ATP03074S

30V N+P Channel MOSFET

Features

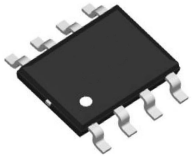
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summary

	N-ch	P-ch	
V_{DS}	30	-30	V
I_D	7.4	-4.7	A
$R_{DS(ON)}$ (at V_{GS}=±10V)	19	48	mΩ
$R_{DS(ON)}$ (at V_{GS}=±4.5V)	26	71	mΩ

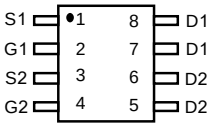
Applications

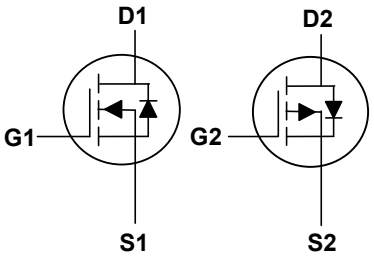
- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



SOP-8 Top View

Top View





Absolute Maximum Ratings(T_A=25℃, unless otherwise noted)

Parameter	Symbol	N-Ch	P-Ch	Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current	I_D@T_A=25℃	7.4	-4.7	A
Continuous Drain Current	I_D@T_A=70℃	5.9	-3.8	A
Pulsed Drain Current[1]	I_{DM}	18	-11	A
Single Pulse Avalanche Energy[3]	EAS	15	11	mJ
Avalanche Current	I_{AS}	7.8	-6.8	A
Total Power Dissipation[4]	P_D@T_A=25℃	1.6		W
Total Power Dissipation[4]	P_D@T_A=70℃	1.0		W
Storage Temperature Range	T_{STG}	-55 to 150		℃
Operating Junction Temperature Range	T_J	-55 to 150		℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	---	78	℃/W

N-Ch Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	30	---	---	V
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=10V , I_D=6.9A	---	16	19	mΩ
		V_{GS}=4.5V , I_D=5A	---	20	26	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1	---	2	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=10V , I_D=1A	---	3.6	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	5.4	---	Ω
Total Gate Charge	Q_g	V_{DS}=15V , V_{GS}=10V , I_D=7A	---	13	---	nC
Gate-Source Charge	Q_{gs}		---	1.6	---	
Gate-Drain Charge	Q_{gd}		---	2.4	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=15V , V_{GS}=10V , R_G=6Ω, I_D=1A	---	6	---	ns
Rise Time	T_r		---	17	---	
Turn-Off Delay Time	$T_{d(off)}$		---	35	---	
Fall Time	T_f		---	9	---	
Input Capacitance	C_{iss}	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	508	---	pF
Output Capacitance	C_{oss}		---	76	---	
Reverse Transfer Capacitance	C_{rss}		---	60	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S		---	---	2	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=2A , T_J=25℃	---	0.75	1.2	V
Reverse Recovery Time	t_{rr}	I_F=5A , di/dt=100A/μs， T_J=25℃	---	8	---	nS
Reverse Recovery Charge	Q_{rr}		---	3	---	nC

Note:

1.Repetitive Rating : Pulsed width limited by maximum junction temperature.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.5mH

