



Description

The HXY10G10S uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 100V$ $I_D = 10A$

$R_{DS(ON)} < 90m\Omega$ @ $V_{GS}=10V$

$V_{DS} = -100V$ $I_D = -5A$

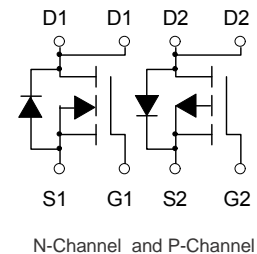
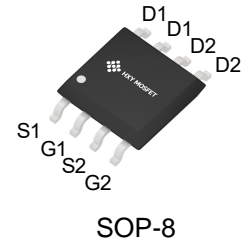
$R_{DS(ON)} < 220m\Omega$ @ $V_{GS}=-10V$

Application

Wireless charging

Boost driver

Brushless motor



Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXY10G10S	SOP-8	HXY MOSFET	3000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
$I_{D@T_A=25^{\circ}C}$	Continuous Drain Current, V_{GS} @ 10V	10	-5	A
$I_{D@T_A=70^{\circ}C}$	Continuous Drain Current, V_{GS} @ 10V	6	-3.5	A
I_{DM}	Pulsed Drain Current	25	-35.3	A
E_{AS}	Single Pulse Avalanche Energy	22.5	35.3	mJ
$P_{D@T_A=25^{\circ}C}$	Total Power Dissipation	2.5	2.5	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	85		$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62.5		$^{\circ}C/W$



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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	100	-	-	V
Gate-body Leakage current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} =100V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	-	2.5	V
Drain-Source on-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 5A	-	65	90	mΩ
			V _{GS} = 4.5V, I _D = 3A	-	75	105	
Forward Transconductance ⁴		g _{fs}	V _{DS} =5V , I _D =5A	-	12	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 15V, V _{GS} =0V, f =1MHz	-	1220	-	pF
Output Capacitance		C _{oss}		-	53	-	
Reverse Transfer Capacitance		C _{rss}		-	42	-	
Gate Resistance		R _g	f =1MHz	-	1.3	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 50V, I _D =5A	-	20.6	-	nC
Gate-Source Charge		Q _{gs}		-	4	-	
Gate-Drain Charge		Q _{gd}		-	3.7	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} =50V, R _G = 3Ω, I _D = 5A	-	4.7	-	ns
Rise Time		t _r		-	21	-	
Turn-Off Delay Time		t _{d(off)}		-	20	-	
Fall Time		t _f		-	16	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 1A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	-	10	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
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=0.1mH, I_{AS}=8A
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



P-Channel Electrical Characteristics (T_J=25 ° C ,unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-100	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V , I _D =-3A	---	180	220	mΩ
		V _{GS} =-4.5V , I _D =-2A	---	210	255	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	---	-2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-80V , V _{GS} =0V , T _J =25°C	---	---	-1	uA
		V _{DS} =-80V , V _{GS} =0V , T _J =85°C	---	---	-30	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	13	---	Ω
Q _g	Total Gate Charge (-10V)	V _{DS} =-50V , V _{GS} =-10V , I _D =-2A	---	19	---	nC
Q _{gs}	Gate-Source Charge		---	3.4	---	
Q _{gd}	Gate-Drain Charge		---	2.9	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-30V , V _{GS} =-10V , R _G =3.3Ω, I _D =-1A	---	9	---	ns
T _r	Rise Time		---	6	---	
T _{d(off)}	Turn-Off Delay Time		---	39	---	
T _f	Fall Time		---	33	---	
C _{iss}	Input Capacitance	V _{DS} =-30V , V _{GS} =0V , f=1MHz	---	1228	---	pF
C _{oss}	Output Capacitance		---	41	---	
C _{rss}	Reverse Transfer Capacitance		---	29	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	-5.0	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =-1A , T _J =25°C	---	---	-1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 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,I_{AS}=-14A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



