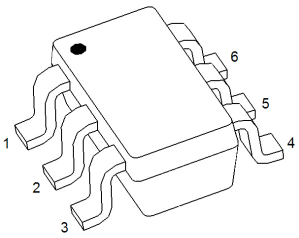
WG10G02A

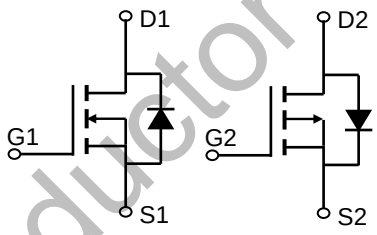
Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ V_{DS} = 20V I_D =12A
- ☐ $R_{DS(ON)}$ < 21mΩ @ V_{GS}=4.5V(Type: 16 mΩ)
- ☐ V_{DS} = -20V I_D =-10A
- ☐ $R_{DS(ON)}$ < 55 mΩ @ V_{GS}=4.5V(Type: 43mΩ)

SOT-23-6L

RoHS COMPLIANT





Schematic Diagram

WildGoose Semiconductor

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±12	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	12	-10	A
I_D@T_C=70 ℃	Continuous Drain Current, V_{GS} @ 10V[1]	6	-5	A
I_{DM}	Pulsed Drain Current[2]	16	-16	A
EAS	Single Pulse Avalanche Energy[3]	28	54	mJ
I_{AS}	Avalanche Current	12.0	-10.0	A
P_D@T_C=25℃	Total Power Dissipation[4]	2.0	2.0	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]	50		℃/W

N-Channel Electrical Characteristics @T_A=25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 20V, 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	0.5	0.75	1.0	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 4.5V, I_D = 4A	-	16	21	mΩ
		V_{GS} = 2.5V, I_D = 3A	-	19	25	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz	-	712	-	pF
C_{oss}	Output Capacitance		-	116	-	pF
C_{rss}	Reverse Transfer Capacitance		-	103	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 4.5V V_{DD} = 10V, I_D = 3A	-	9	-	nC
Q_{gs}	Gate Source Charge		-	1.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	2.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 4.5V, V_{DD} = 10V I_D= 3A, R_{GEN} = 3Ω	-	5	-	ns
t_r	Turn-On Rise Time		-	16	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	23	-	ns
t_f	Turn-Off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	12	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	27	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 6.8A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 3A, di/dt = 100A/us	-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	2	-	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%.

Wingoose Semiconductor

P-Channel Electrical Characteristics @T_A=25℃ unless otherwise noted

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	0.45	0.65	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-2.5V, I_D=-1.0A	-	57	74	mΩ
		V_{GS}=-4.5V, I_D=-1A	-	43	55	
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-4.5A	-	6	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-4V,V_{GS}=0V, F=1.0MHz	-	415	-	PF
Output Capacitance	C_{oss}		-	223	-	PF
Reverse Transfer Capacitance	C_{rss}		-	87	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-4V, ,R_L=-1.2Ω, V_{GEN}=-4.5V,R_g=1Ω	-	12	-	nS
Turn-on Rise Time	t_r		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	V_{DS}=-4V,I_D=-4.5A,V_{GS}=-4.5V	-	5.8	-	nC
Gate-Source Charge	Q_{gs}		-	0.85	-	nC
Gate-Drain Charge	Q_{gd}		-	1.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-4.5A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-10	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

