N and P Channel Enhancement Mode Power MOSFET

Description

This Product uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

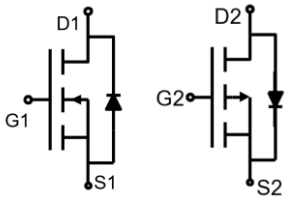
General Features

- **NMOS**
- V_{DS} 60V
- I_D (at V_{GS} = 10V) 6A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 35mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 45mΩ

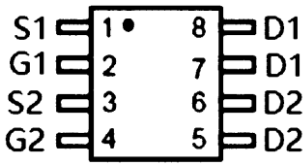
- **PMOS**
- V_{DS} -60V
- I_D (at V_{GS} = -10V) -6A
- $R_{DS(ON)}$ (at V_{GS} = -10V) < 45mΩ
- RoHS Compliant

Application

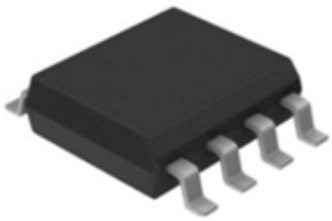
- Power switch
- DC/DC converters



Schematic diagram



Marking and pin assignment



SOP-8

Device	Package	Marking	Packaging
G06NP06S2	SOP-8双基	G06NP06	4000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	NMOS	PMOS	Unit
Drain-Source Voltage	V_{DS}	60	-60	V
Continuous Drain Current	I_D	6	-6	A
Pulsed Drain Current (note1)	I_{DM}	24	-24	A
Gate-Source Voltage	V_{GS}	±20	±20	V
Power Dissipation	P_D	2	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	-55 To 150	ºC

Thermal Resistance

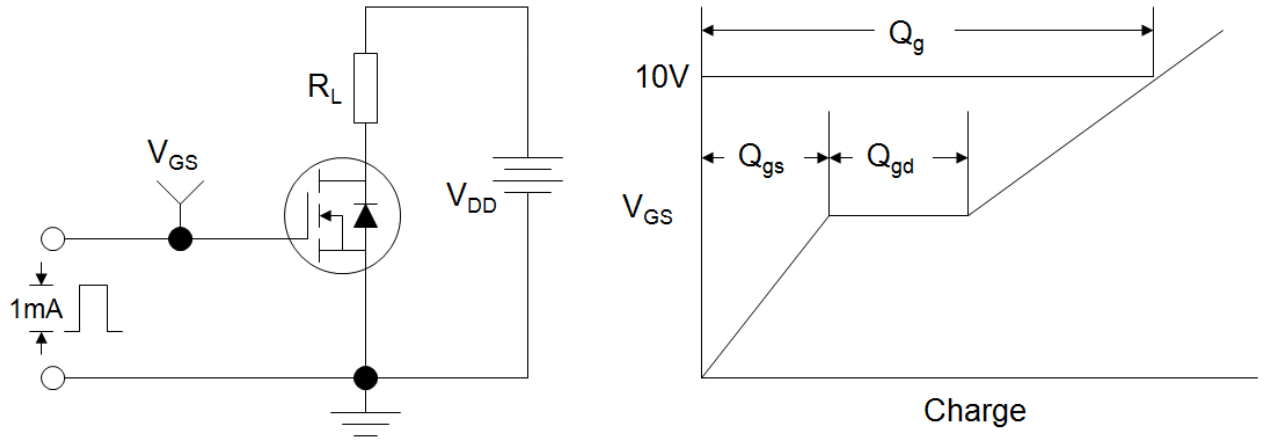
Parameter	Symbol	NMOS	PMOS	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	50	ºC/W

NMOS Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6A	--	30	35	mΩ
		V_{GS} = 4.5V, I_D = 4A	--	33	45	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=6A	--	12.5	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V, f = 1.0MHz	--	1350	--	pF
Output Capacitance	C_{oss}		--	54	--	
Reverse Transfer Capacitance	C_{rss}		--	51	--	
Total Gate Charge	Q_g	V_{DS} = 30V, I_D = 5A, V_{GS} = 10V	--	22	--	nC
Gate-Source Charge	Q_{gs}		--	3.3	--	
Gate-Drain Charge	Q_{gd}		--	5.2	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 30V, I_D = 5A, R_G = 3Ω	--	5.2	--	ns
Turn-on Rise Time	t_r		--	3	--	
Turn-off Delay Time	$t_{d(off)}$		--	17	--	
Turn-off Fall Time	t_f		--	2.5	--	
Drain-Source Body Diode Characteristics						
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 6A, V_{GS} = 0V	--	--	1.2	V
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	6	A