4.The power dissipation is limited by 150℃ junction temperature

N-Ch Typical Characteristics

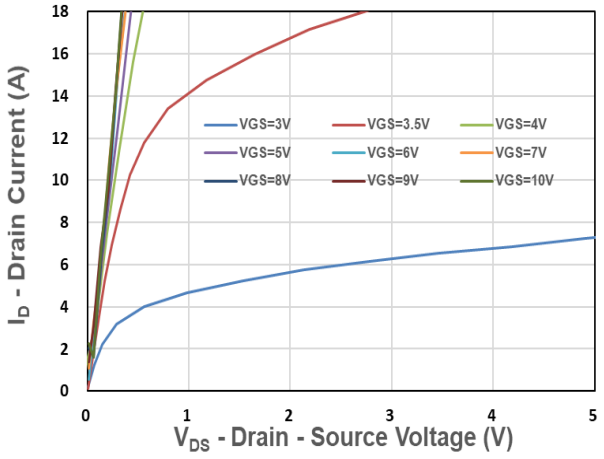


Figure 1. Output Characteristics

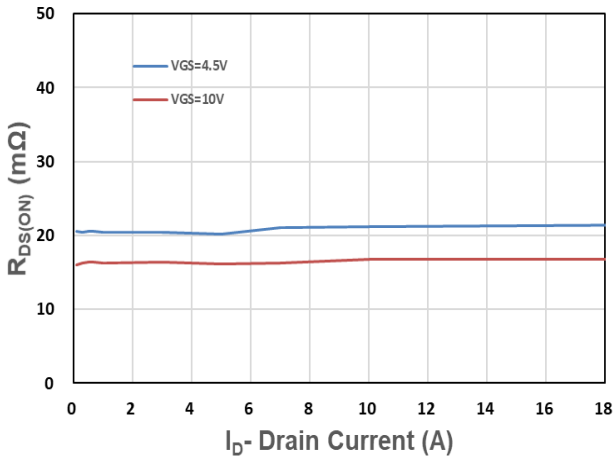


Figure 2. On−Resistance vs. I_D

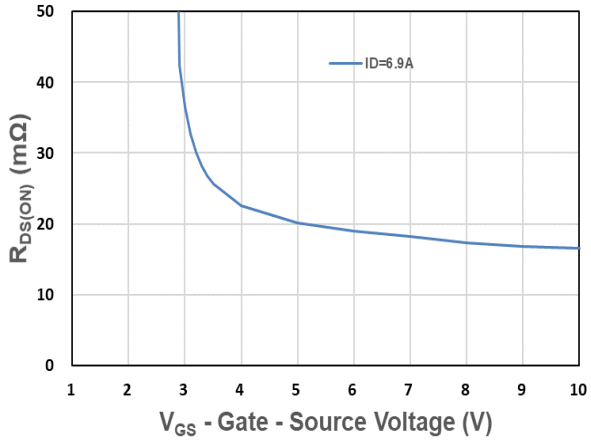


Figure 3. On−Resistance vs. V_{GS}

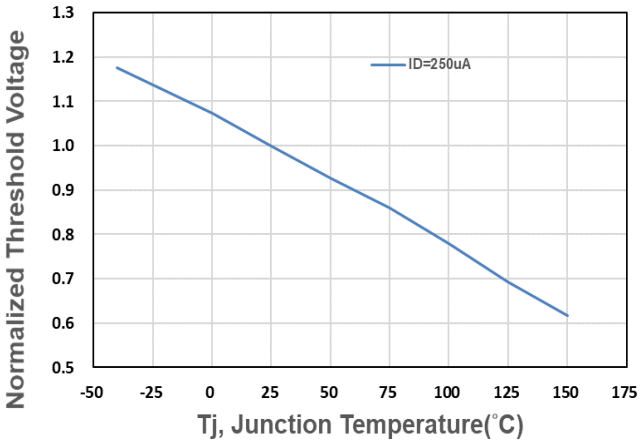


Figure 4. Gate Threshold Voltage

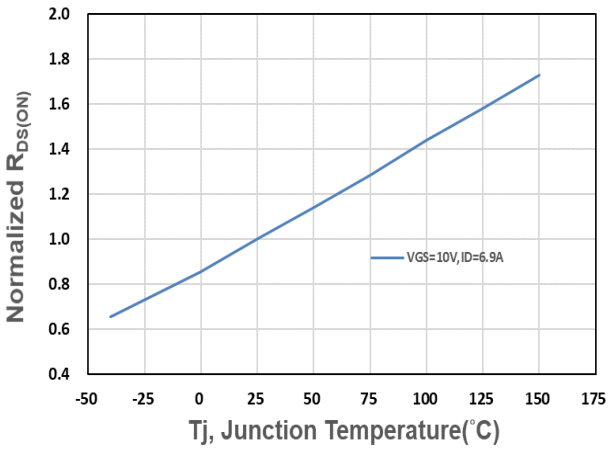


Figure 5. Drain-Source On Resistance

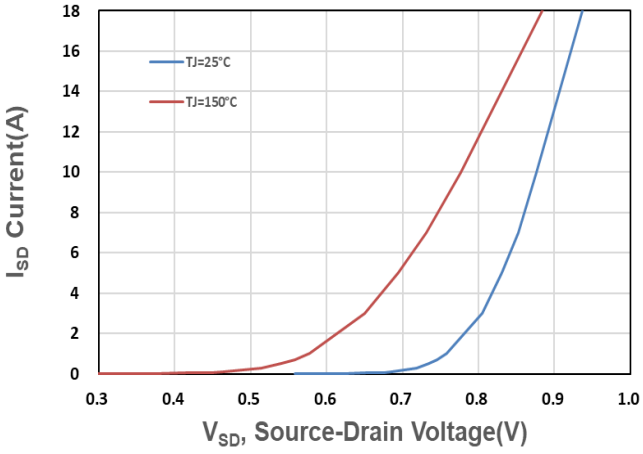


Figure 6. Source-Drain Diode Forward

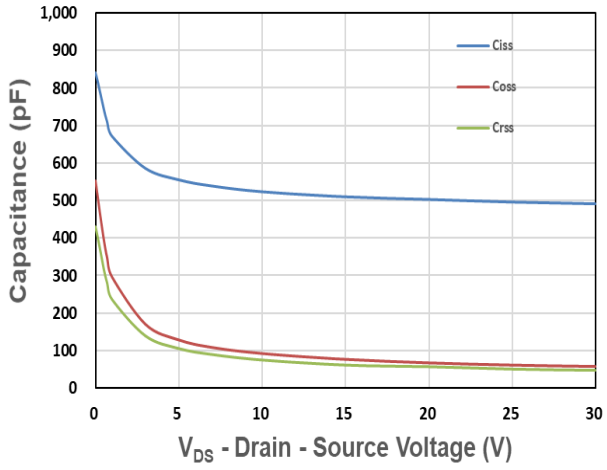


Figure 7. Capacitance

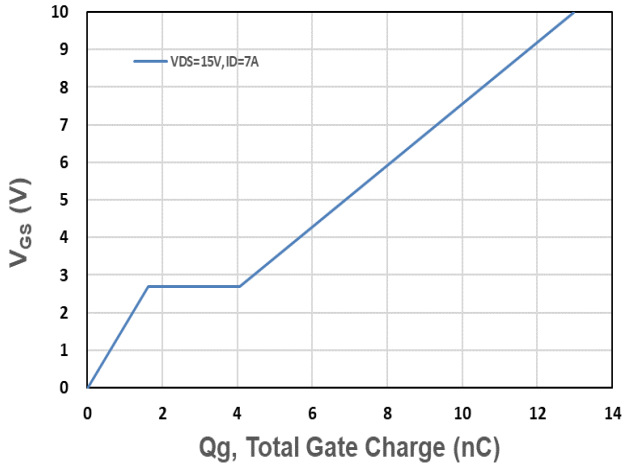


Figure 8. Gate Charge Characteristics

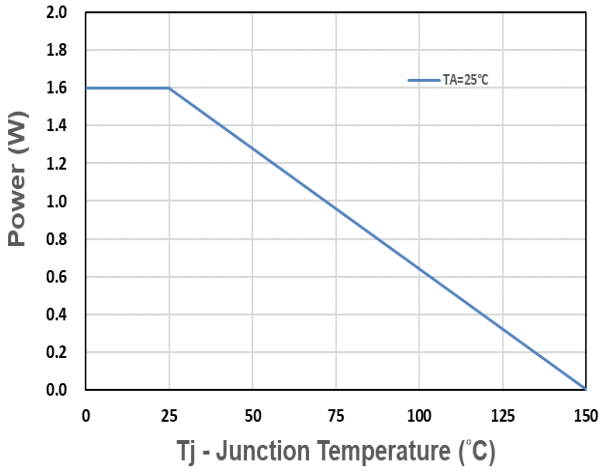