WinGoose Semiconductor

Typical Performance Characteristics（(T_A = 25 °C, unless otherwise noted)）

N-Channel

Figure 1: Output Characteristics

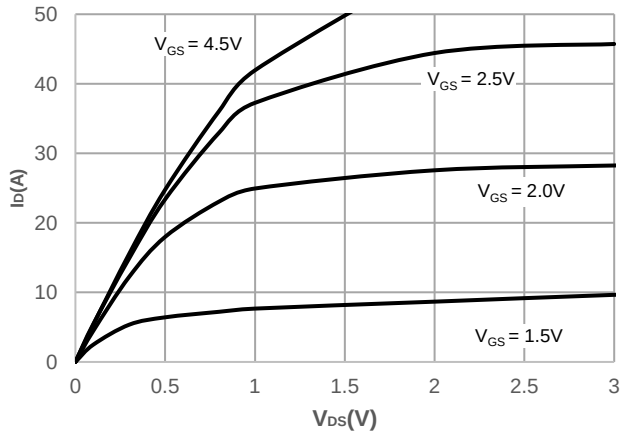


Figure 2: Typical Transfer Characteristics

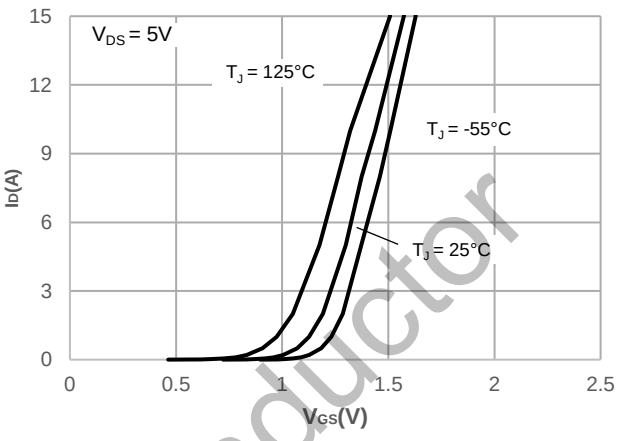