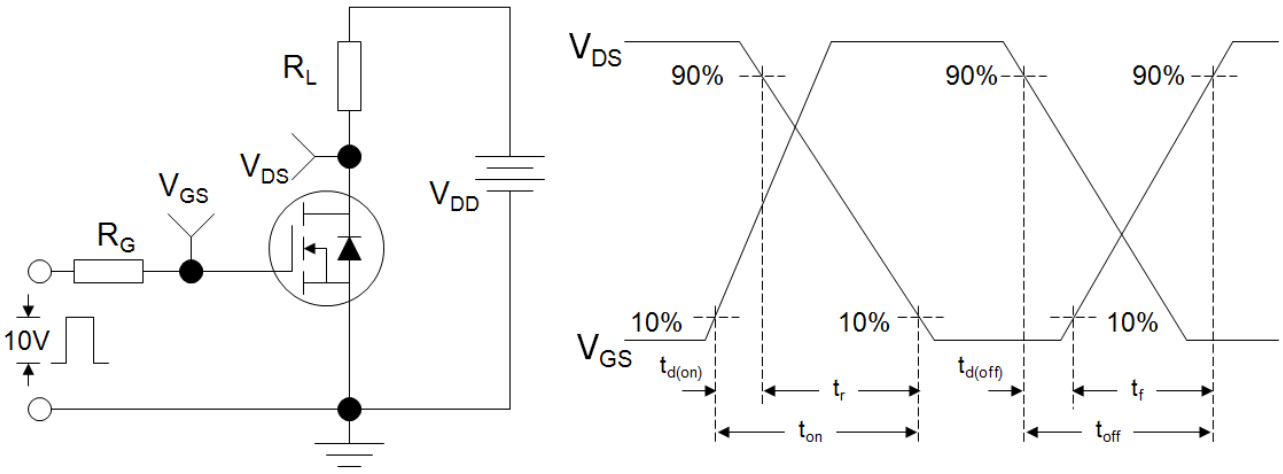
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

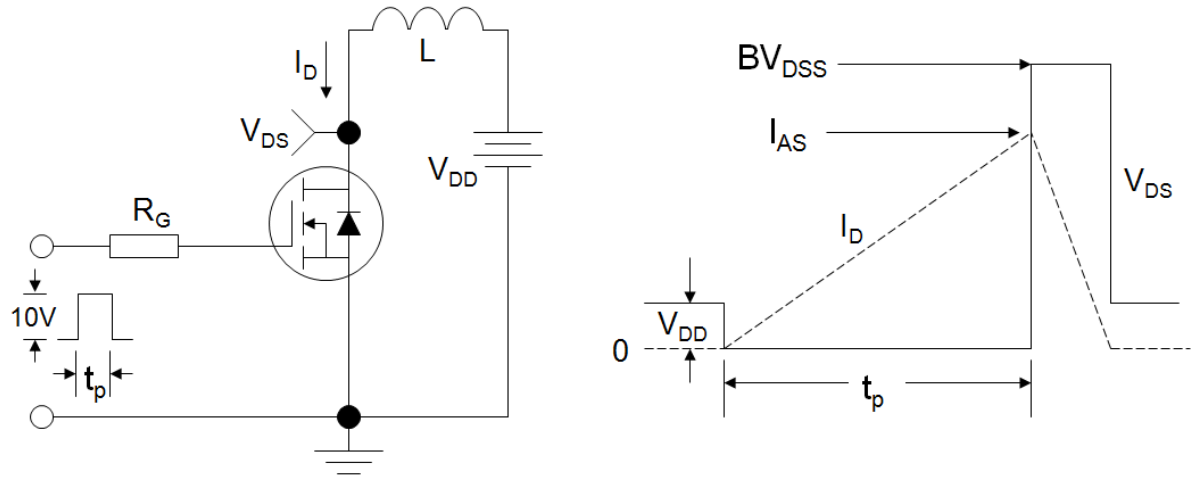
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



NMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

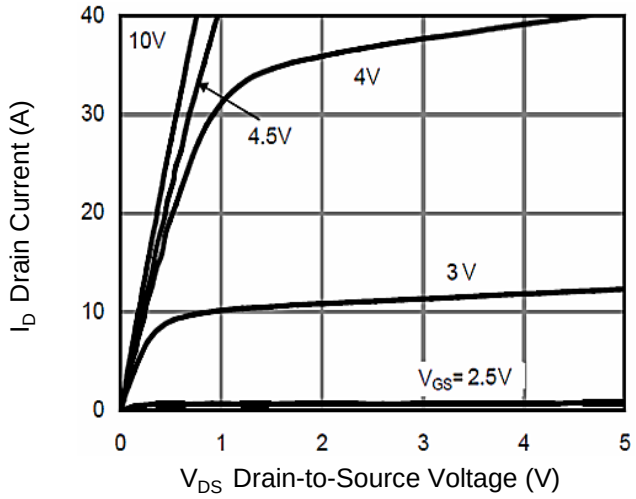


Figure 2. Transfer Characteristics

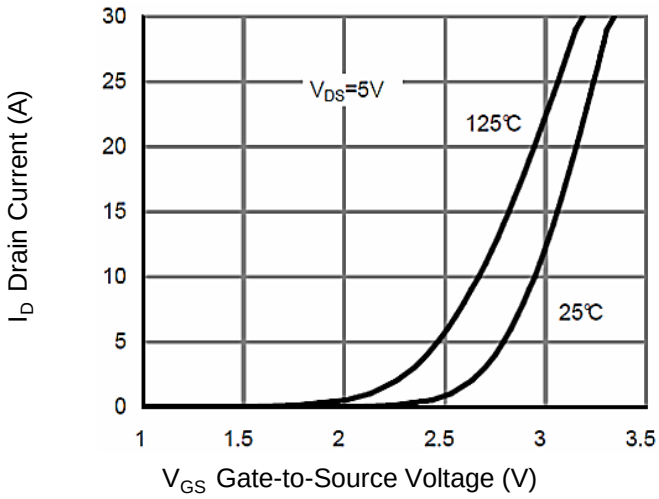


Figure 3.Drain-Source On-Resistance

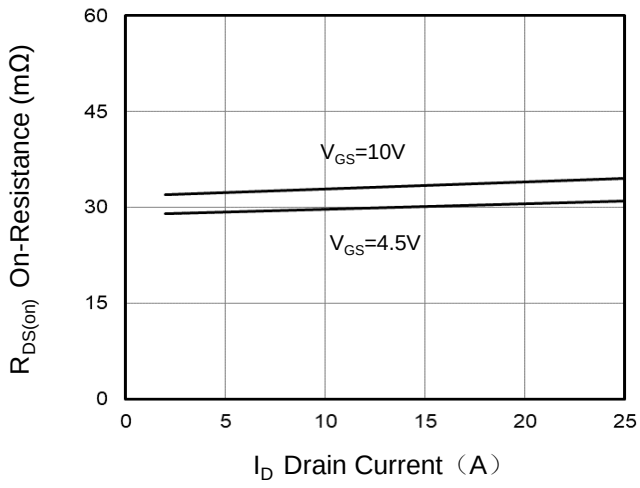


Figure 4. Gate Charge

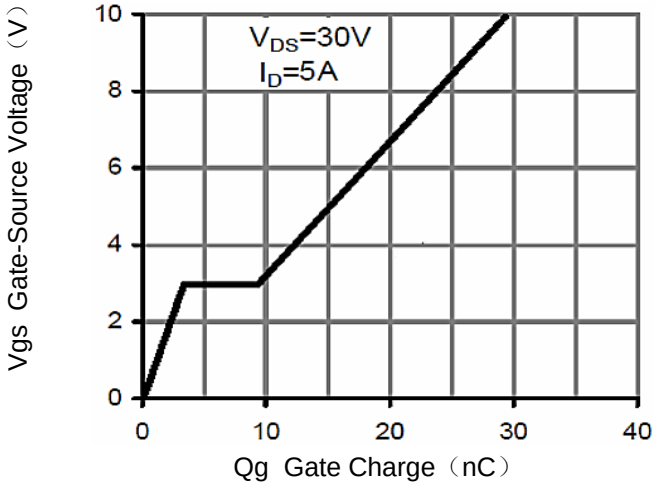


Figure 5. Capacitance

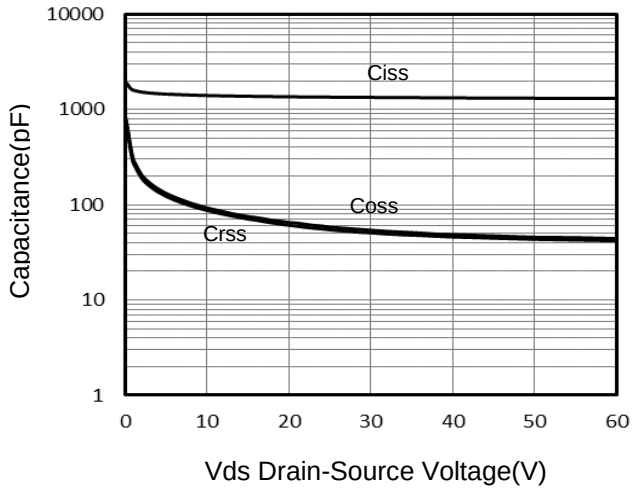
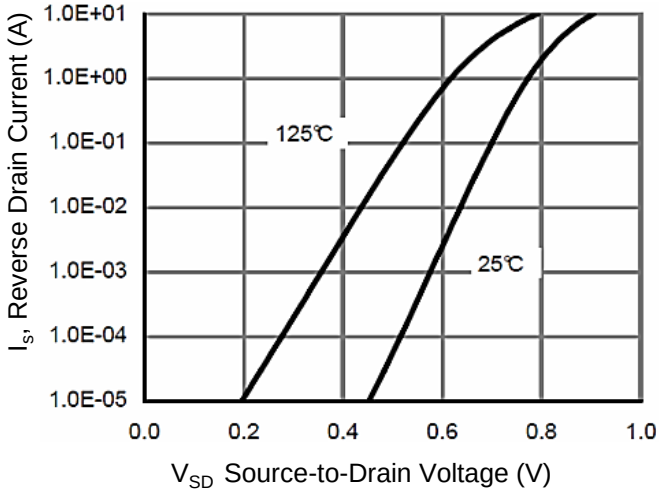