Figure 9. Power Dissipation

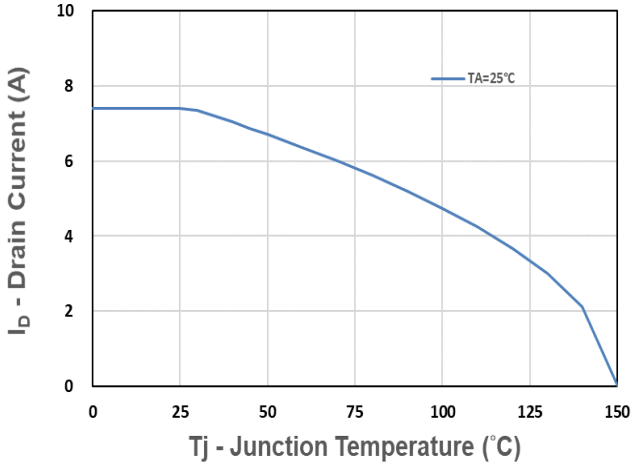


Figure 10. Drain Current

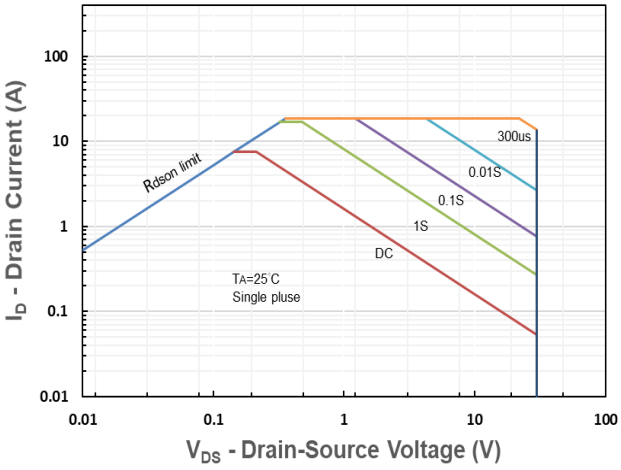


Figure 11. Safe Operating Area

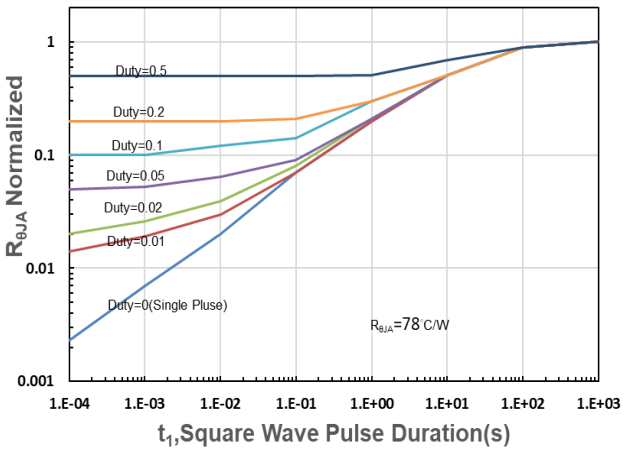


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance

P-Ch Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-30	---	---	V
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=-10V , I_D=-5.2A	---	40	48	mΩ
		V_{GS}=-4.5V , I_D=-4A	---	54	71	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-1	---	-2	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=-10V , I_D=-1A	---	3.7	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	28	---	Ω
Total Gate Charge	Q_g	V_{DS}=-15V , V_{GS}=-10V , I_D=-6A	---	13	---	nC
Gate-Source Charge	Q_{gs}		---	1.6	---	
Gate-Drain Charge	Q_{gd}		---	2.6	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω, I_D=-1A	---	6	---	ns
Rise Time	T_r		---	17	---	
Turn-Off Delay Time	$T_{d(off)}$		---	65	---	
Fall Time	T_f		---	35	---	
Input Capacitance	C_{iss}	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	619	---	pF
Output Capacitance	C_{oss}		---	78	---	
Reverse Transfer Capacitance	C_{rss}		---	65	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S		---	---	-2	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V , I_S=-1.7A , T_J=25℃	---	-0.78	-1.2	V
Reverse Recovery Time	t_{rr}	I_F=-4.5A , di/dt=100A/μs, T_J=25℃	---	8	---	nS
Reverse Recovery Charge	Q_{rr}		---	3	---	nC

