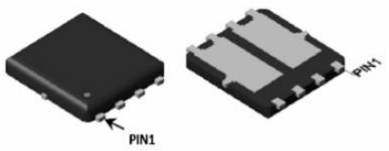
WGM78V30

Features:

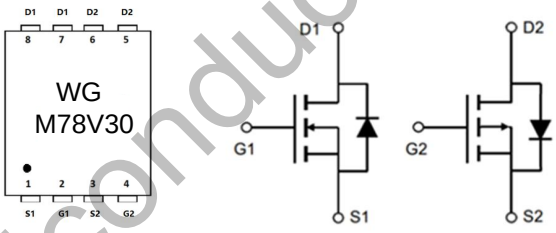
- ☐ Advanced Trench Technology.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ V_{DS} = 30V I_D =40 A
- ☐ $R_{DS(ON)}$ < 8.6mΩ @ V_{GS}=10V (Type: 6.6mΩ)
- ☐ V_{DS} = -30V I_D =-45 A
- ☐ $R_{DS(ON)}$ < 9.5 mΩ @ V_{GS}=10V (Type: 7.6mΩ)

PDFN5x6

RoHS COMPLIANT



Top View Bottom View



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	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	40	-45	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	25	-29	A
I_{DM}	Pulsed Drain Current (1)	160	-180	A
E_{AS}	Single Pulsed Avalanche Energy	49 (2)	113 (3)	A
P_D@T_C=25℃	Total Power Dissipation	24	34.4	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 (4)	39		℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	5.2		℃/W

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=15V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=14A
3. E_{AS} condition: Starting T_J=25C, V_{DD}=-20V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-21.3A
4. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB

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

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} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.8	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(5)	V_{GS} = 10V, I_D = 20A	-	6.6	8.6	mΩ
		V_{GS} = 4.5V, I_D = 15A	-	9.6	12.5	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	1174	-	pF
C_{oss}	Output Capacitance		-	162	-	pF
C_{rss}	Reverse Transfer Capacitance		-	130	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 15V, I_D = 20A	-	23	-	nC
Q_{gs}	Gate Source Charge		-	4.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	5.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V I_D= 15A, R_{GEN} = 3Ω	-	7	-	ns
t_r	Turn-On Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	25	-	ns
t_f	Turn-Off Fall Time		-	6	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	40	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	160	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 20A, di/dt = 100A/us	-	10	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3	-	nC

Notes:

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

WildGoose Semiconductor

Electrical Characteristics (T_J=25℃ unless otherwise specified) P-Channel

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= -30V, V_{GS}=0V,	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±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 (6)	V_{GS}= -10V, I_D= -30A	-	7.6	9.5	mΩ
		V_{GS}= -4.5V, I_D= -20A	-	12	15.6	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= -15V, V_{GS}=0V, f=1.0MHz	-	3564	-	pF
C_{oss}	Output Capacitance		-	416	-	pF
C_{rss}	Reverse Transfer Capacitance		-	373	-	pF
Q_g	Total Gate Charge	V_{DD}= -15V, I_D= -20A, V_{GS}= -10V	-	37	-	nC
Q_{gs}	Gate-Source Charge		-	6.5	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	9.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}= -15V, I_D= -30A, V_{GS}= -10V, R_{GEN}=2.5Ω	-	16	-	ns
t_r	Turn-on Rise Time		-	21	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	68	-	ns
t_f	Turn-off Fall Time		-	52	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-45	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	180	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -30A	-	-	-1.2	V

Notes:

6. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

WildGoose Semiconductor

Typical Performance Characteristics N-Channel

Figure 1: Output Characteristics

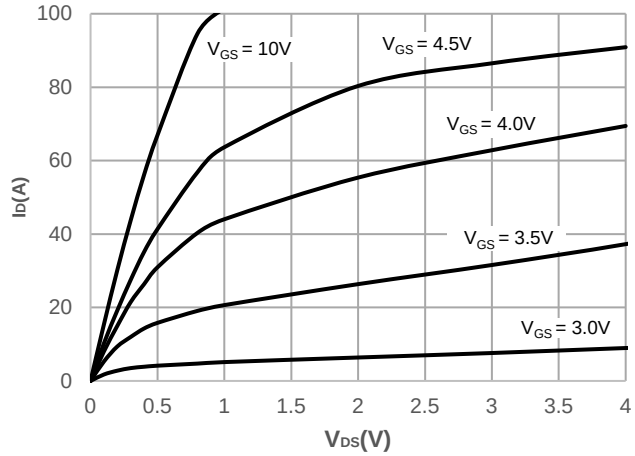


Figure 2: Typical Transfer Characteristics

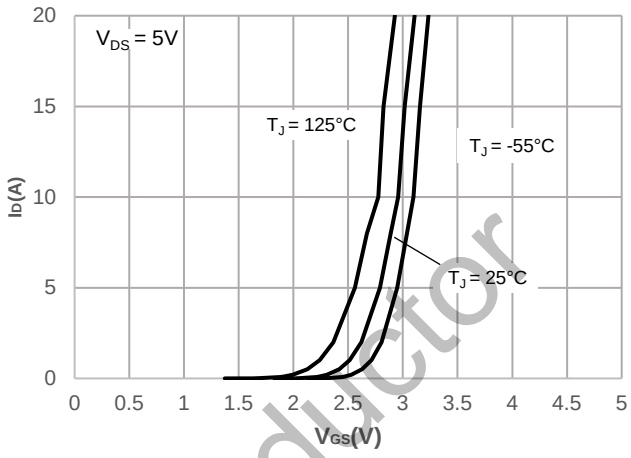


Figure 3: On-resistance vs. Drain Current

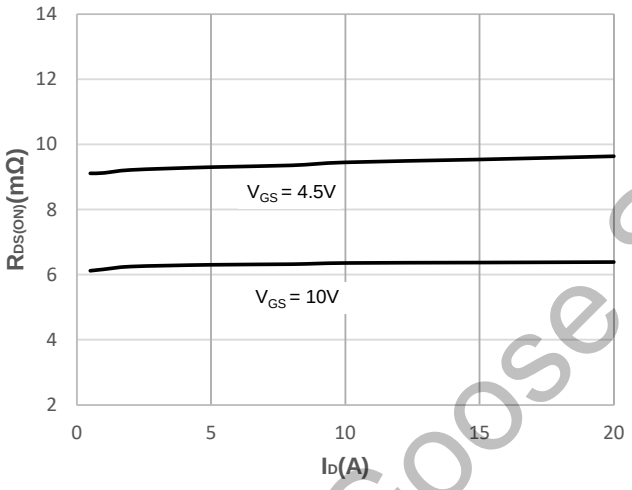


Figure 4: Body Diode Characteristics

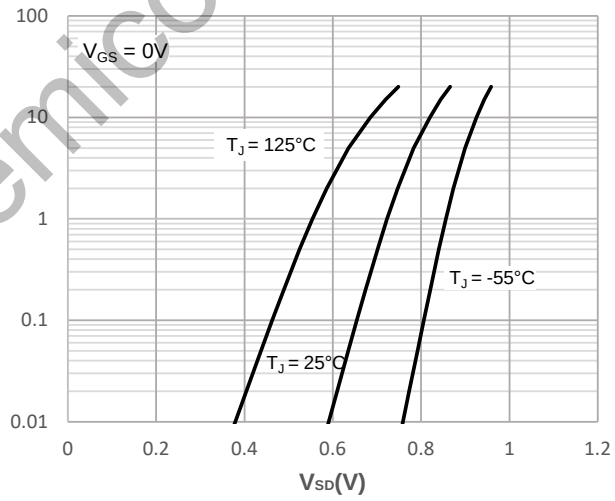


Figure 5: Gate Charge Characteristics

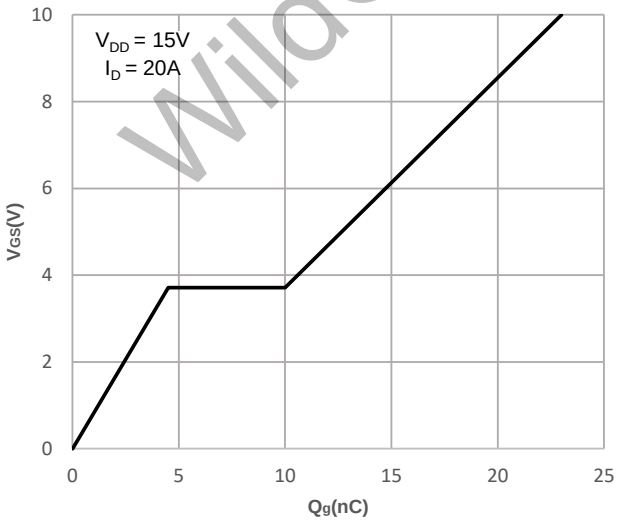
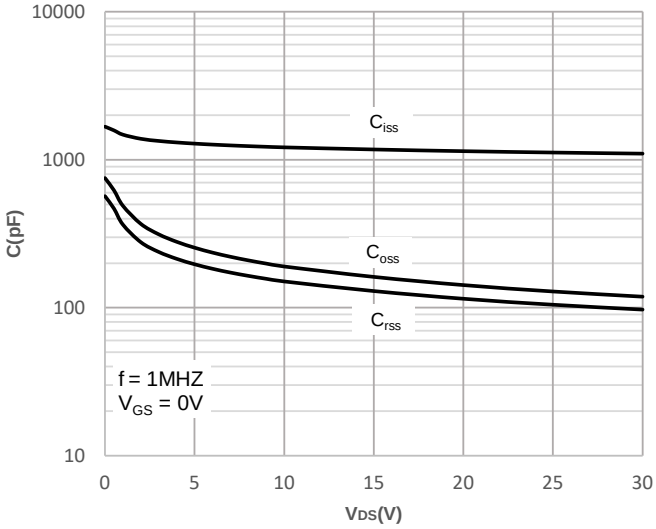