Figure 3: On-resistance vs. Drain Current

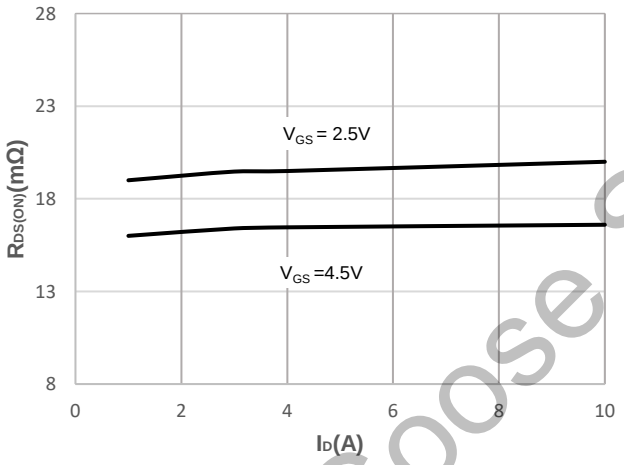


Figure 4: Body Diode Characteristics

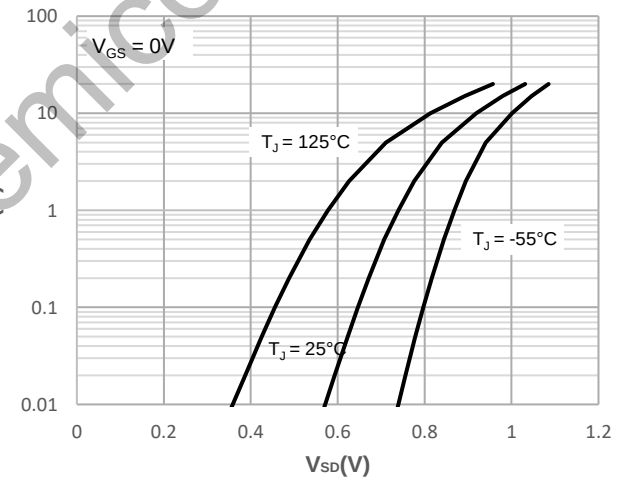


Figure 5: Gate Charge Characteristics

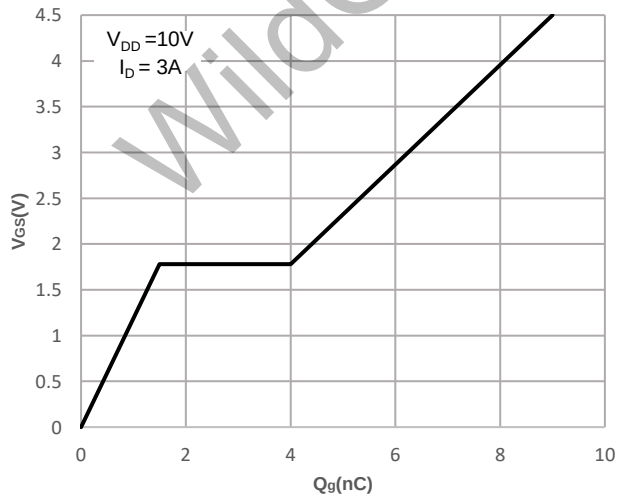
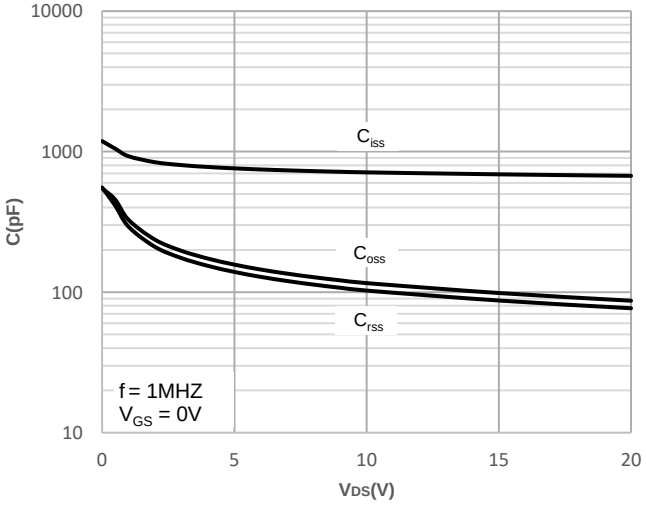