Note:

1.Repetitive Rating : Pulsed width limited by maximum junction temperature.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.5mH

4.The power dissipation is limited by 150℃ junction temperature

P-Ch Typical Characteristics

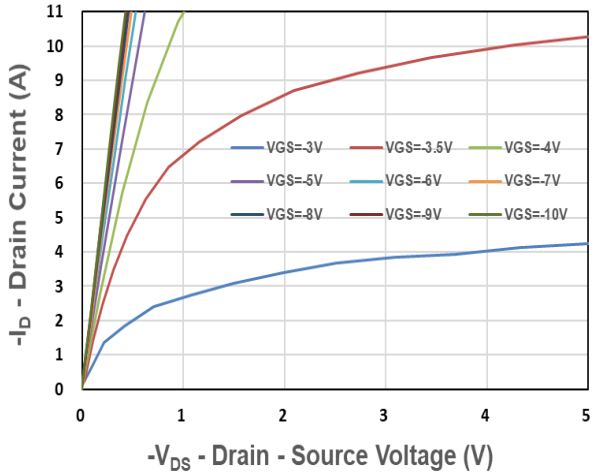


Figure 1. Output Characteristics

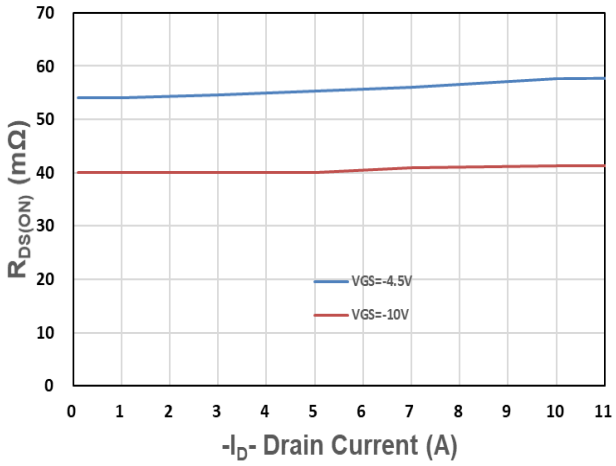


Figure 2. On−Resistance vs. I_D

