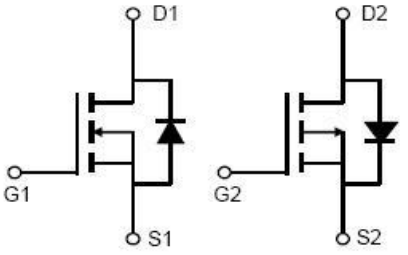
MX4606

30V Complementary MOSFET

Description

Ther MX4606 uses advanced trench technology to Provi deexcellent RDS(ON), low gate charge.

This device may be used to form a level shifted high side switch, and for a host of other application.



Schematic diagram

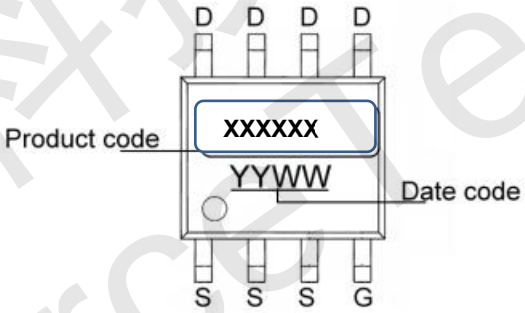
General Features

N-Channel
VDS = 30V,ID =6A
RDS(ON) (Typ.)20mΩ @ VGS =10V
RDS(ON) (Typ.)29mΩ @ VGS =4.5V

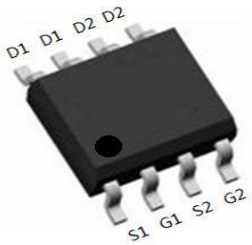
P-Channel

VDS = -30V,ID = -5A
RDS(ON)(Typ.)38mΩ @ VGS =-10V
RDS(ON)(Typ.)58mΩ @ VGS =-4.5V

High Power and current handing capability
Lead free product is acquired
Surface mount package



Marking and pin assignment



SOP-8 top view

Application

PWM applications
Load switch
Power management

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	N-Channel	P-Channel	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	30	-30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	±20	V
I_D	Drain Current-Continuous	6	-5	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed	30	-30	A
P_D	Maximum Power Dissipation	2.5	2.5	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	℃

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Table 2. Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	℃/W

Table 3.
N-Channel Electrical Characteristics (TA=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{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-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1	1.5	2.5	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=6A	3	7		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=6A		20	30	mΩ
		V_{GS}=4.5V, I_D=5A		29	42	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		580		pF
C_{oss}	Output Capacitance			96		pF
C_{rss}	Reverse Transfer Capacitance			72		pF
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=15V,I_D=6A,R_L=15Ω V_{GS}=10V,R_G=2.5Ω		10		nS
t_r	Turn-on Rise Time			4		nS
$t_{d(off)}$	Turn-Off Delay Time			27		nS
t_f	Turn-Off Fall Time			5		nS
Q_g	Total Gate Charge	V_{DS}=10V,I_D=6A, V_{GS}=10V		13		nC
Q_{gs}	Gate-Source Charge			1.5		nC
Q_{gd}	Gate-Drain Charge			4.5		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				6	A
V_{SD}	Forward on Voltage **(Note 1)**	V_{GS}=0V,I_S=6A		0.89	1.2	V