Figure 6: Capacitance Characteristics



WildGoose Semiconductor

Typical Performance Characteristics（(T_A = 25 °C, unless otherwise noted)）

N-Channel

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

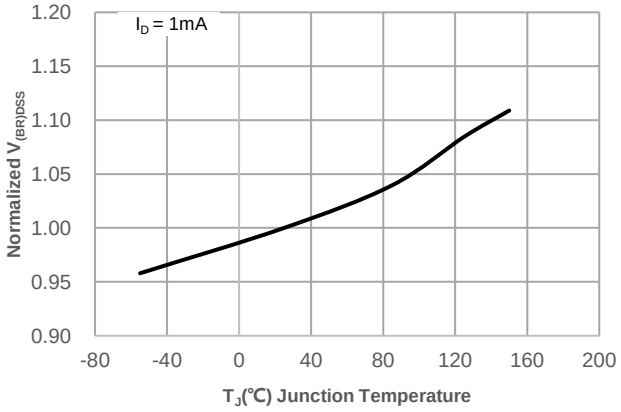


Figure 8: Normalized on Resistance vs. Junction Temperature

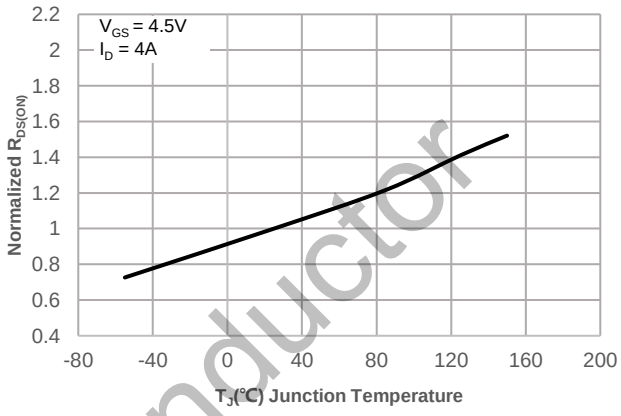


Figure 9: Maximum Safe Operating Area

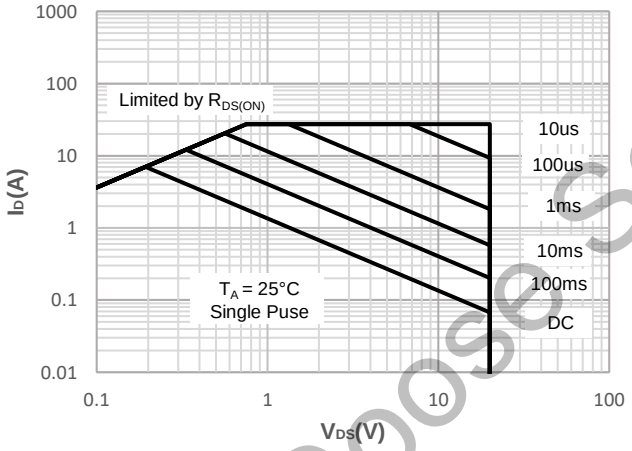


Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

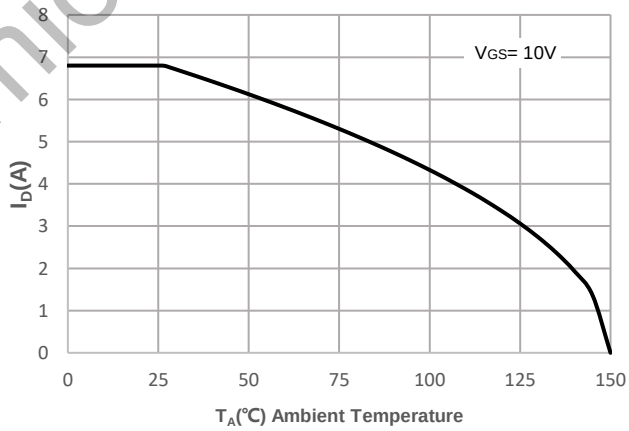


Figure 11: Normalized Maximum Transient Thermal Impedance

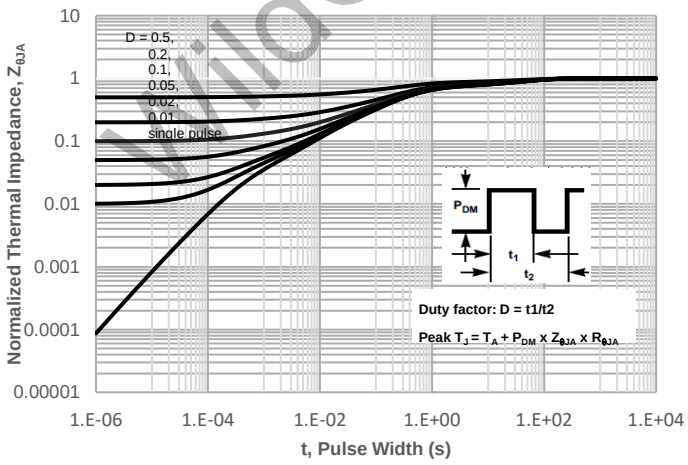
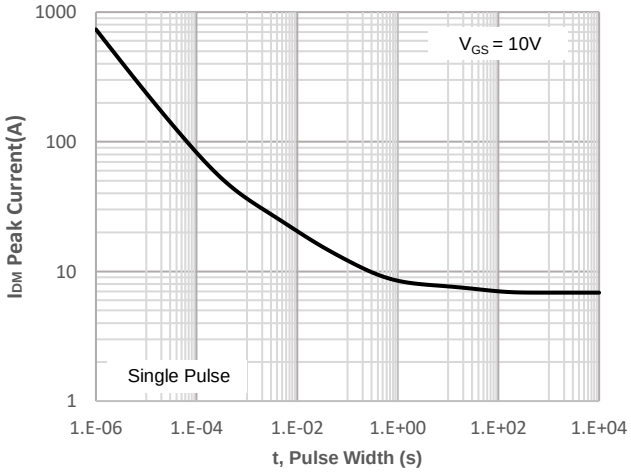