Figure 6: Capacitance Characteristics



WildGoose Semiconductor

Typical Performance Characteristics N-Channel

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

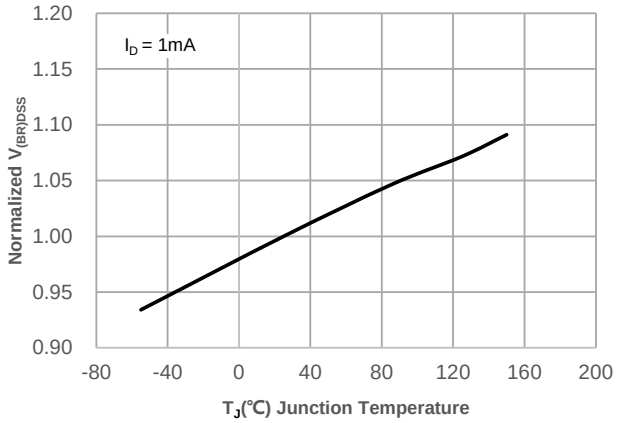


Figure 8: Normalized on Resistance vs. Junction Temperature

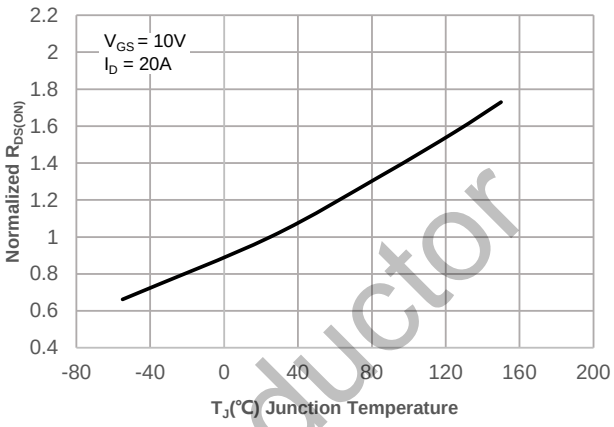


Figure 9: Maximum Safe Operating Area

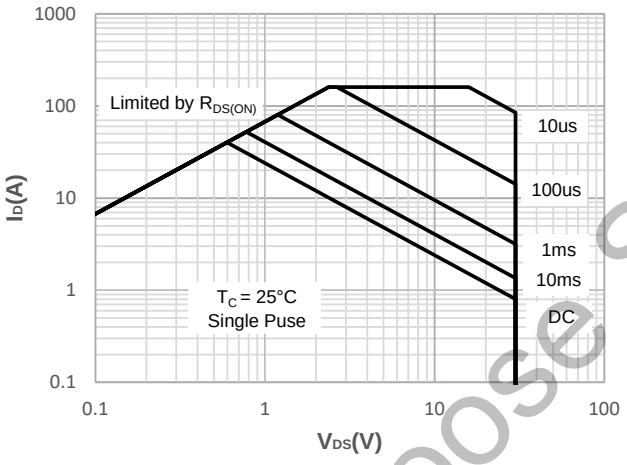


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

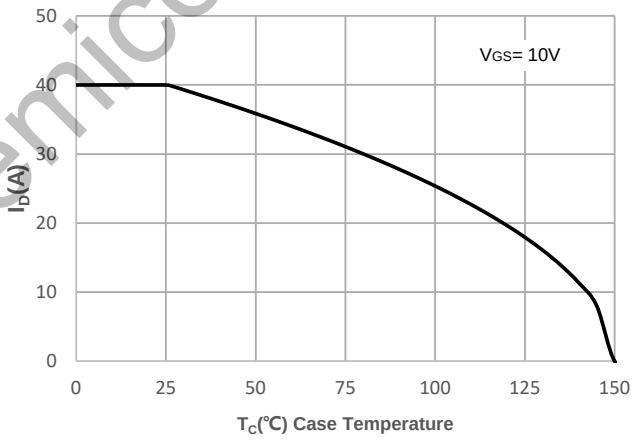


Figure 11: Normalized Maximum Transient Thermal Impedance

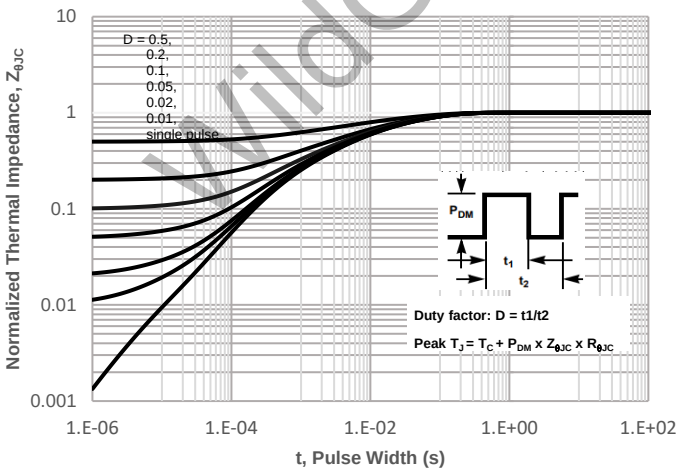
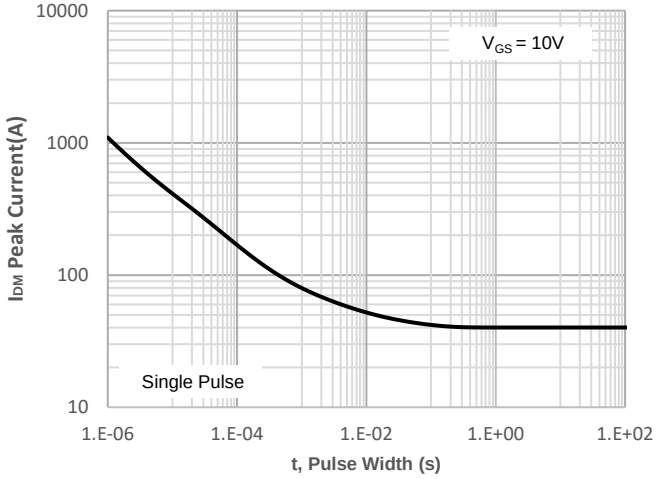