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

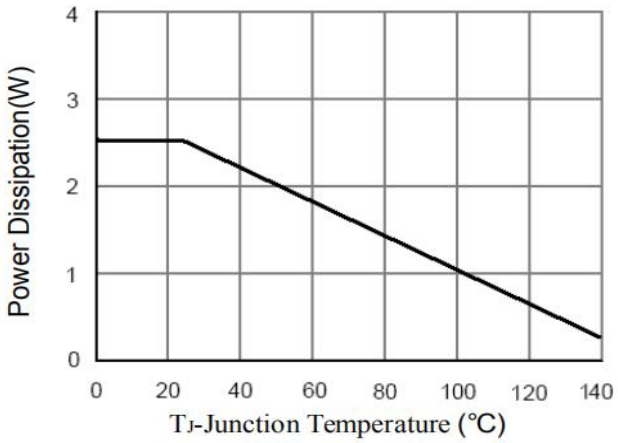

Figure2. Drain Current

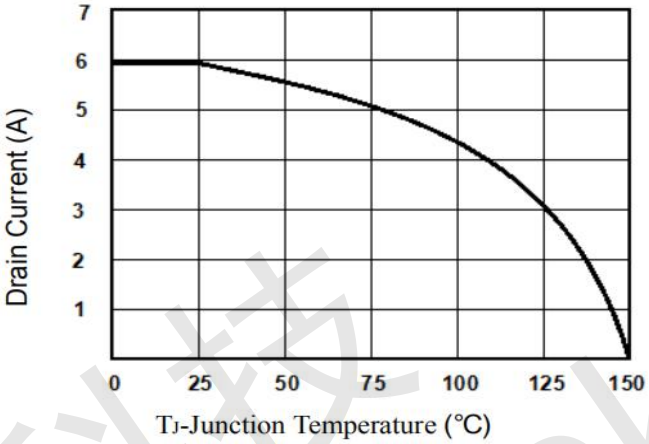

Figure3. Output Characteristics

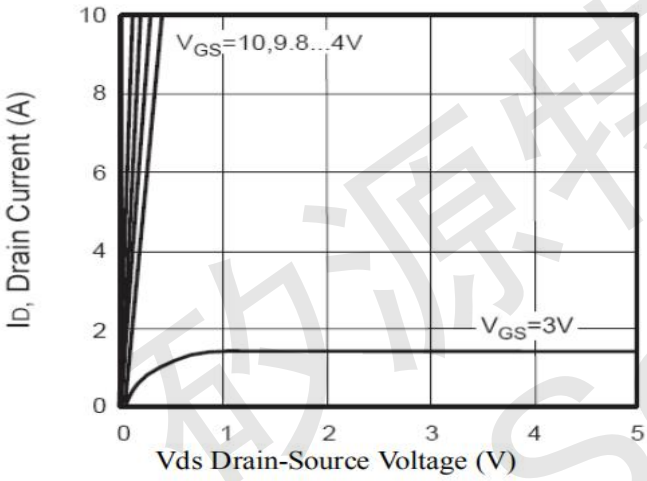

Figure4. Transfer Characteristics

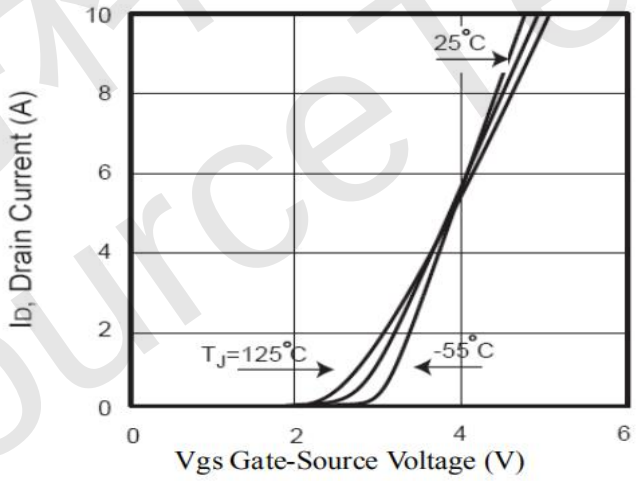

Figure5. Capacitance