Figure 12: Peak Current Capacity



WillGoose Semiconductor

Typical Performance Characteristics（(T_A = 25 °C, unless otherwise noted)）

P-Channel

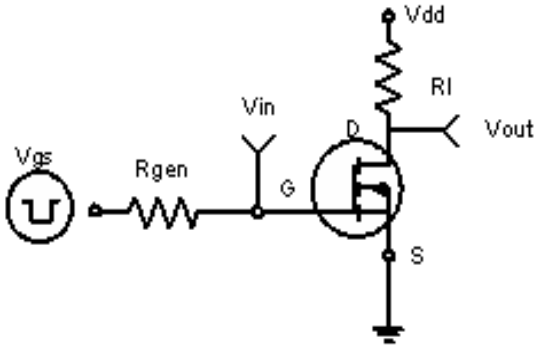


Figure 1:Switching Test Circuit

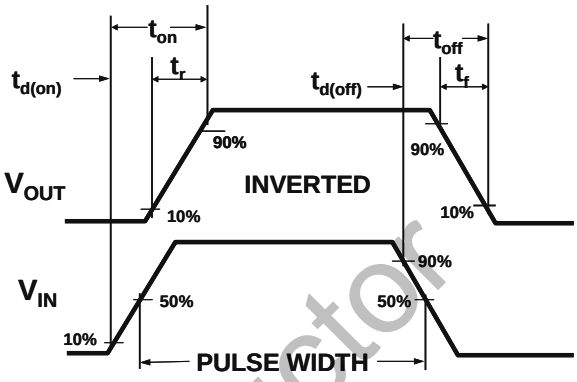
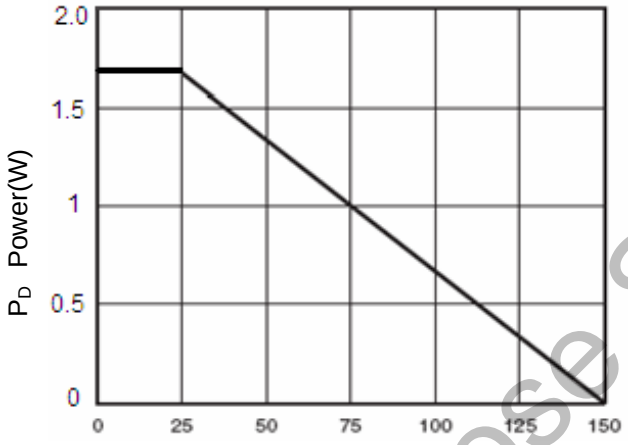
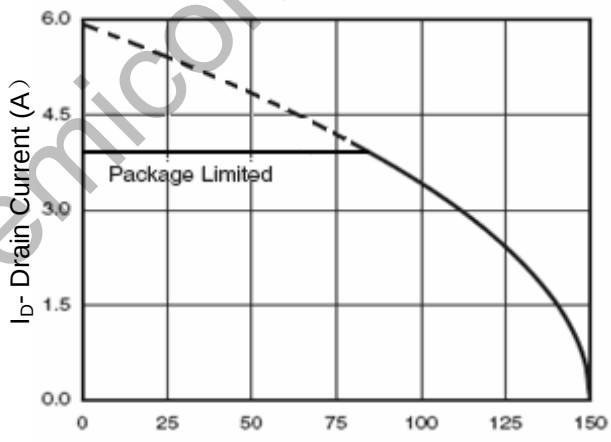


Figure 2:Switching Waveforms



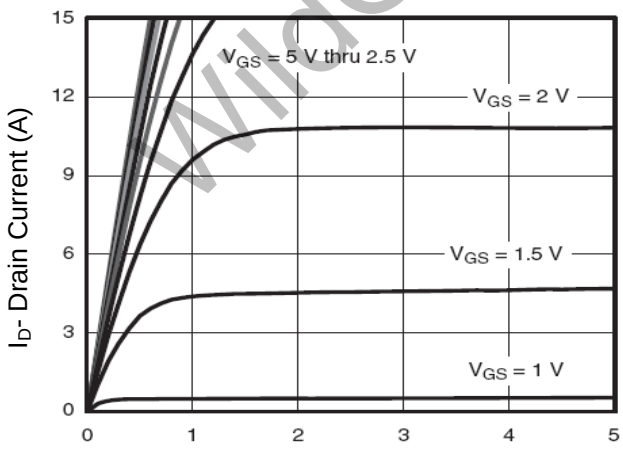
TJ-Junction Temperature(℃)