N-Channel Typical Characteristics

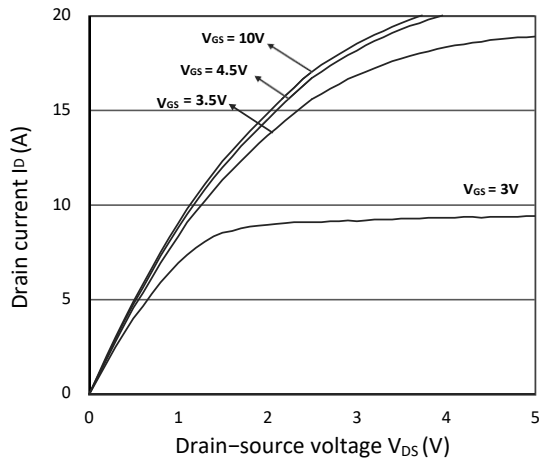


Figure 1. Output Characteristics

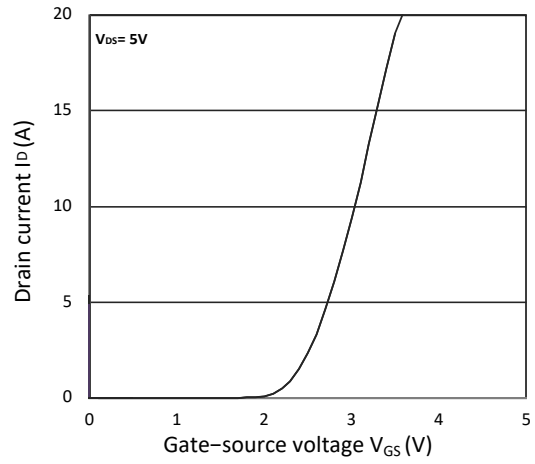


Figure 2. Transfer Characteristics

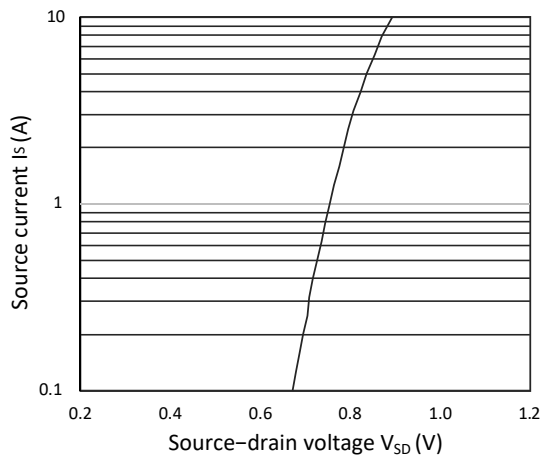


Figure 3. Forward Characteristics of Reverse