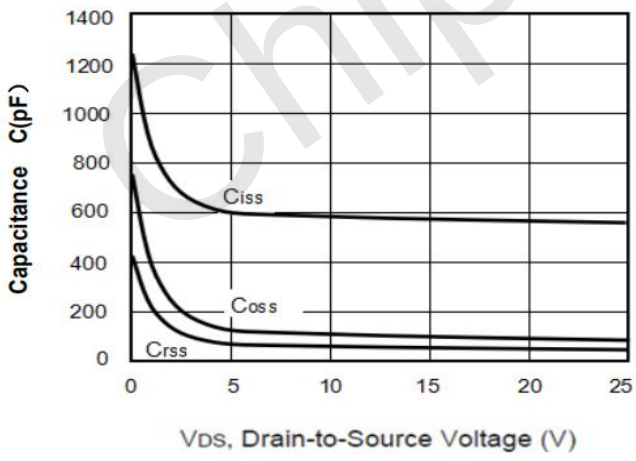

Figure6. $R_{DS(ON)}$ vs Junction Temperature

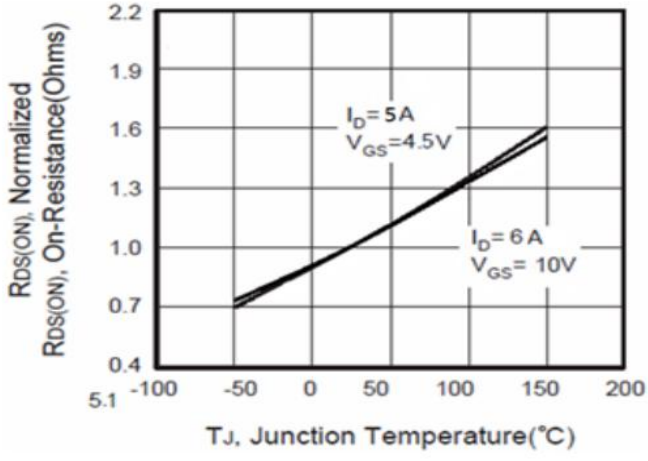

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Figure7. Max BV_{DSS} vs Junction Temperature

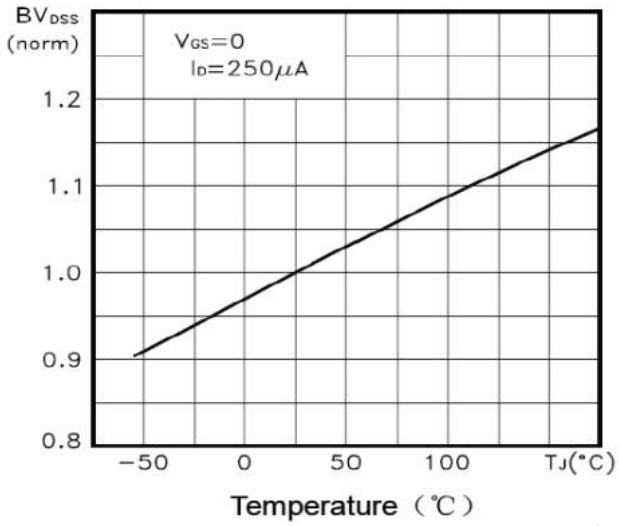
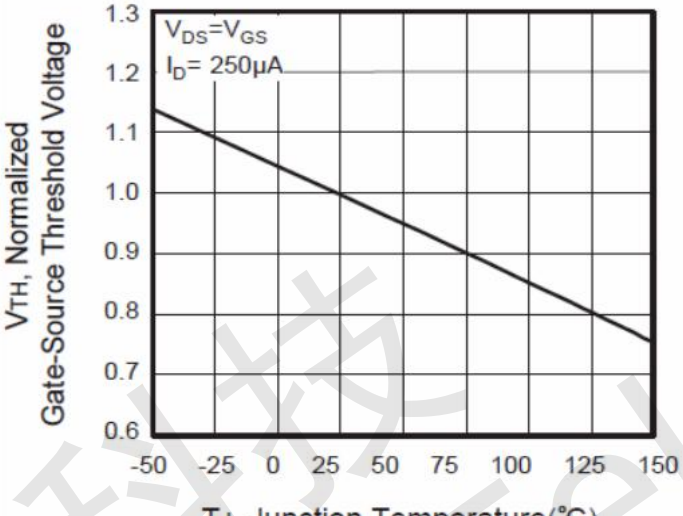
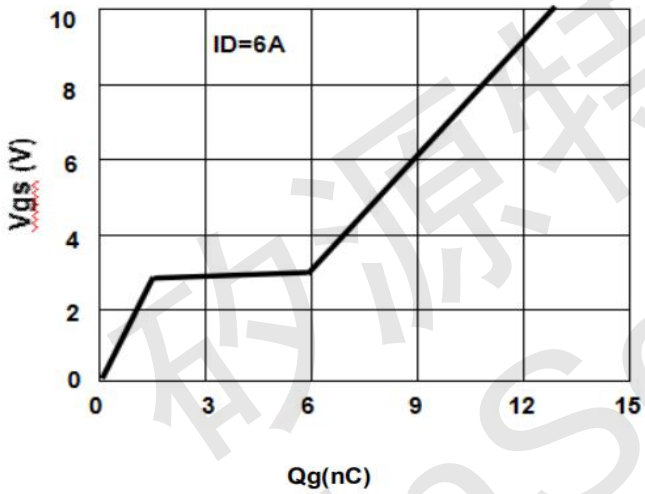