Figure 12: Peak Current Capacity



WildGoose Semiconductor

Test Circuit

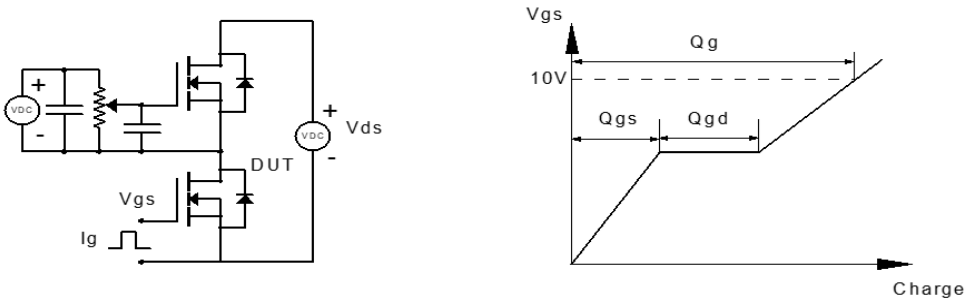


Figure 1: Gate Charge Test Circuit & Waveform

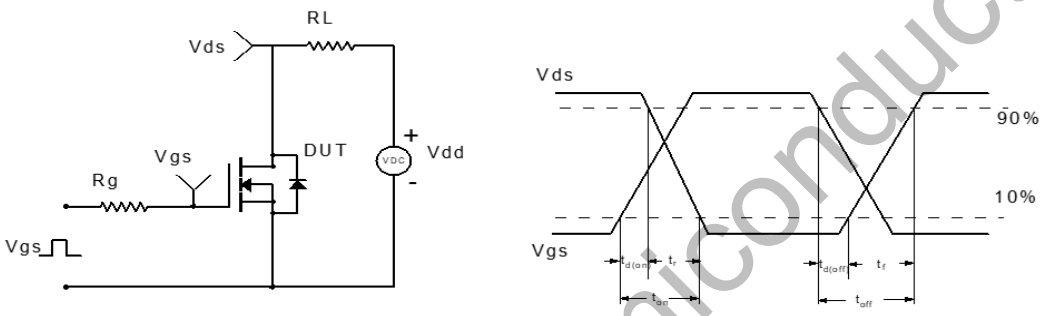


Figure 2: Resistive Switching Test Circuit & Waveform

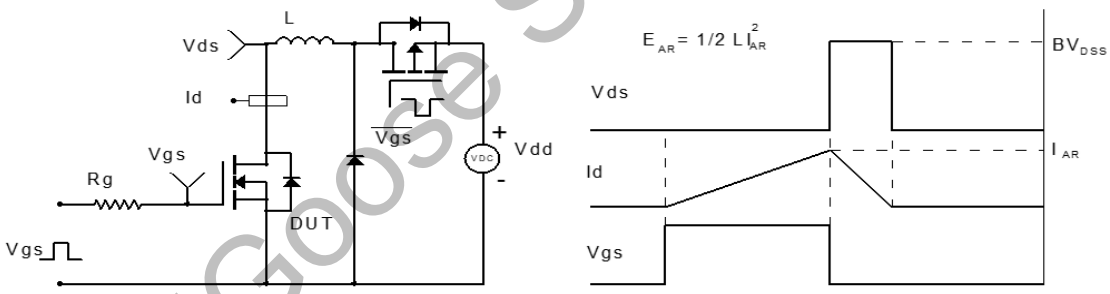


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

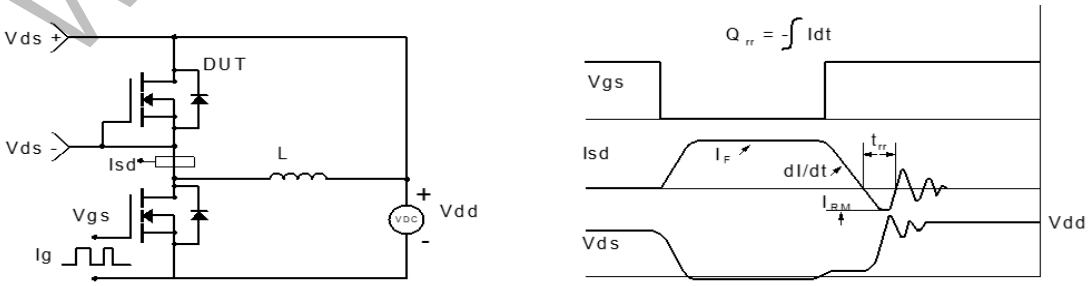


Figure 4: Diode Recovery Test Circuit & Waveform

WildGoose Semiconductor

