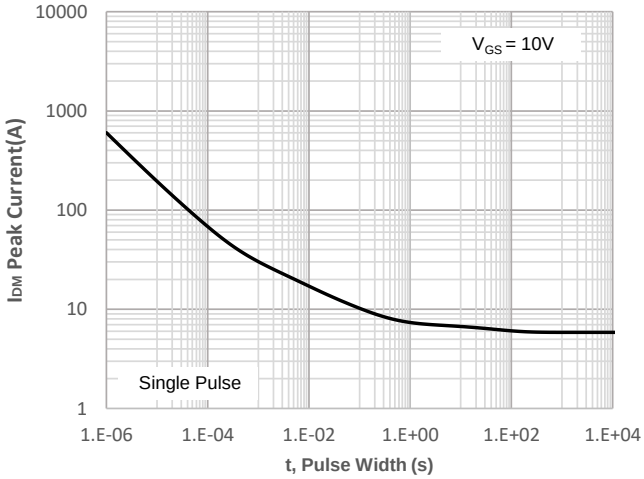


Figure 12: Peak Current Capacity



WildGoose Semiconductor

Typical Performance Characteristics

Figure 1: Output Characteristics

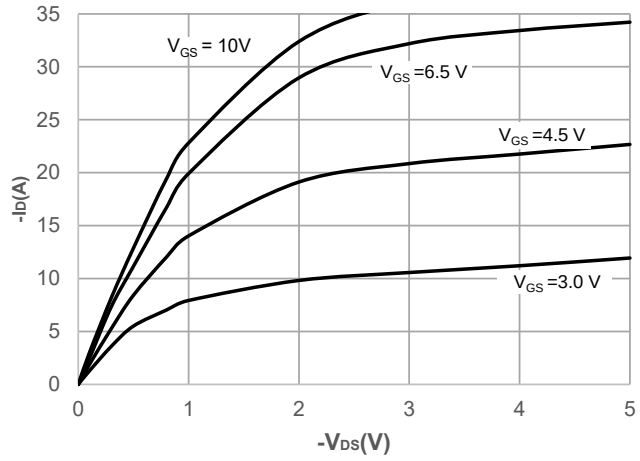


Figure 2: Typical Transfer Characteristics

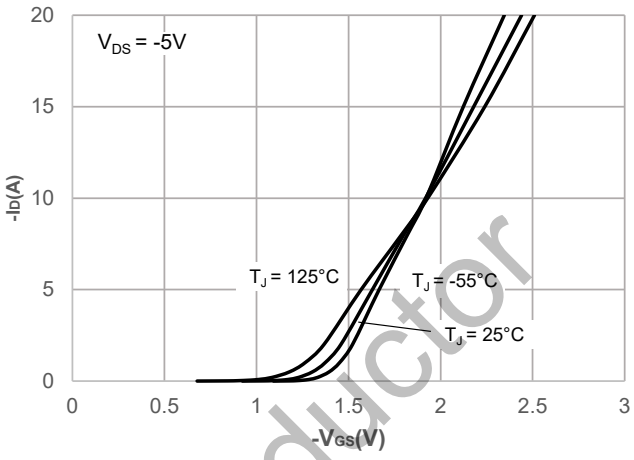