Figure 6. Source-Drain Diode Forward



NMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

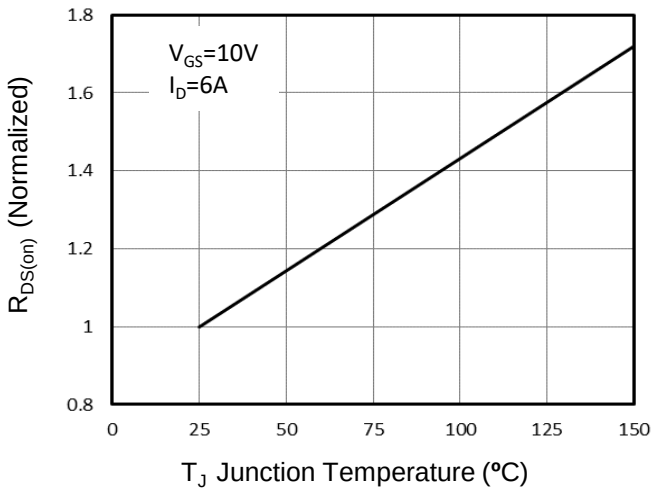


Figure 8. Safe Operation Area

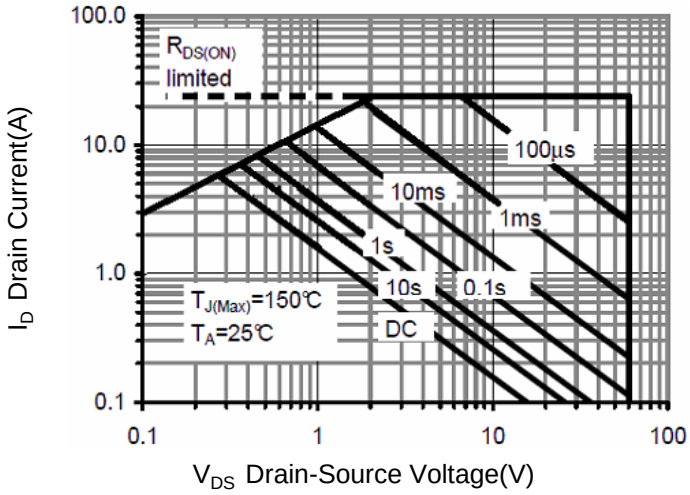
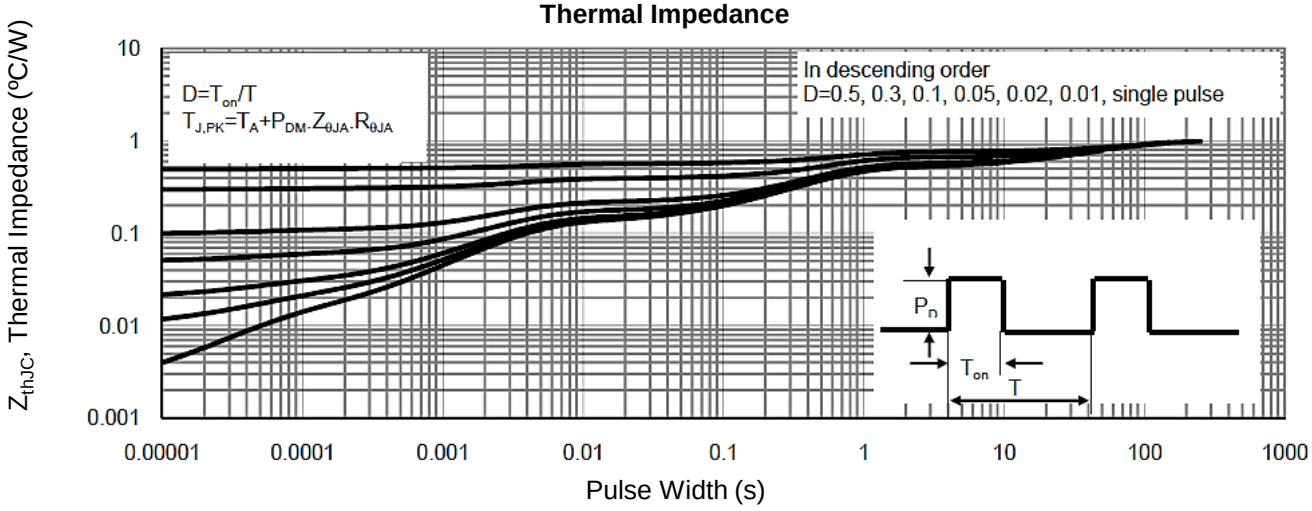