Typical Performance Characteristics P-Channel

Figure 1: Output Characteristics

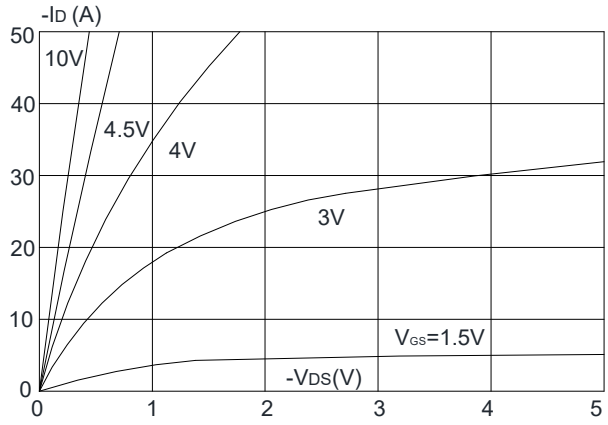


Figure 2: Typical Transfer Characteristics

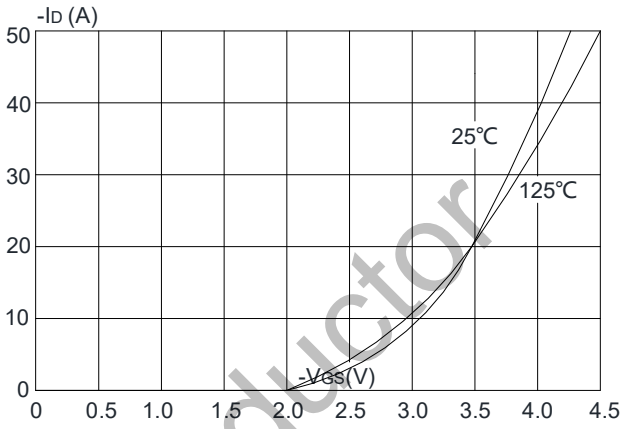


Figure 3: On-resistance vs. Drain Current

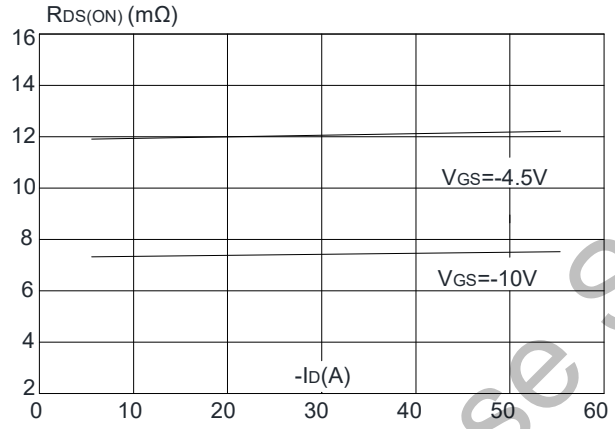


Figure 4: Body Diode Characteristics

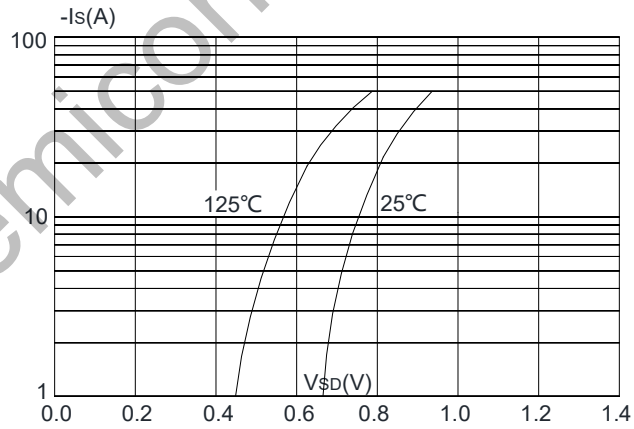


Figure 5: Gate Charge Characteristics

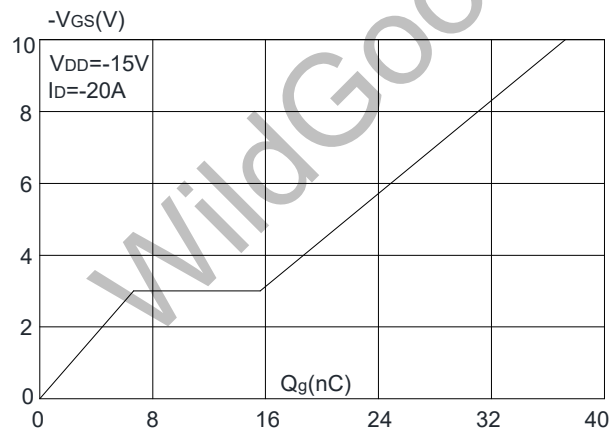
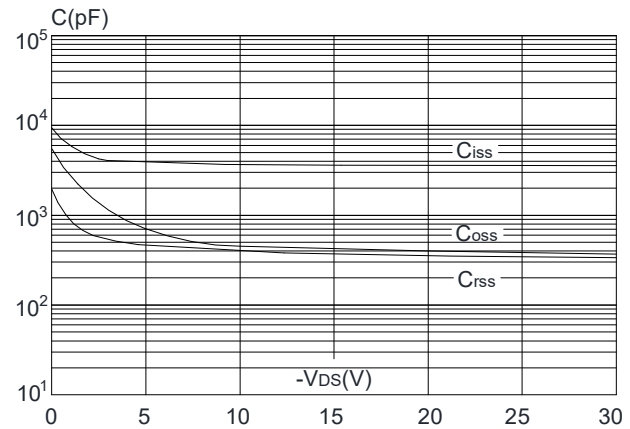