Figure 3: On-resistance vs. Drain Current

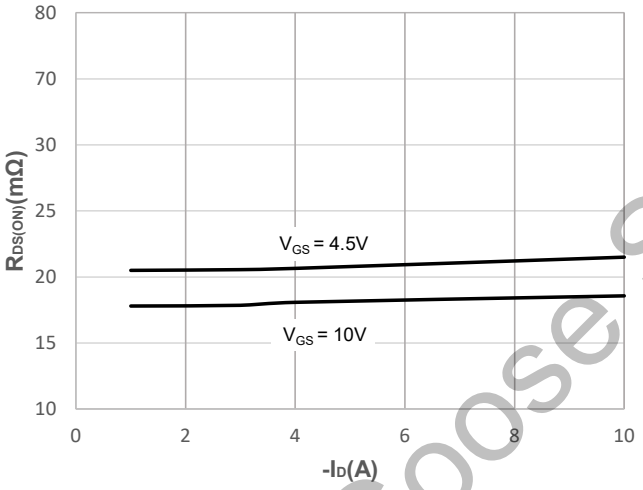


Figure 4: Body Diode Characteristics

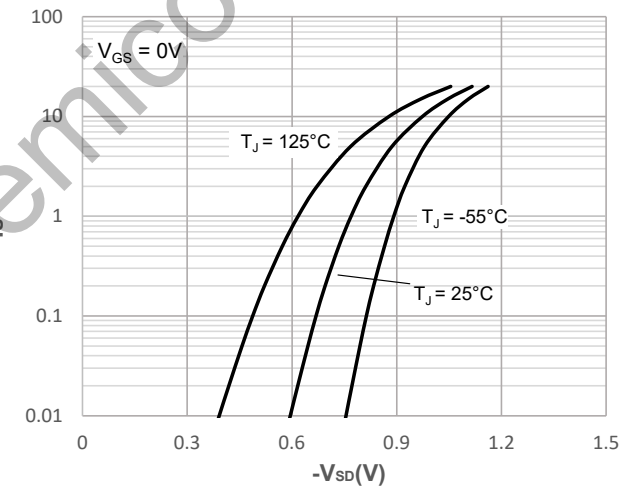


Figure 5: Gate Charge Characteristics

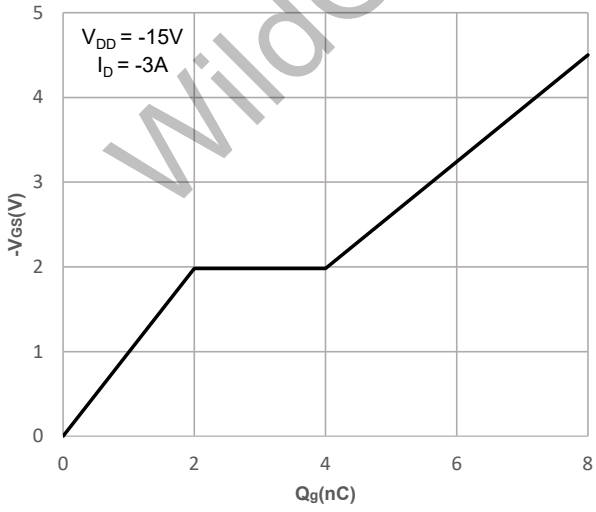
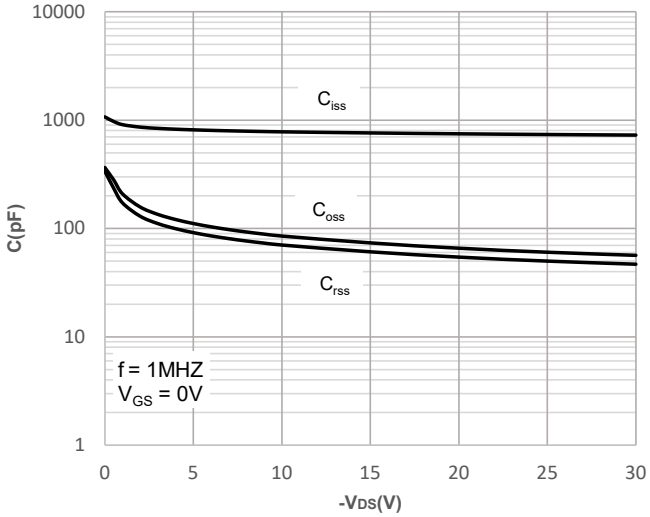