Figure 9. Normalized Maximum Transient Thermal Impedance

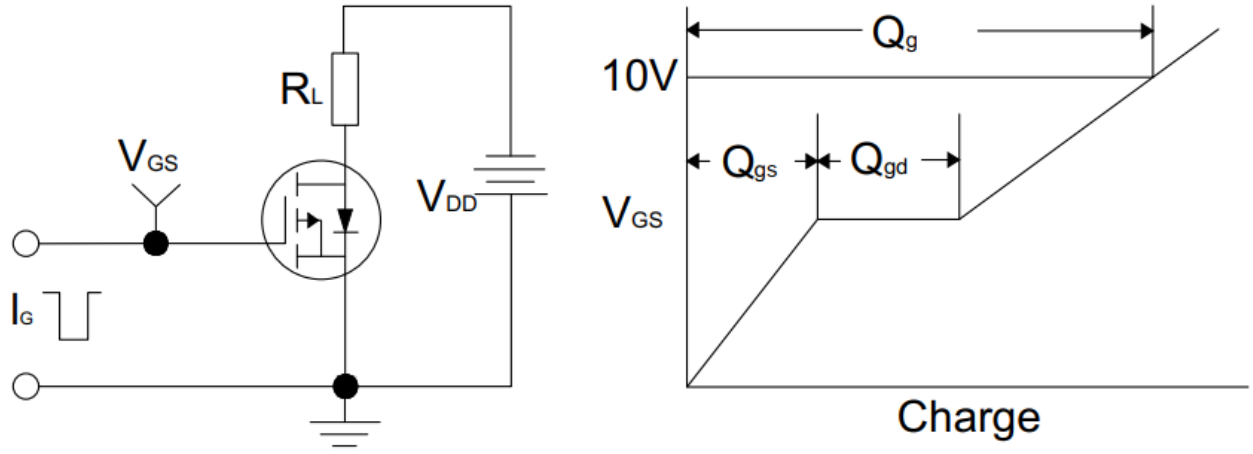


PMOS Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -60V, V_{GS} = 0V, T_J = 25ºC	--	--	-1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.5	-2.5	-3.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -5A	--	37	45	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-5A	--	9	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -30V, f = 1.0MHz	--	2610	--	pF
Output Capacitance	C_{oss}		--	114	--	
Reverse Transfer Capacitance	C_{rss}		--	111	--	
Total Gate Charge	Q_g	V_{DD} = -30V, I_D = -5A, V_{GS} = -10V	--	25	--	nC
Gate-Source Charge	Q_{gs}		--	4	--	
Gate-Drain Charge	Q_{gd}		--	7	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = -30V, I_D = -5A, R_G = 6Ω	--	15	--	ns
Turn-on Rise Time	t_r		--	58	--	
Turn-off Delay Time	$t_{d(off)}$		--	30	--	
Turn-off Fall Time	t_f		--	36	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	-6	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = -5A, V_{GS} = 0V	--	--	-1.2	V

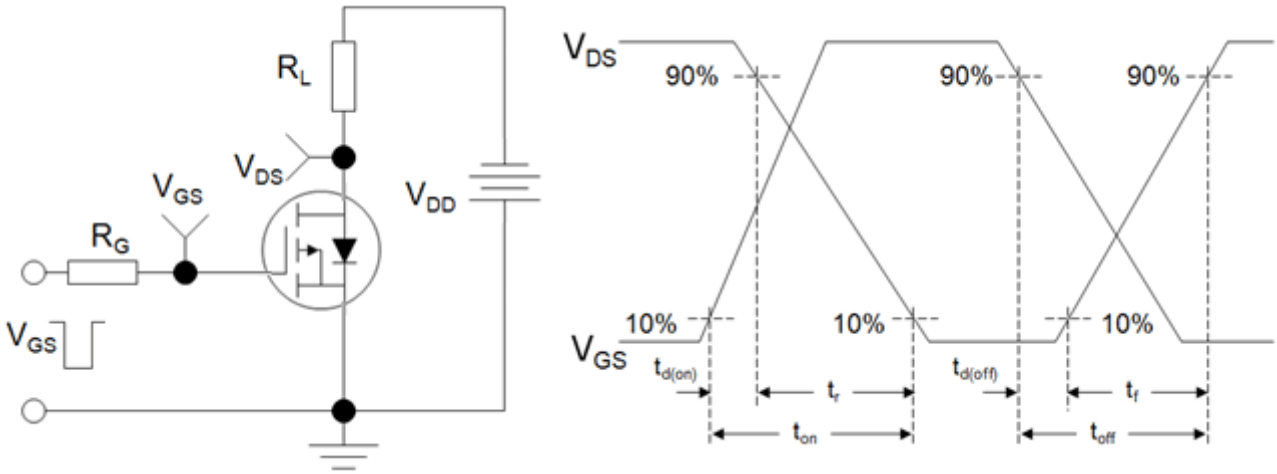
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