Figure8. $V_{GS(th)}$ vs Junction Temperature





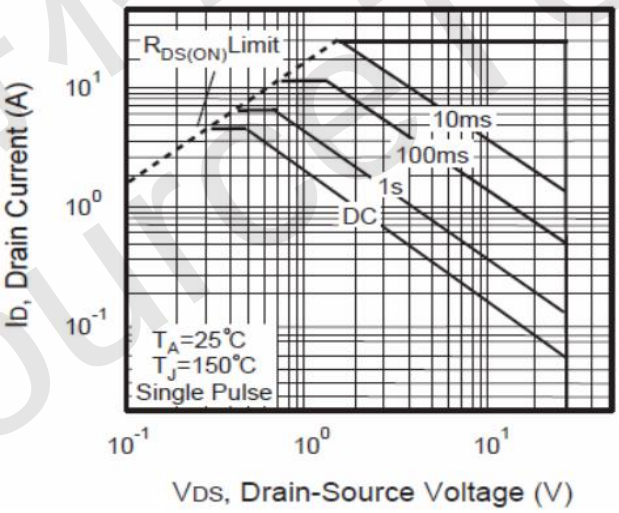


Figure11. Normalized Maximum Transient Thermal Impedance

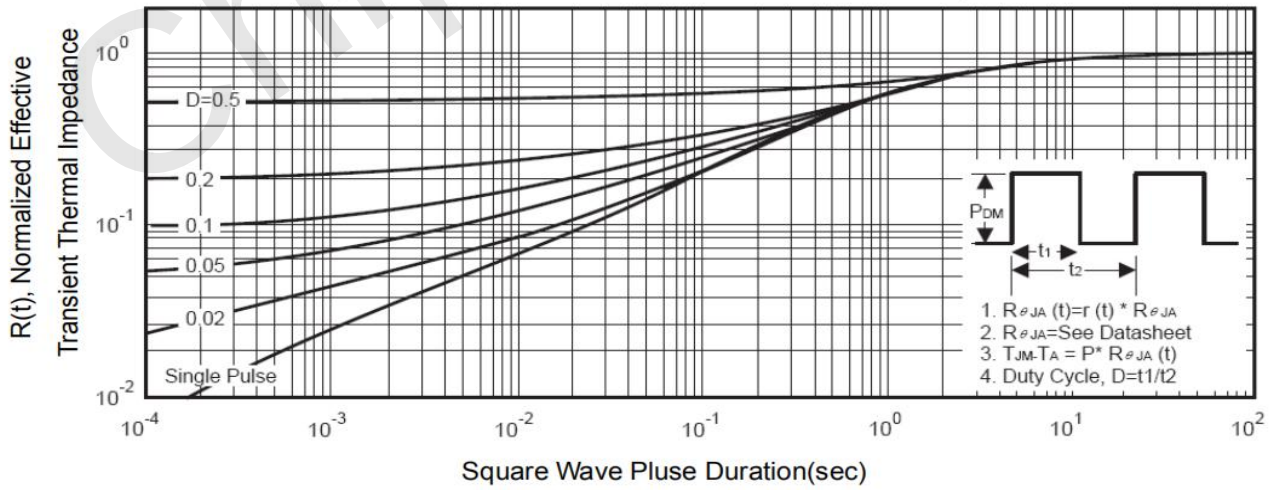


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Table 4.
P-Channel Electrical Characteristics (T_A=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V,V_{GS}=0V			-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-1	-1.6	-3	V
g_{FS}	Forward Transconductance	V_{DS}=-5V,I_D=-5A	4	9		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-5.A		38	49	mΩ
		V_{GS}=-4.5V, I_D=-4A		58	90	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V, f=1.0MHz		605		pF
C_{oss}	Output Capacitance			106		pF
C_{rss}	Reverse Transfer Capacitance			79		pF
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V,I_D=-1A,R_L=15Ω V_{GS}=-10V,R_G=2.5Ω		11		nS
t_r	Turn-on Rise Time			5		nS
$t_{d(off)}$	Turn-Off Delay Time			30		nS
t_f	Turn-Off Fall Time			7		nS
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-5A, V_{GS}=-10V		13		nC
Q_{gs}	Gate-Source Charge			1.2		nC
Q_{gd}	Gate-Drain Charge			4.5		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				-5	A
V_{SD}	Forward on Voltage **(Note 1)**	V_{GS}=0V,I_S=-1.7A			-1.2	V