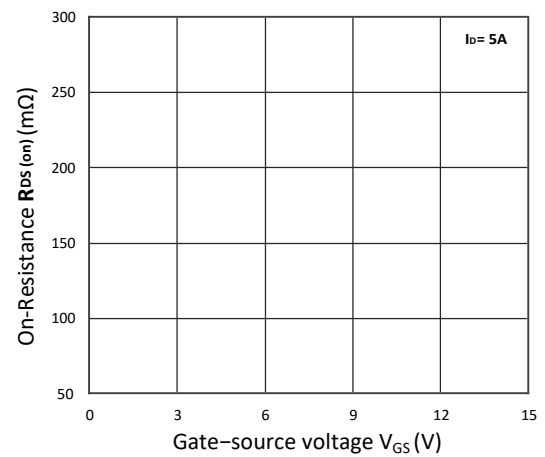


Figure 4. $R_{DS(on)}$ vs. V_{GS}

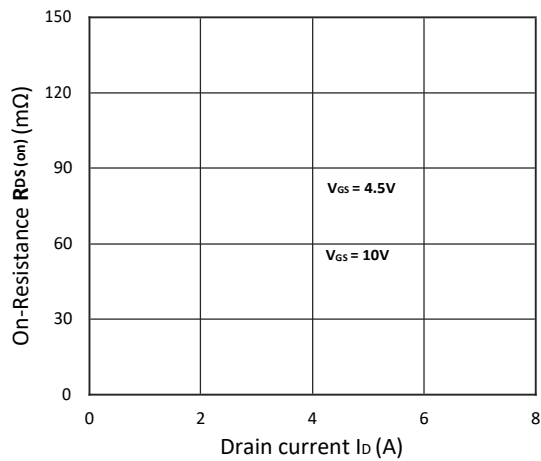


Figure 5. $R_{DS(on)}$ vs. I_D

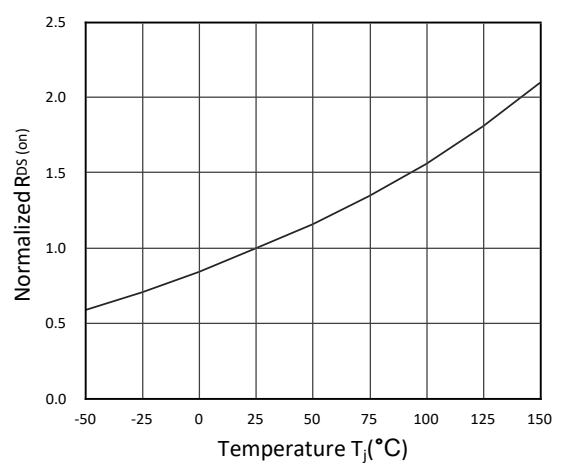


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

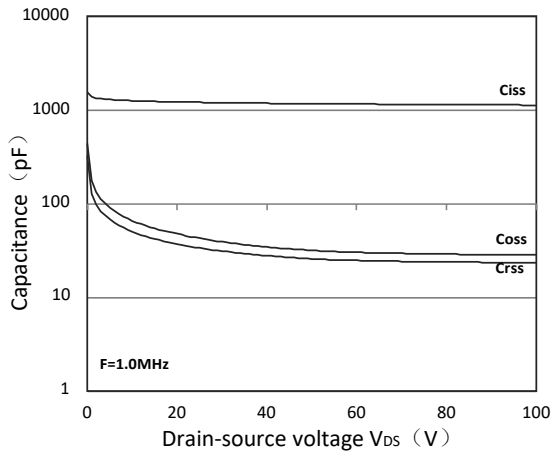