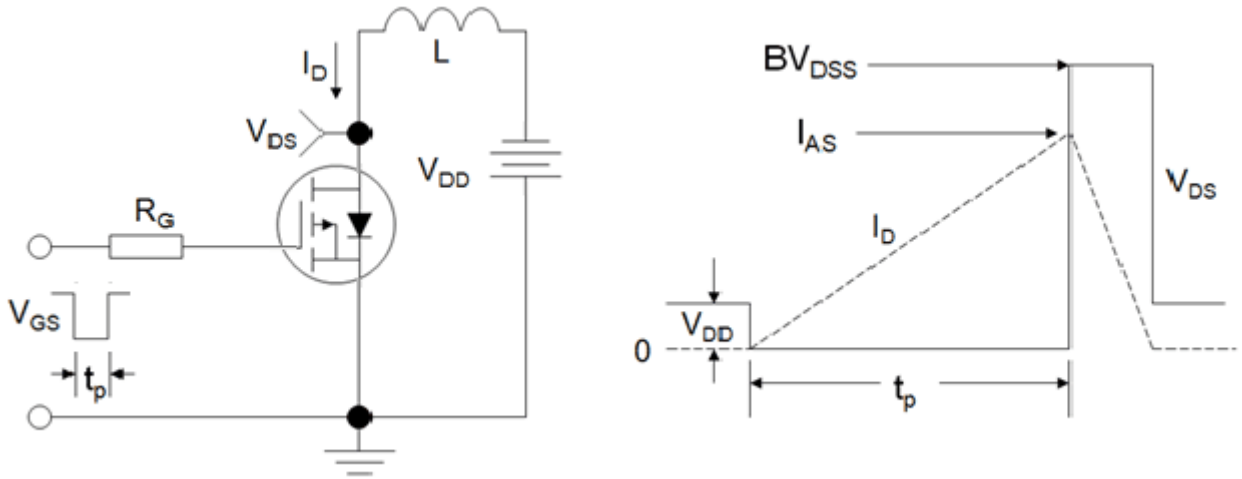
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



PMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

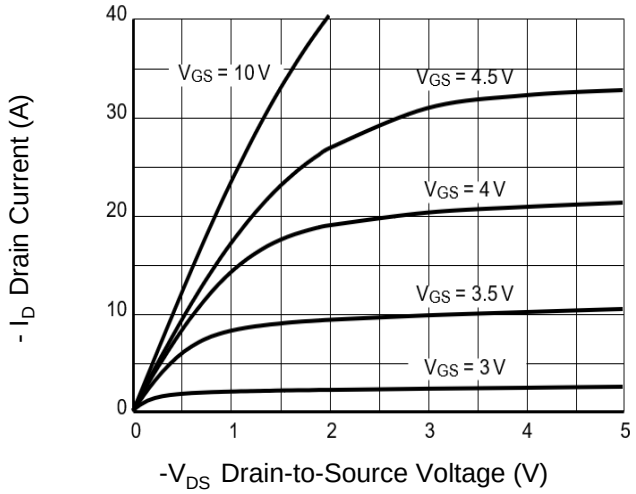


Figure 2. Transfer Characteristics

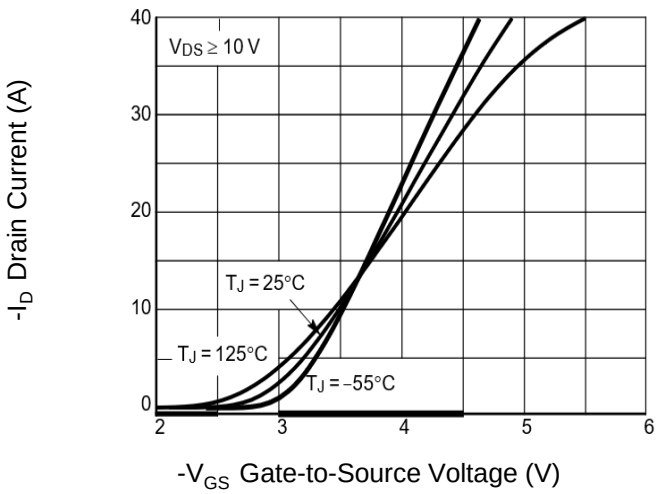


Figure 3.Rdson-Drain Current

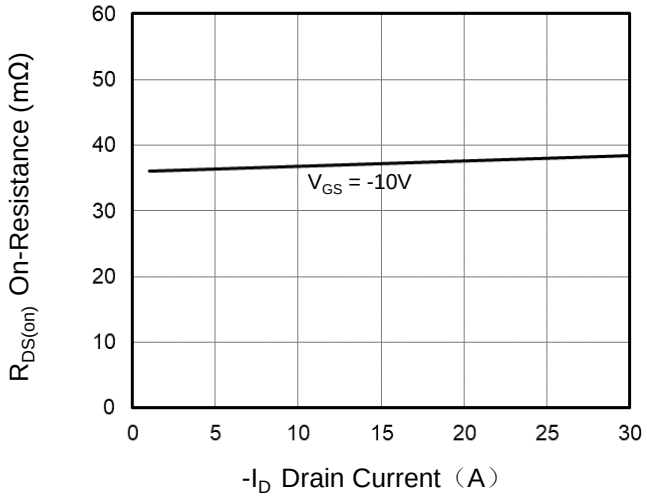


Figure 4. Gate Charge

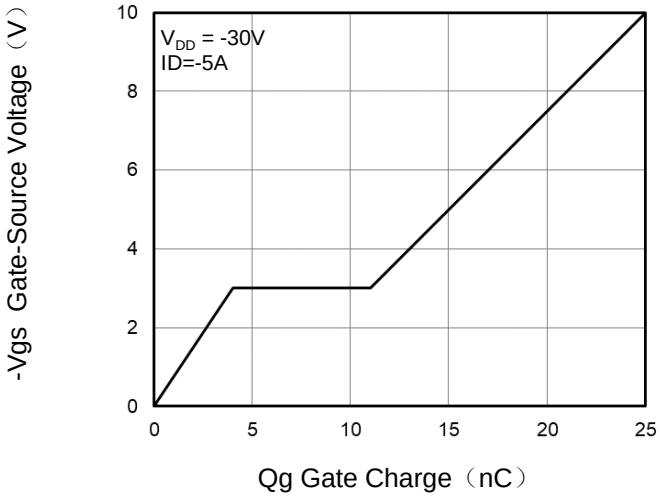


Figure 5. Capacitance

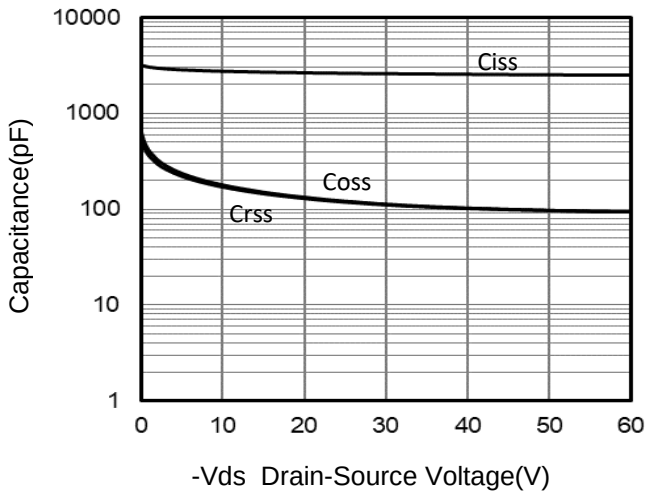
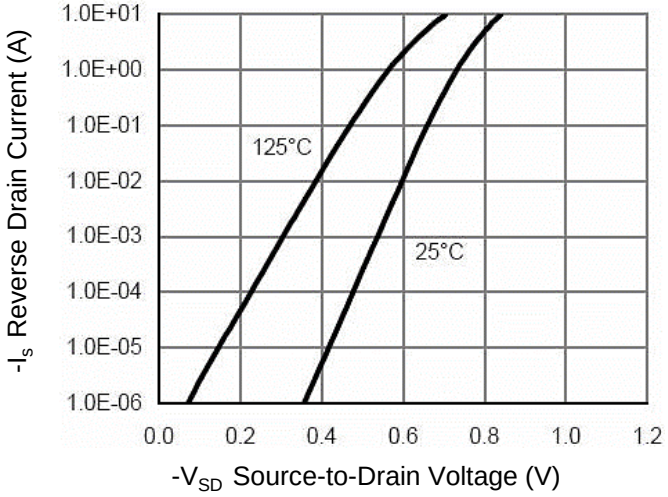