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

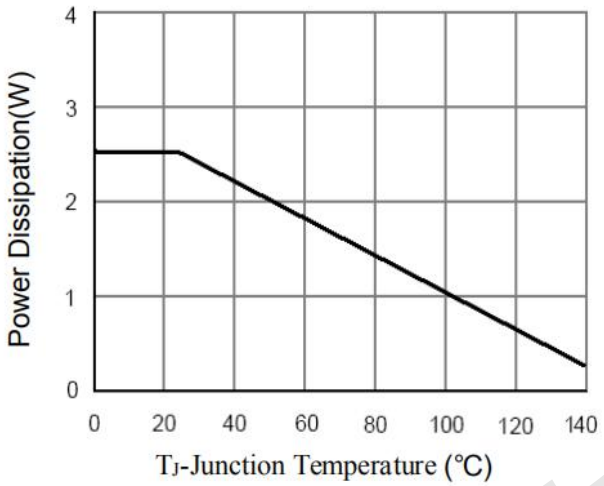

Figure2. Drain Current

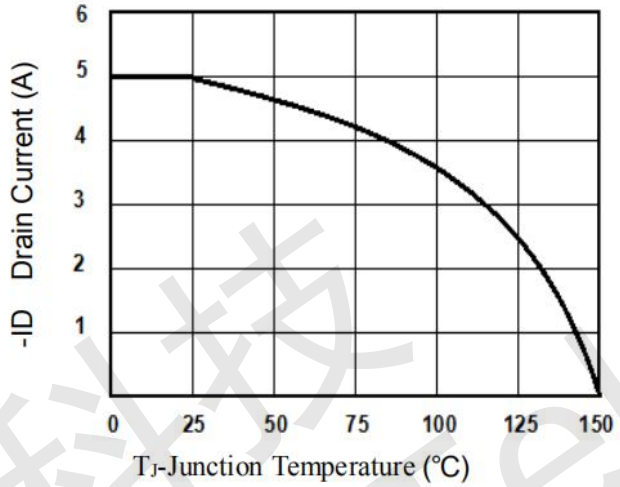

Figure3. Output Characteristics

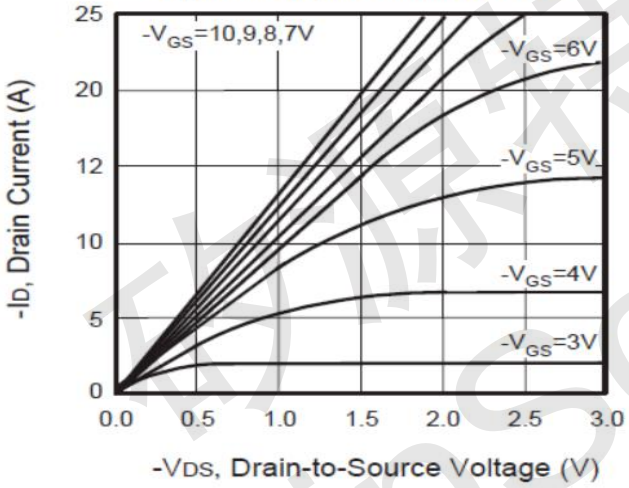

Figure4. Transfer Characteristics