Figure 7. Capacitance Characteristics

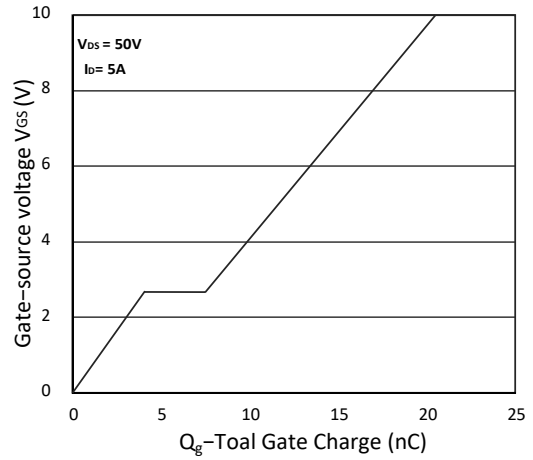


Figure 8. Gate Charge Characteristics

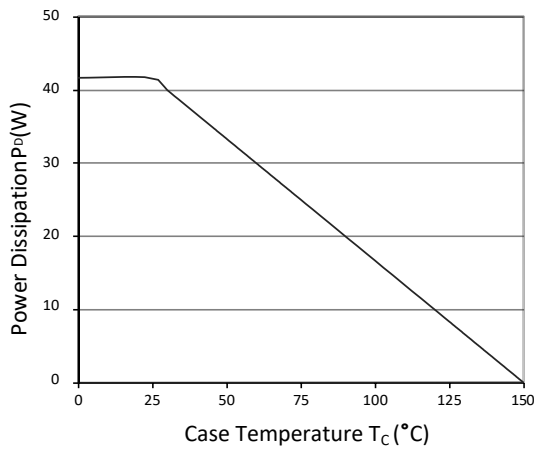


Figure 9. Power Dissipation

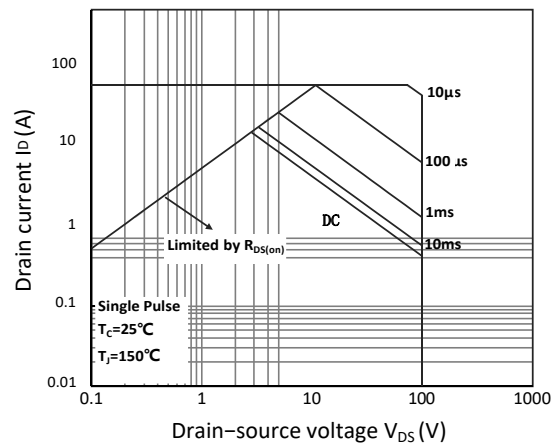


Figure 10. Safe Operating Area