Figure 6. Source-Drain Diode Forward



PMOS Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

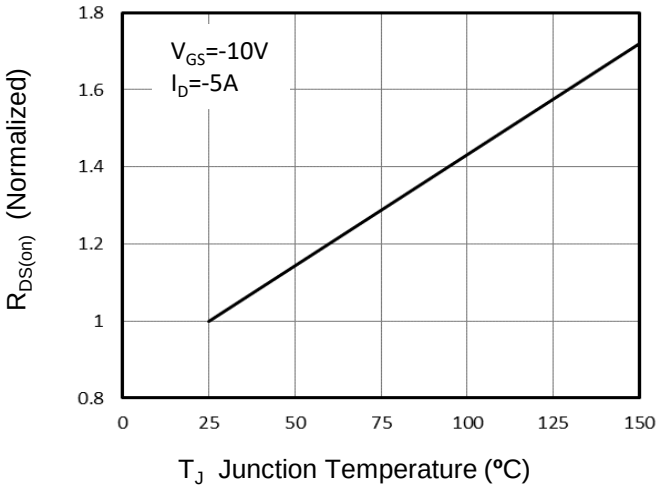


Figure 8. Safe Operation Area

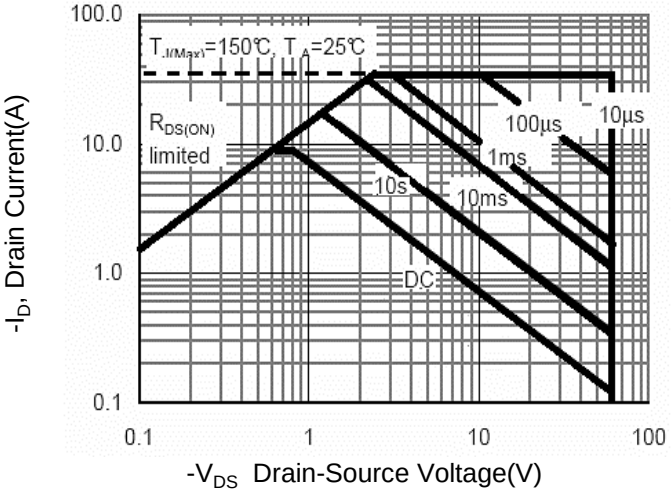
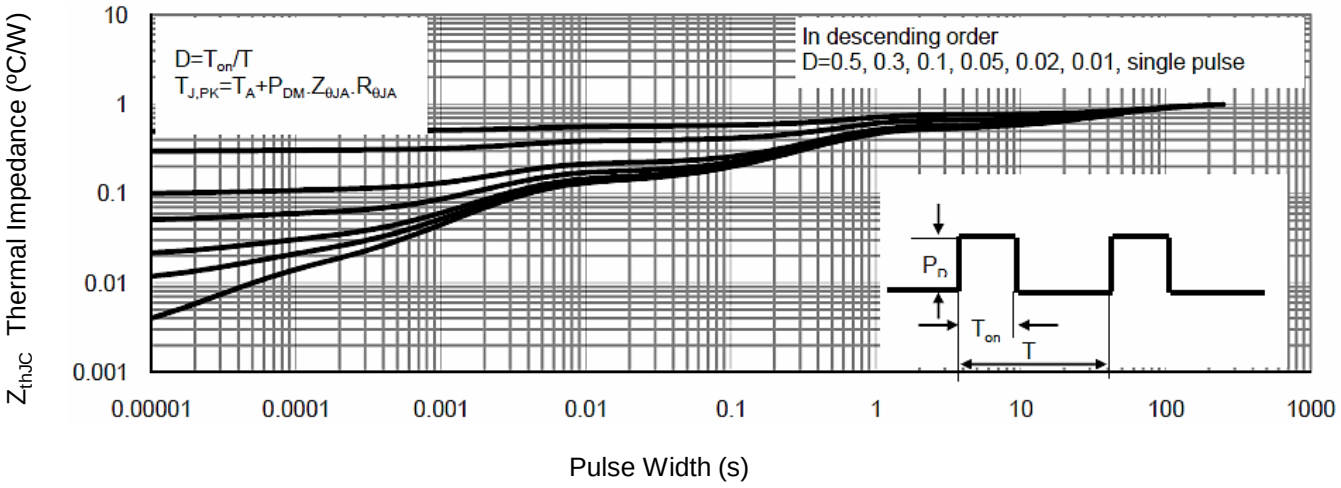
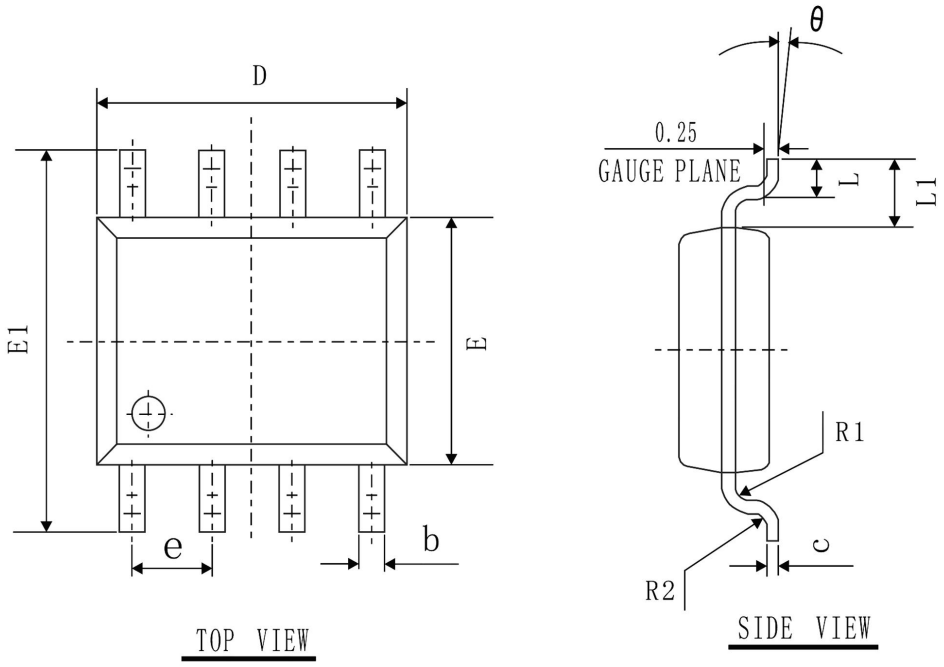
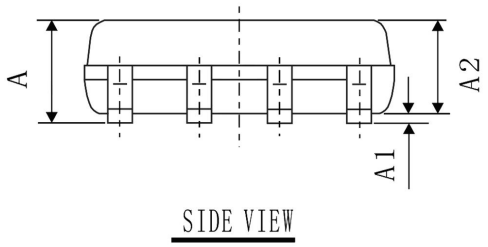


Figure 9. Normalized Maximum Transient Thermal Impedance



SOP-8 Package Information





COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		