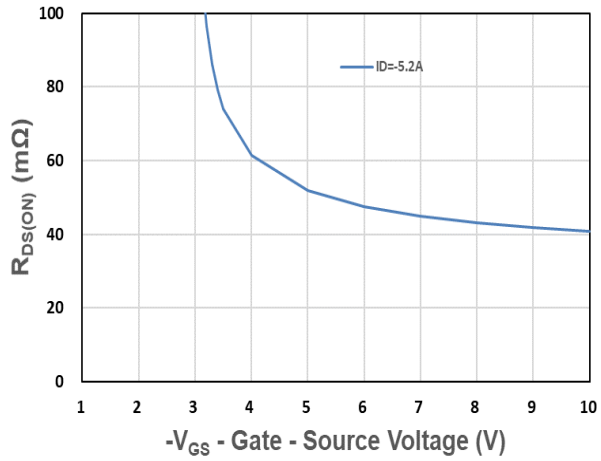


Figure 3. On−Resistance vs. V_{GS}

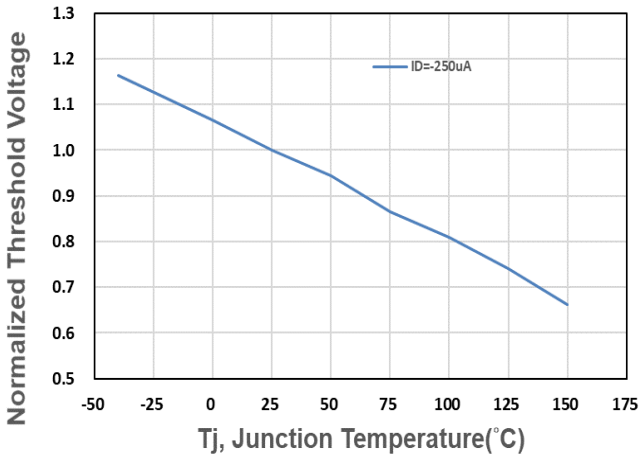


Figure 4. Gate Threshold Voltage

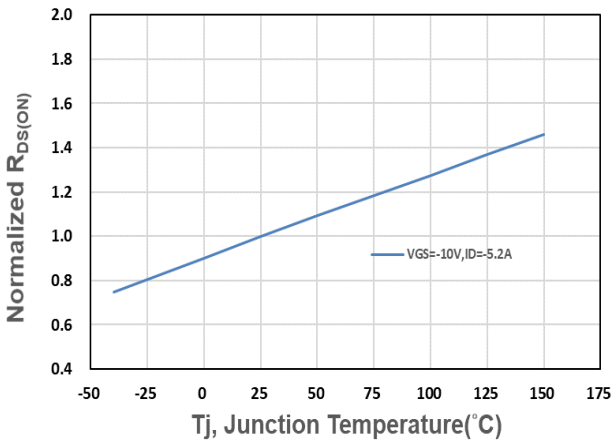


Figure 5. Drain-Source On Resistance

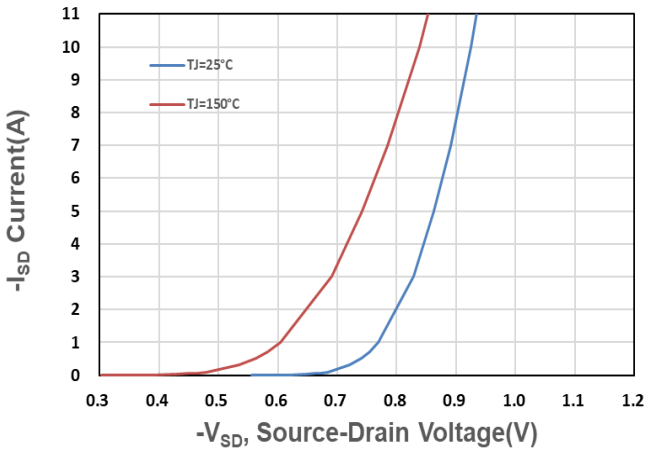


Figure 6. Source-Drain Diode Forward

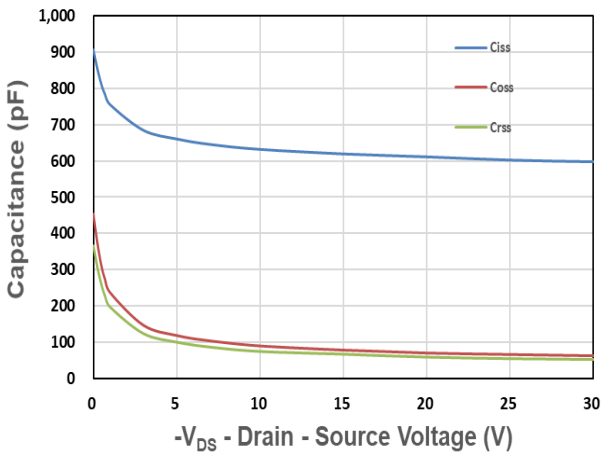


Figure 7. Capacitance

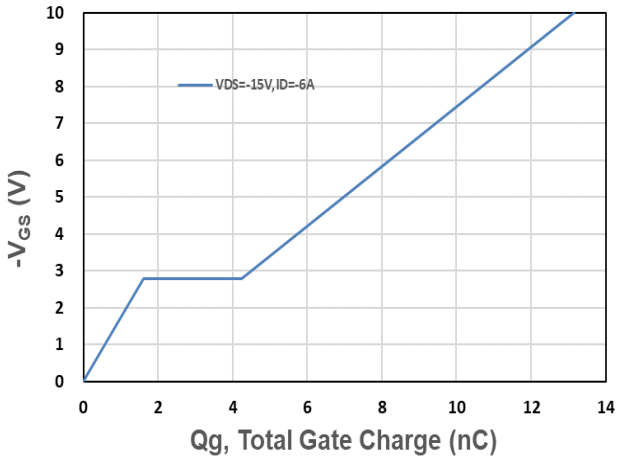