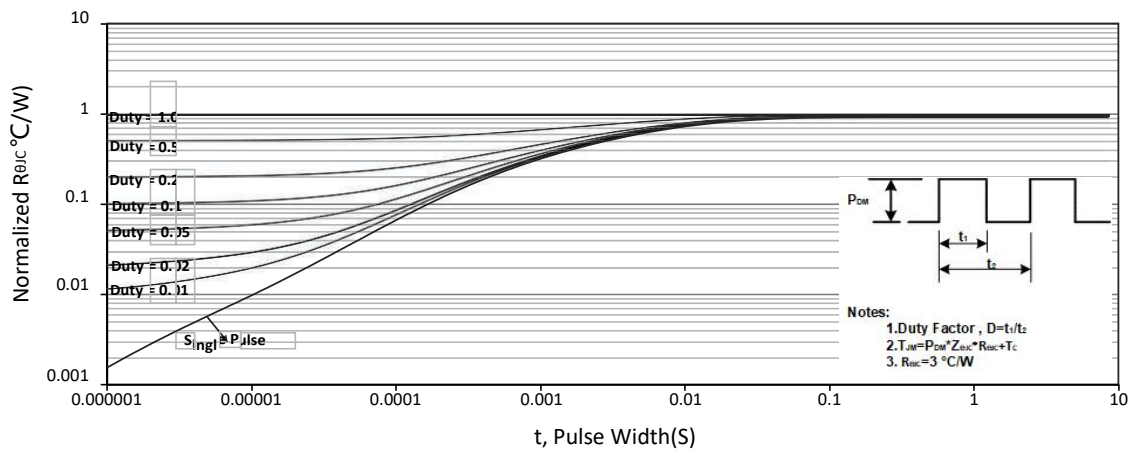
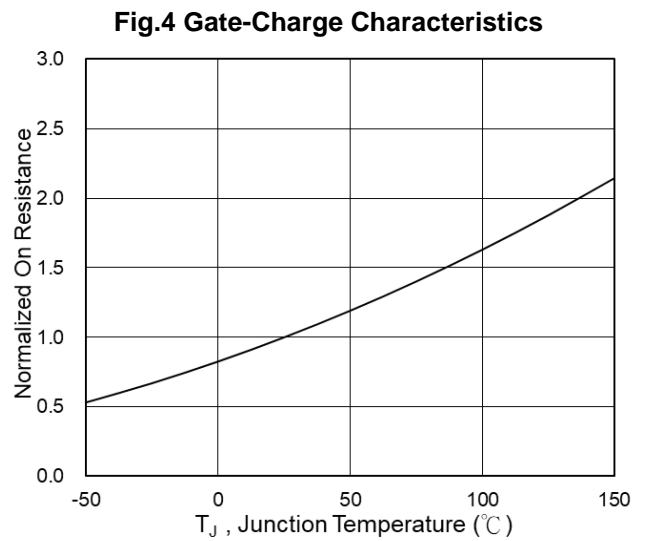
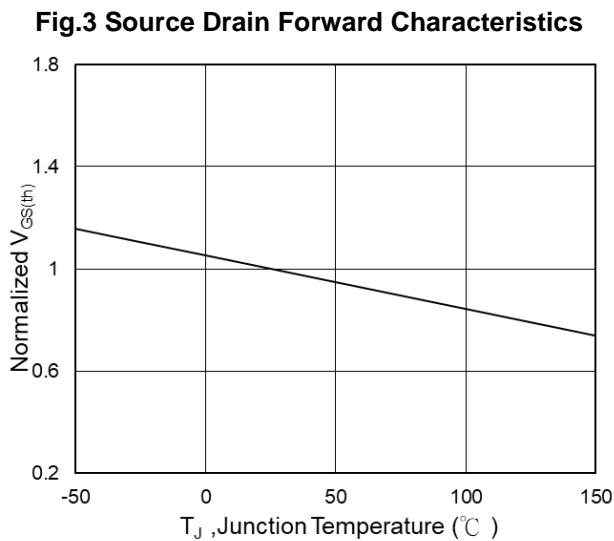
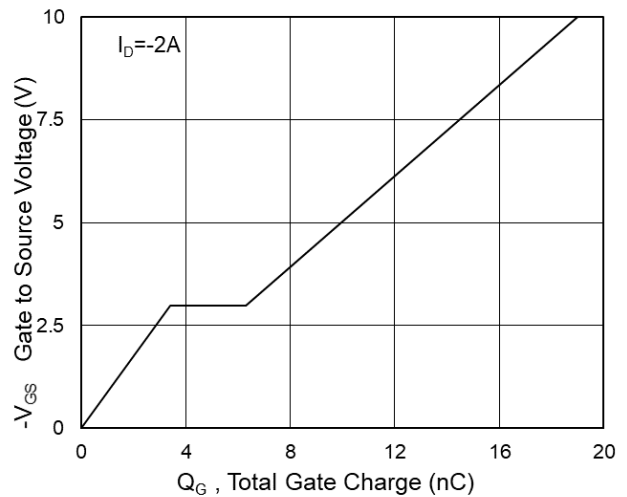
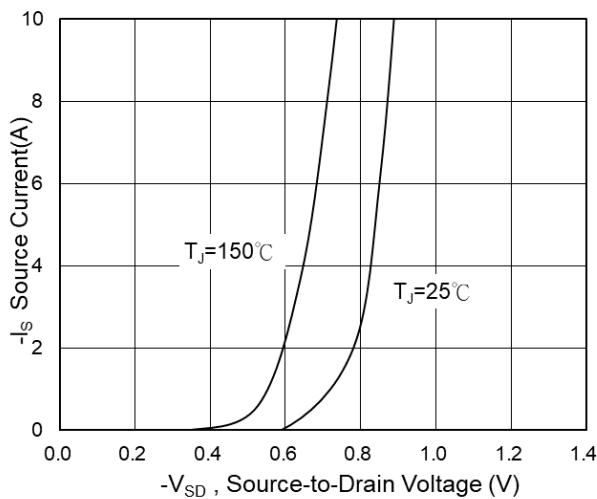
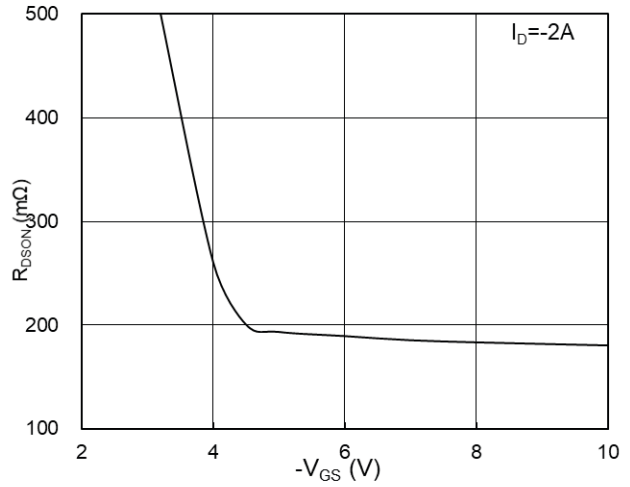
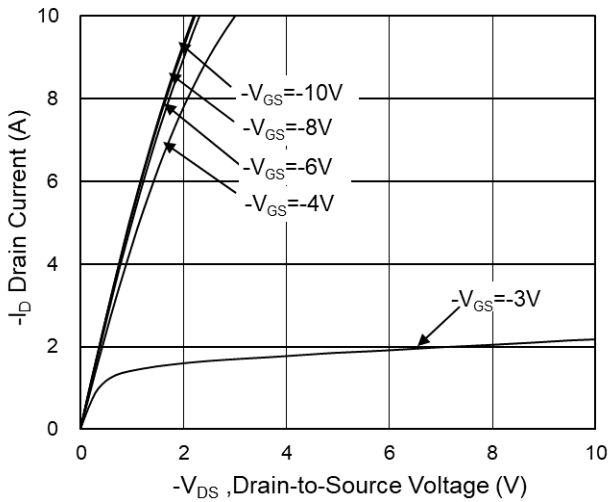