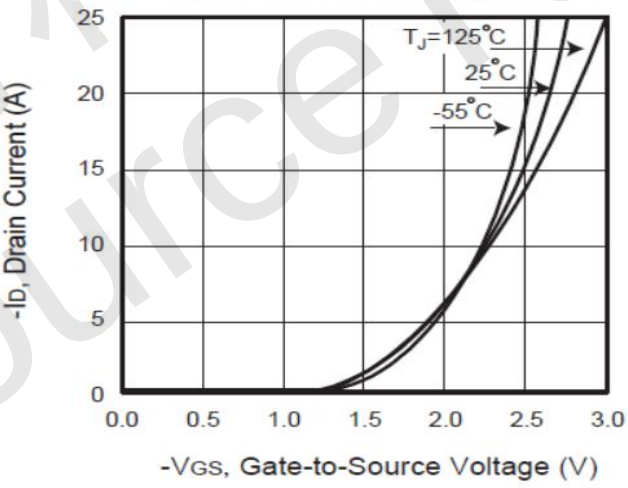

Figure5. Capacitance

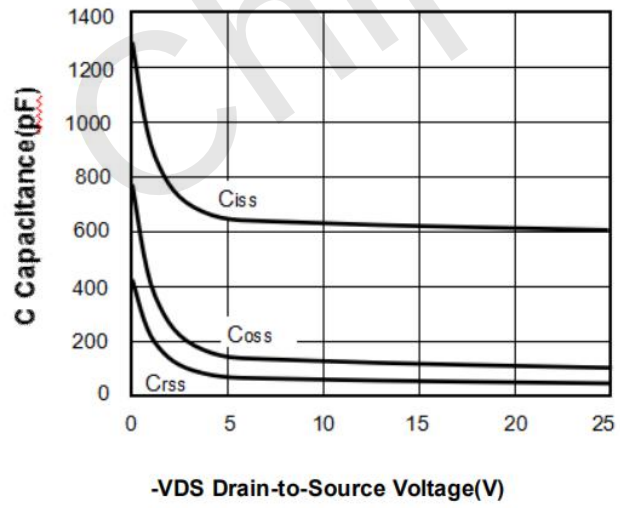

Figure6. $R_{DS(ON)}$ vs Junction Temperature

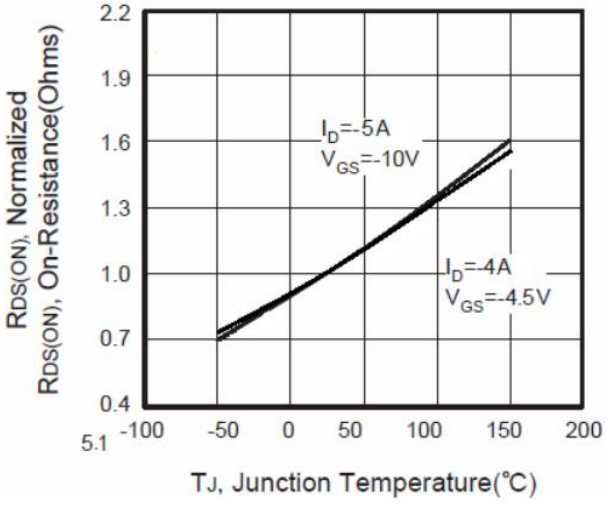

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Figure7. MaxBV$_{DSS}$ vs Junction Temperature