Figure 3 Power Dissipation



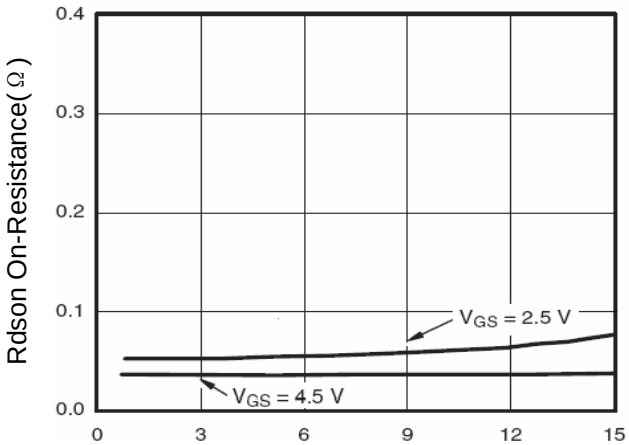
TJ-Junction Temperature(℃)

Figure 4 Drain Current



Vds Drain-Source Voltage (V)

Figure 5 Output Characteristics



ID- Drain Current (A)

Figure 6 Drain-Source On-Resistance

WidGoose Semiconductor

Typical Performance Characteristics（(T_A = 25 °C, unless otherwise noted)）

P-Channel

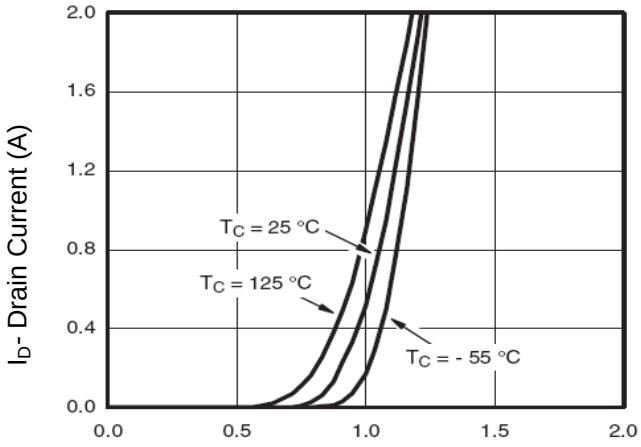


Figure 7 Transfer Characteristics