Figure 8. Gate Charge Characteristics

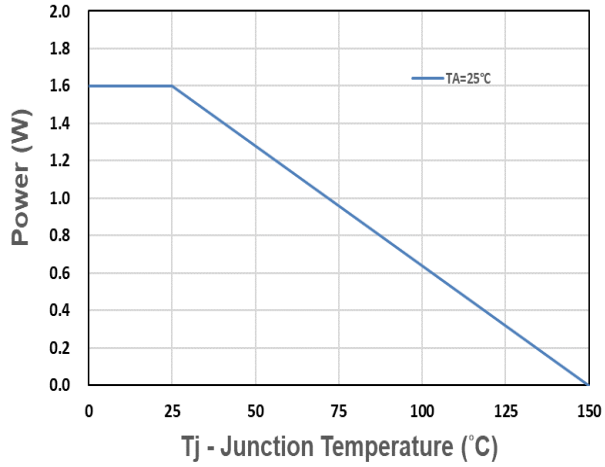


Figure 9. Power Dissipation

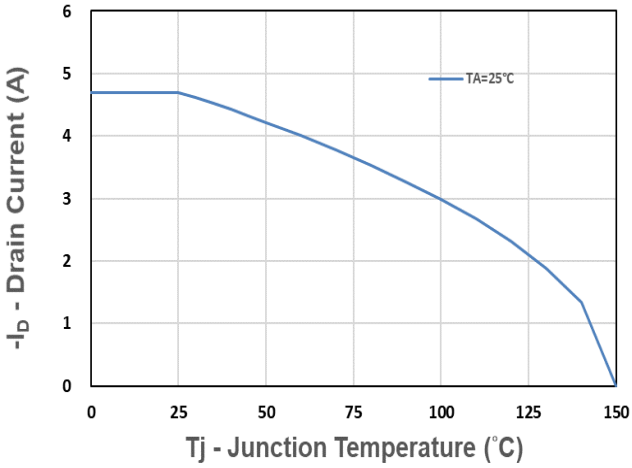


Figure 10. Drain Current

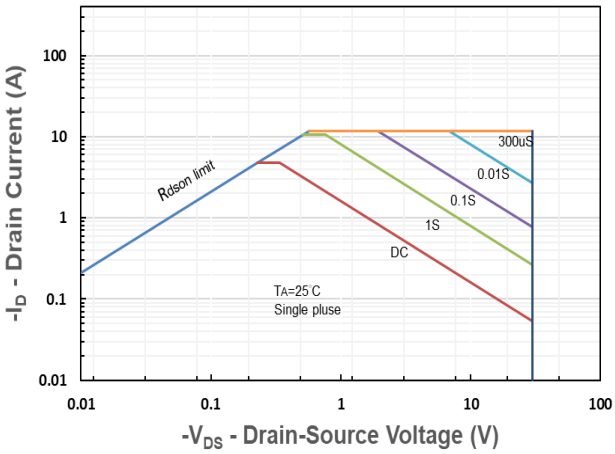


Figure 11. Safe Operating Area

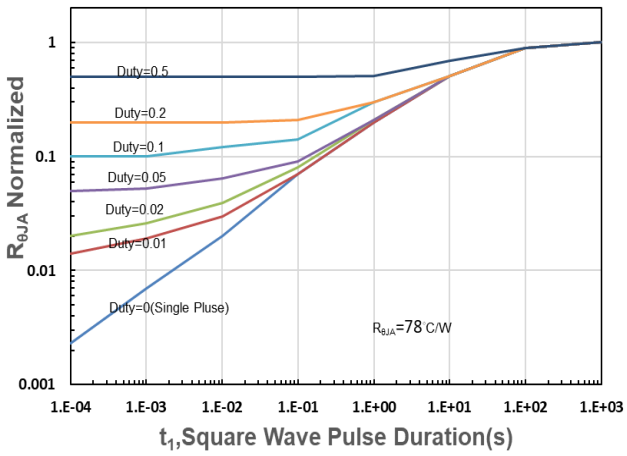
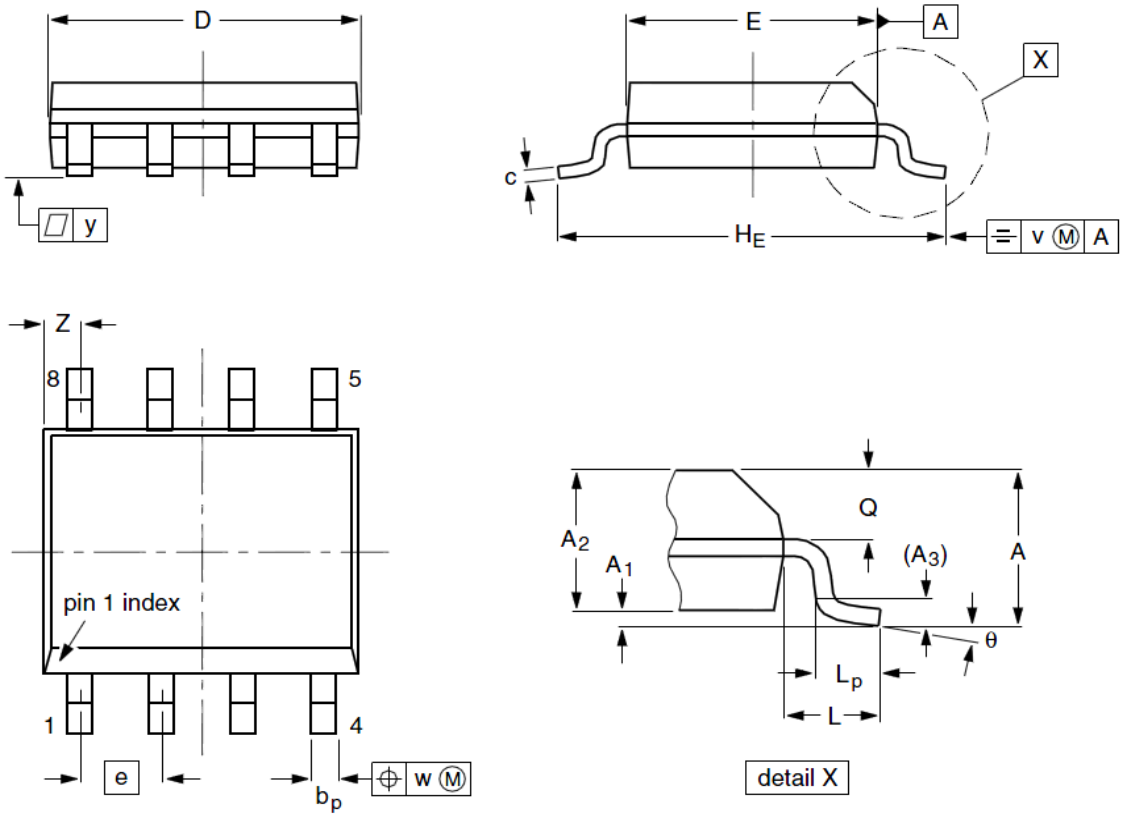


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance

SOP-8 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.35	1.55	1.75	**A_1**	0.10	0.18	0.25
A_2	1.25	1.45	1.65	**A_3**	--	0.25	--
b_p	0.36	0.42	0.51	**c**	0.19	0.22	0.25
D	4.70	4.92	5.10	**E**	3.80	3.90	4.00
e	--	1.27	--	**H_E**	5.80	6.00	6.20
L	--	1.05	--	**L_P**	0.40	0.68	1.00
Q	0.60	0.65	0.73	**v**	--	0.25	--
w	--	0.25	--	**y**	--	0.10	--
Z	0.30	0.50	0.70	**θ**	0°		8°