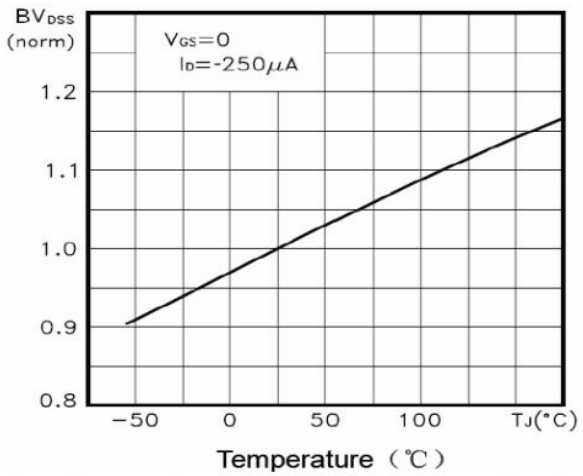


Figure8. V$_{GS(th)}$ vs Junction Temperature

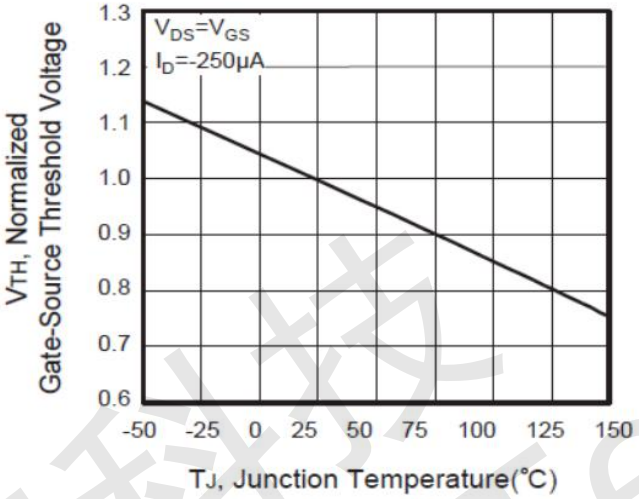


Figure9. Gate Charge Waveforms

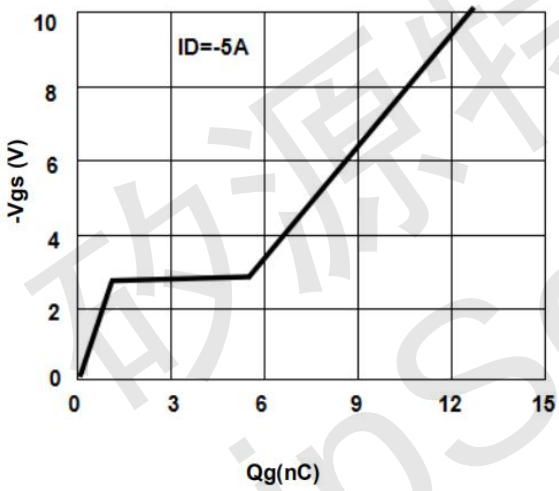
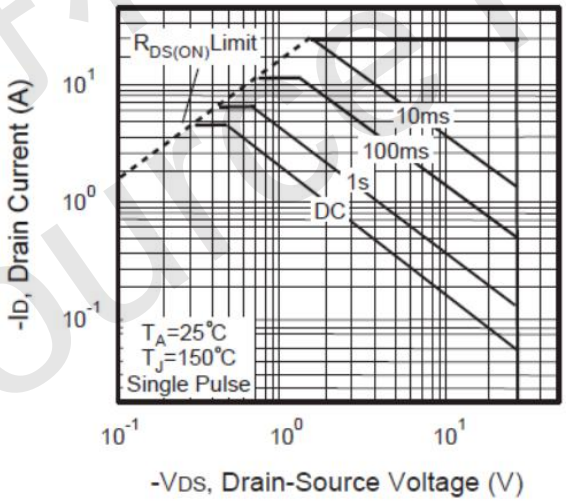