Figure 6: Capacitance Characteristics



WildGoose Semiconductor

Typical Performance Characteristics P-Channel

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

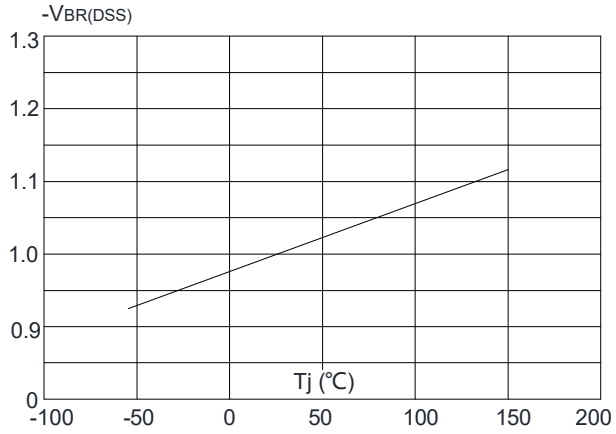


Figure 8: Normalized on Resistance vs. Junction Temperature

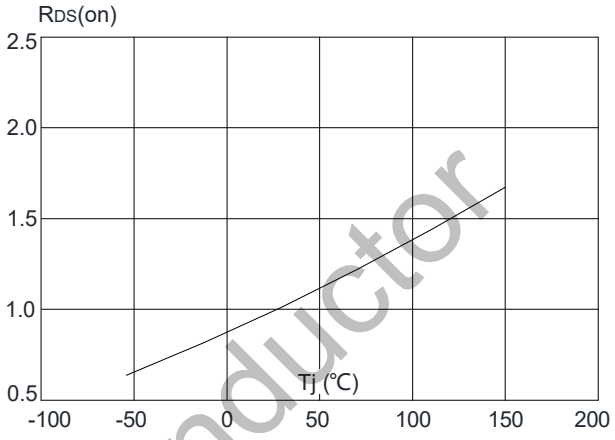


Figure 9: Maximum Safe Operating Area

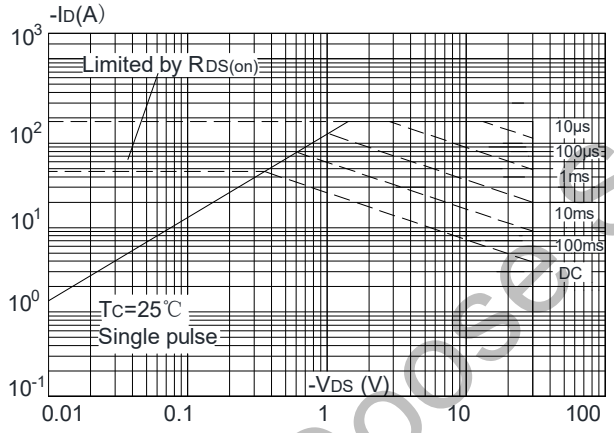


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

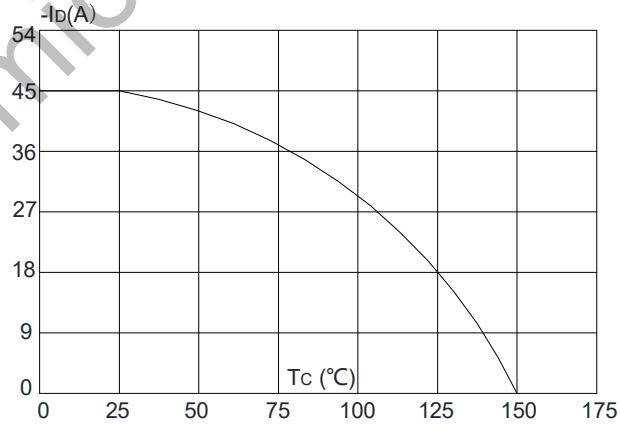
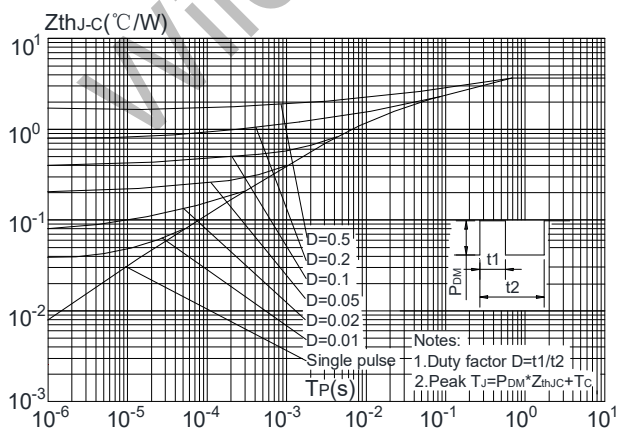


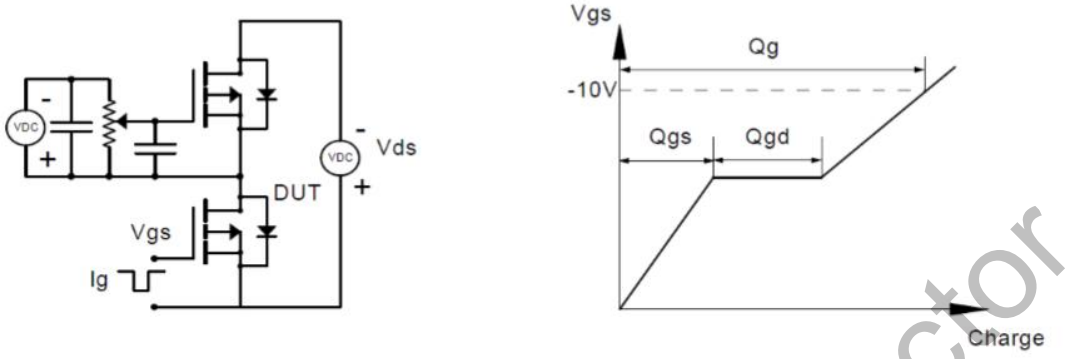
Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