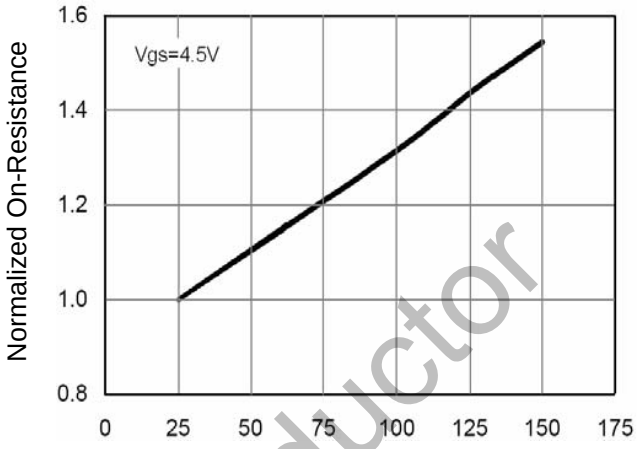


Figure 8 Drain-Source On-Resistance

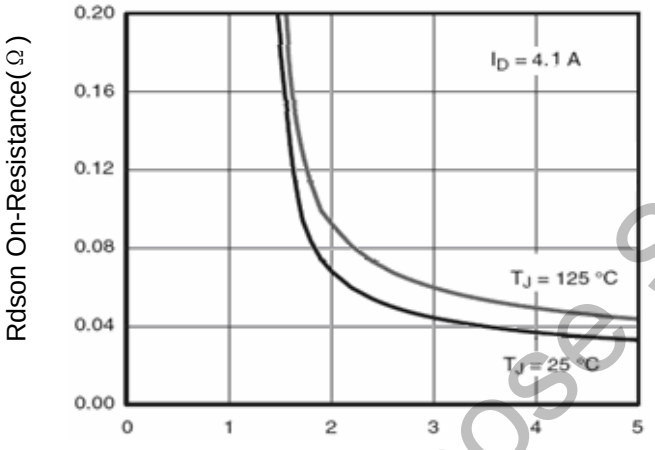


Figure 9 Rdson vs Vgs

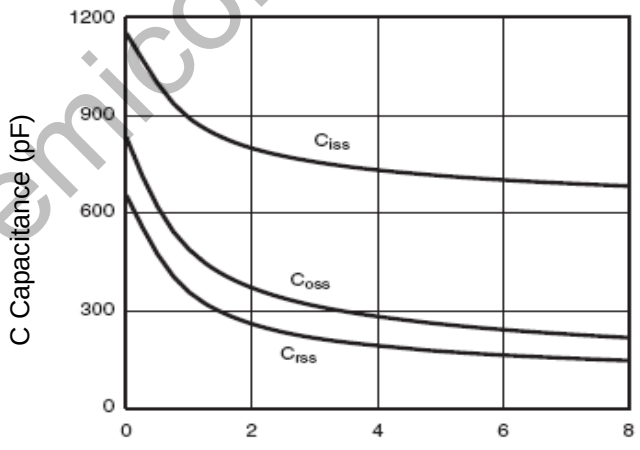


Figure 10 Capacitance vs Vds

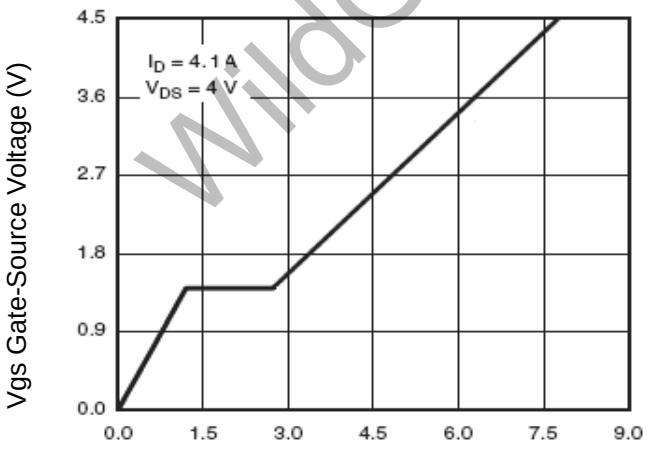


Figure 11 Gate Charge

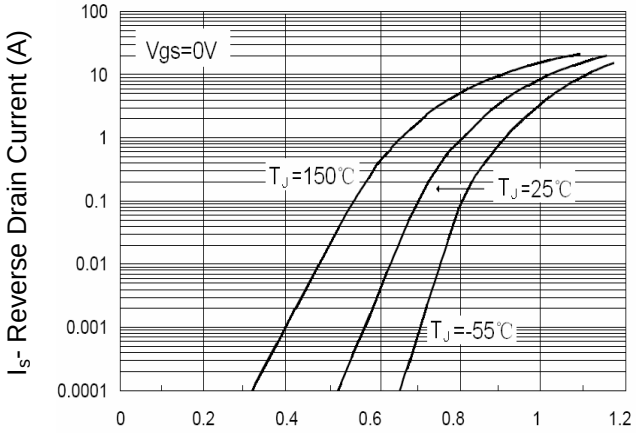


Figure 12 Source- Drain Diode Forward

WildGoose Semiconductor

Typical Performance Characteristics（(T_A = 25 °C, unless otherwise noted)）