Figure 6: Capacitance Characteristics



WildGoose Semiconductor

Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

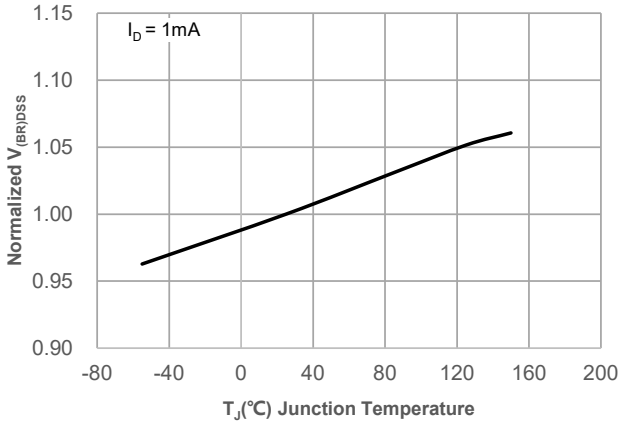


Figure 8: Normalized on Resistance vs. Junction Temperature

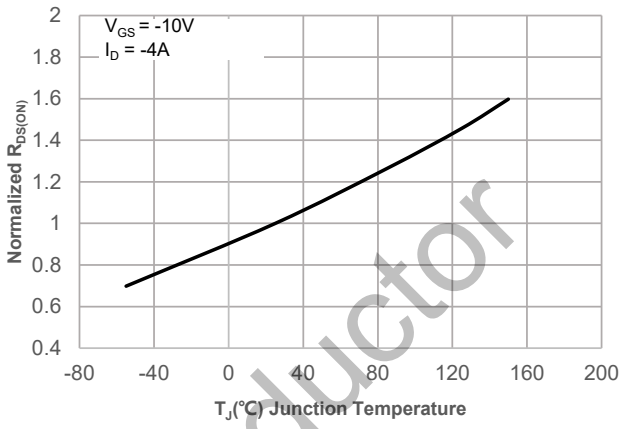


Figure 9: Maximum Safe Operating Area

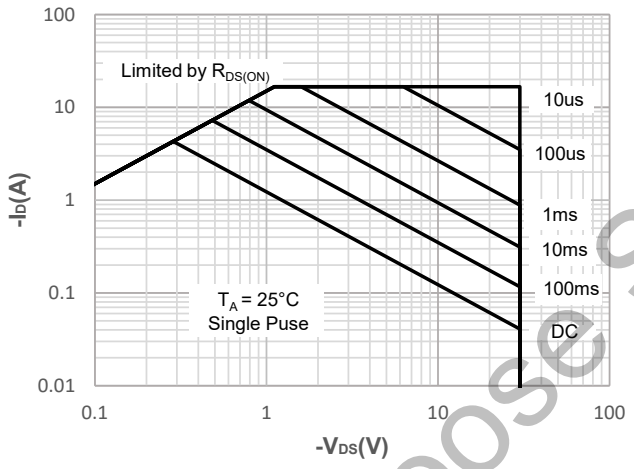


Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

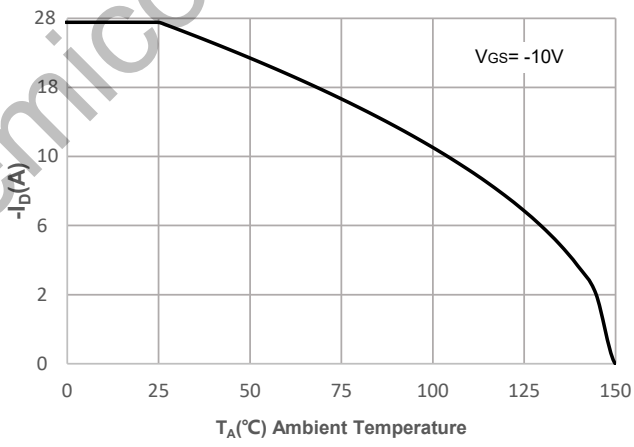


Figure 11: Normalized Maximum Transient Thermal Impedance

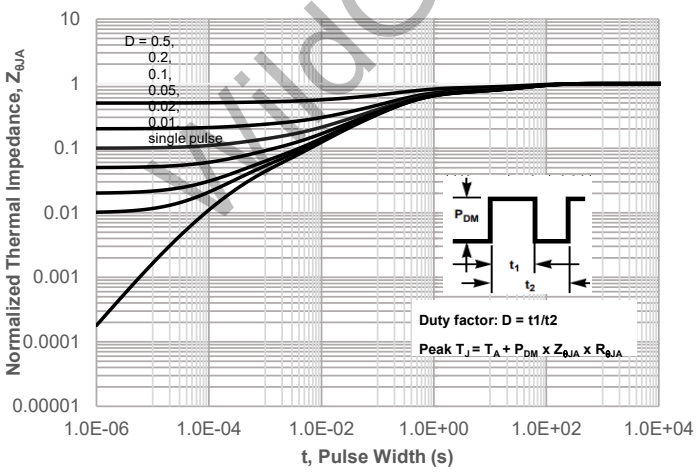