Figure10. Maximum Safe Operating Area



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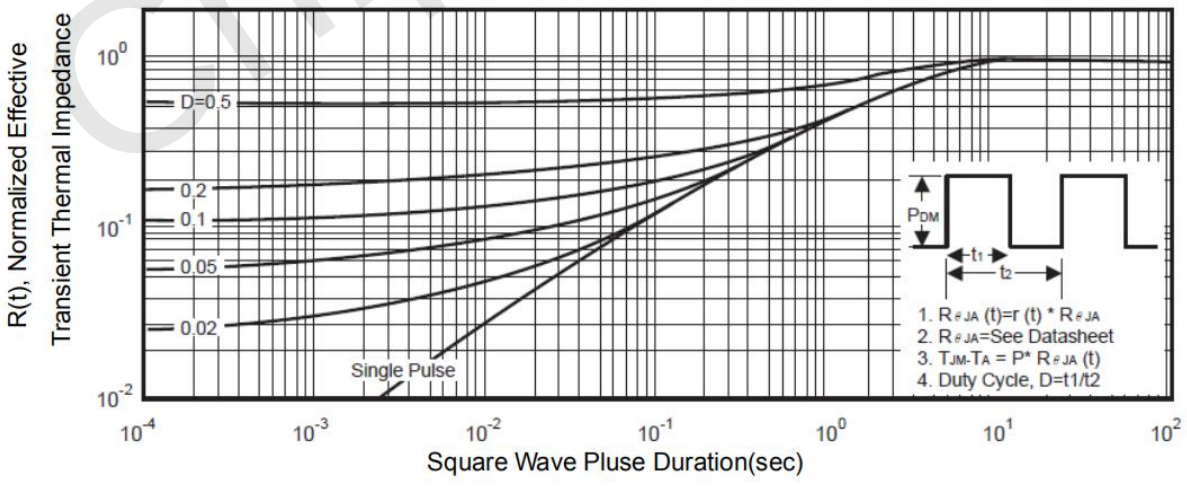

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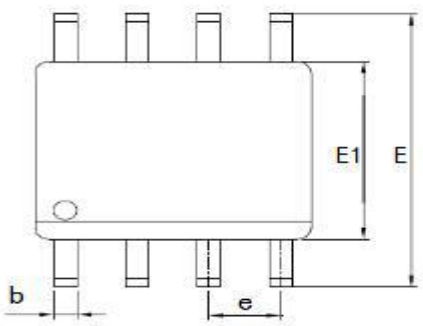
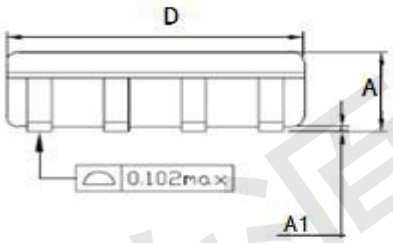
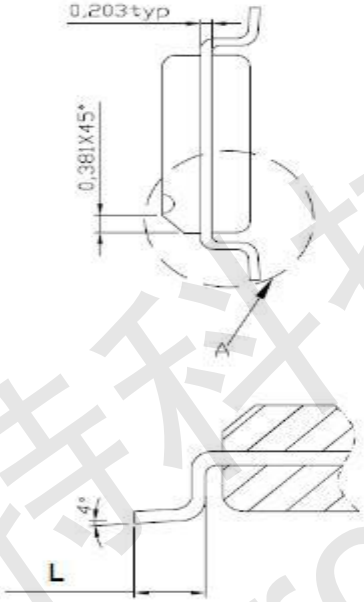
SOP-8 Package Information







A 局部放大

COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.1	0.15	0.2
b	0.346	0.406	0.466
D	4.8	4.89	4.98
E	5.75	6.00	6.25
E1	3.81	3.90	3.99
e	1.27TYP		
L	0.406	0.838	1.27

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