P-Channel

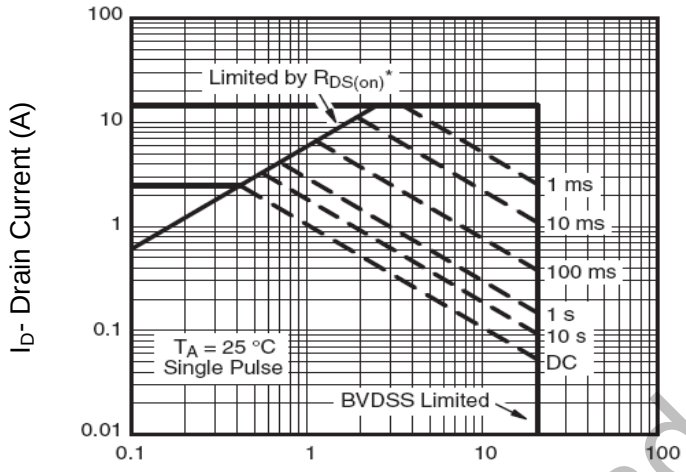


Figure 13 Safe Operation Area

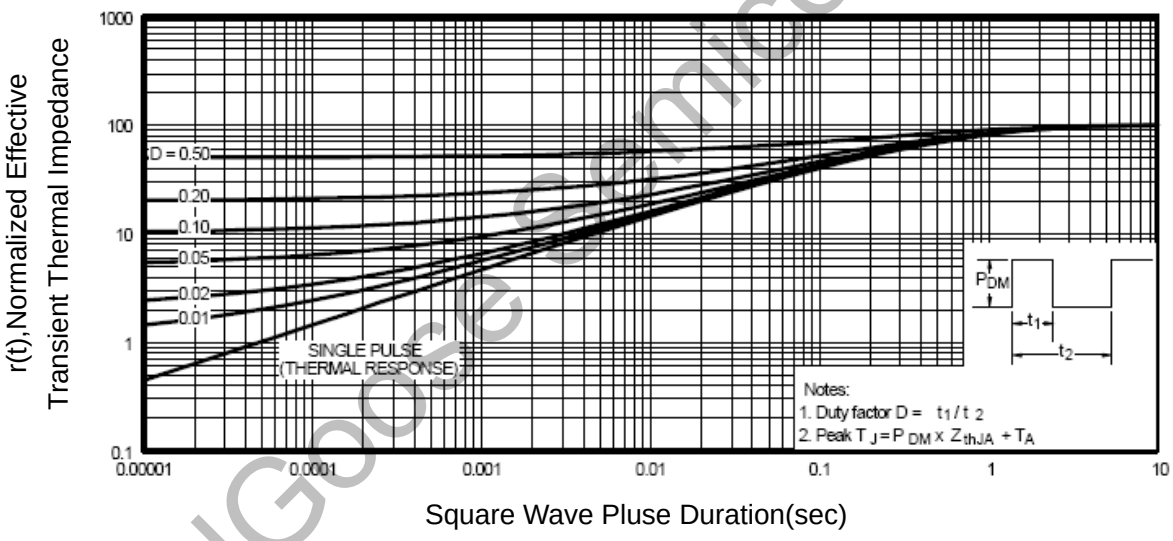


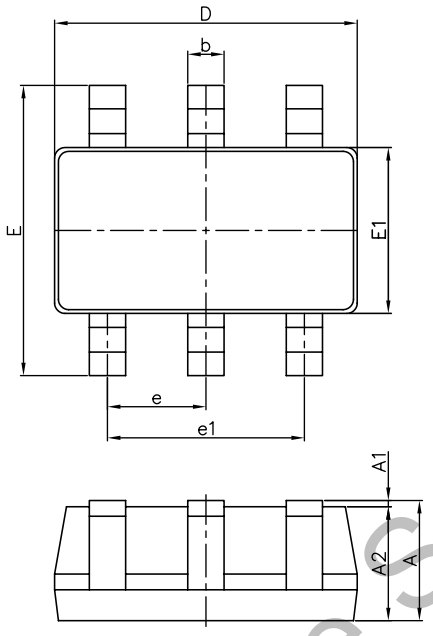
Figure 14 Normalized Maximum Transient Thermal Impedance

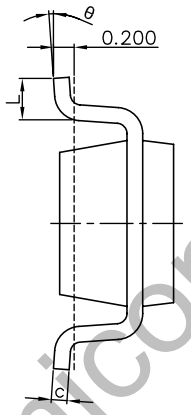
WildGoose Semiconductor

Package Dimension

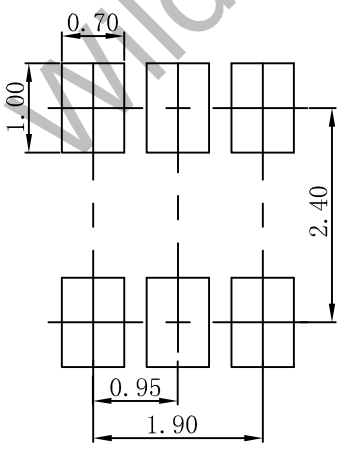
SOT-23-6L

Unit: mm





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

WildGoose Semiconductor