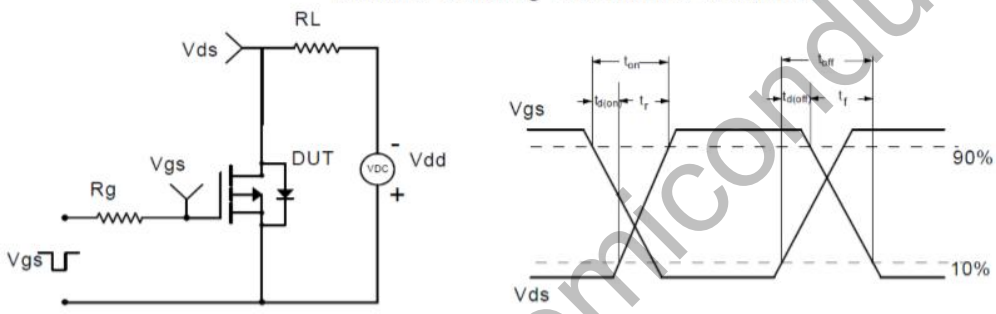
WildGoose Semiconductor

Test Circuit

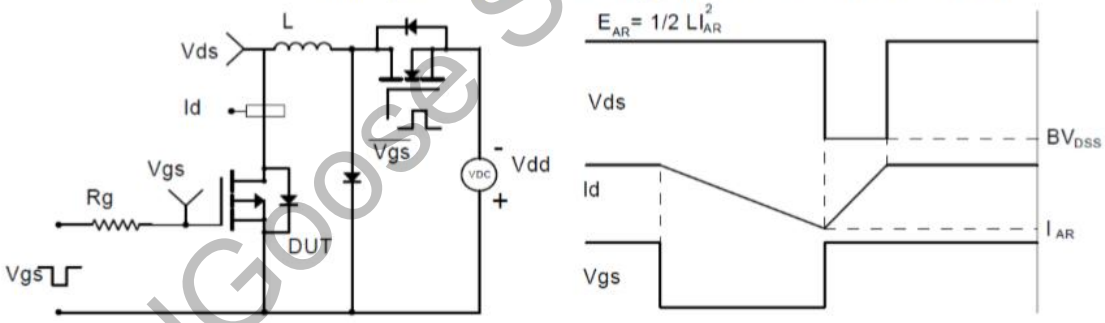
Gate Charge Test Circuit & Waveform



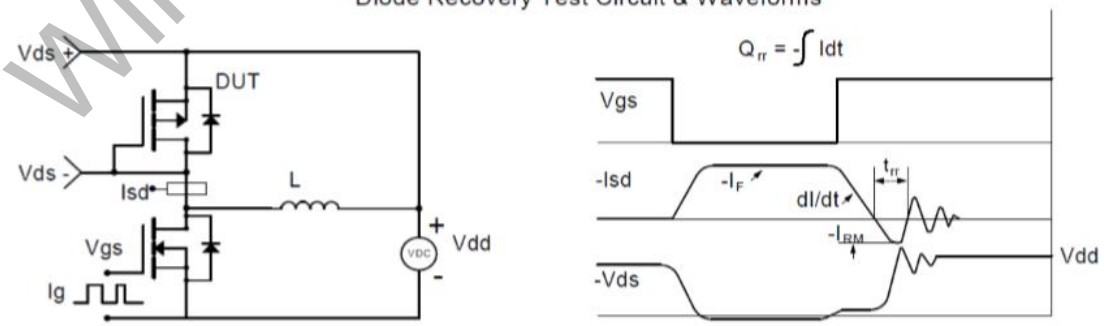
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

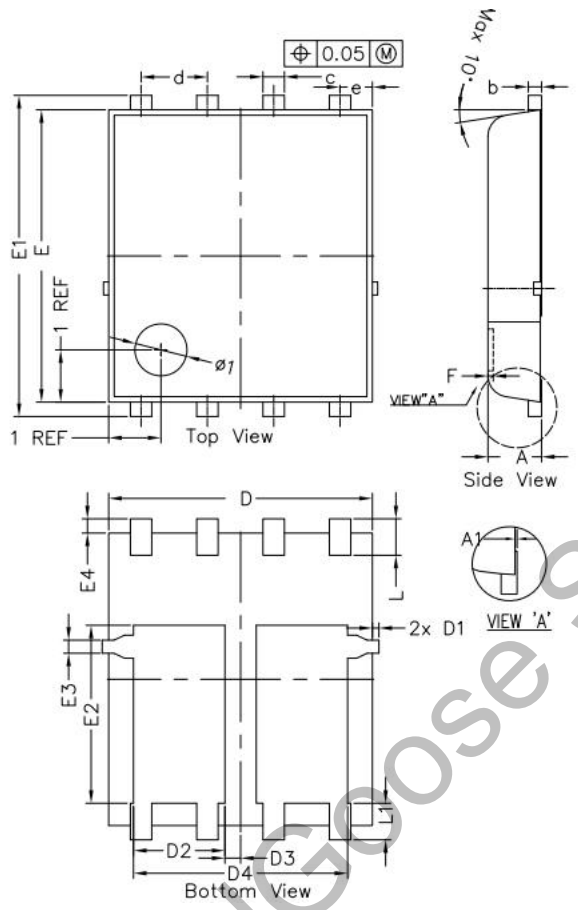


WildGoose Semiconductor

Package Dimension

PDFN5x6

Unit: mm



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
* A	0.900	1.000	1.100	0.035	0.039	0.043
A1	0.000	---	0.050	0.000	----	0.002
b	0.246	0.254	0.312	0.010	0.010	0.012
* c	0.310	0.410	0.510	0.012	0.016	0.020
d		1.27 BSC			0.050 BSC	
* D	4.950	5.050	5.150	0.195	0.199	0.203
*D1	---	---	0.125	---	---	0.005
*D2	1.650	1.750	1.850	0.065	0.069	0.073
D3	0.200	0.300	0.400	0.008	0.012	0.016
D4	4.000	4.100	4.200	0.157	0.161	0.165
e		0.62 BSC			0.024 BSC	
* E	5.500	5.600	5.700	0.217	0.220	0.224
* E1	6.050	6.150	6.250	0.238	0.242	0.246
E2	3.310	3.410	3.510	0.130	0.134	0.138
E3	0.150	0.250	0.350	0.006	0.010	0.014
* E4	0.175	0.275	0.375	0.007	0.011	0.015
F	-	-	0.100	-	-	0.004
* L	0.500	0.600	0.700	0.02	0.02	0.03
L1	0.600	0.700	0.800	0.02	0.03	0.03

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