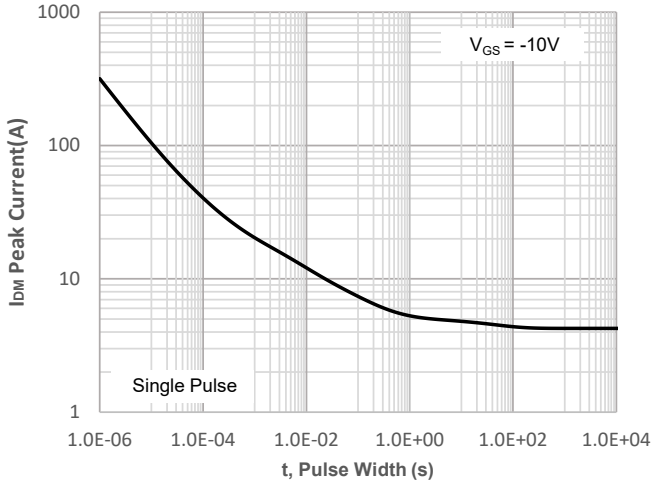


Figure 12: Peak Current Capacity



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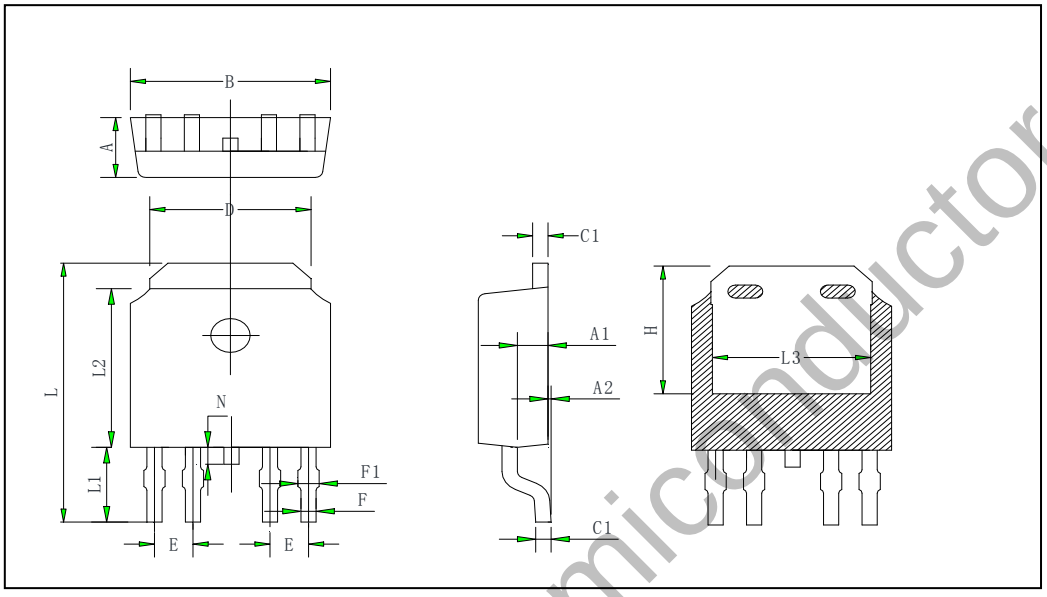
Package Dimension

TO-252-4L

Unit: mm



Symbol	Min	Typ	Max
A	2.20	2.30	2.40
A1	0.91	1.01	1.11
A2	0.05	0.15	0.25
B	6.45	6.60	6.75
C	0.45	0.50	0.58
C1	0.45	0.50	0.58
D	5.12	5.32	5.52
E		1.27 TYP	
F1	0.45	0.60	0.75
F	0.40	0.50	0.60
H	4.70	4.90	5.10
L	9.70	10.00	10.20
L1	2.6	2.8	3.0
L2	5.95	6.10	6.25
L3	5.00	5.20	5.40`
N	0.45	0.65	0.85

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