Figure 11. Normalized Maximum Transient Thermal Impedance



P-Channel Typical Characteristics



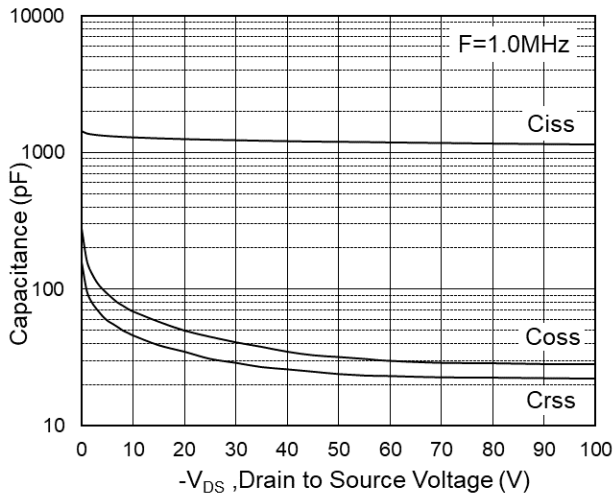


Fig.7 Capacitance

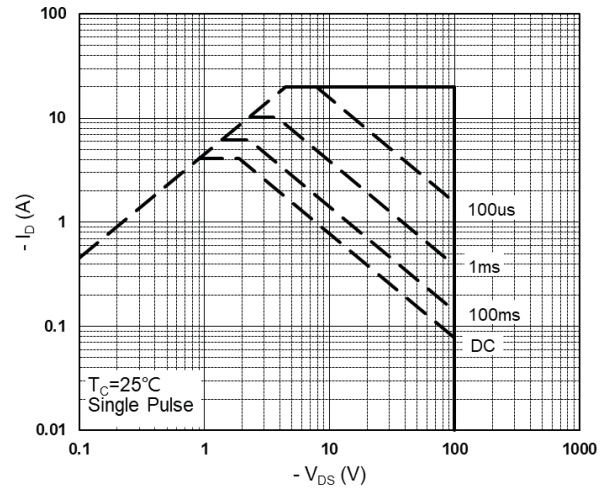


Fig.8 Safe Operating Area

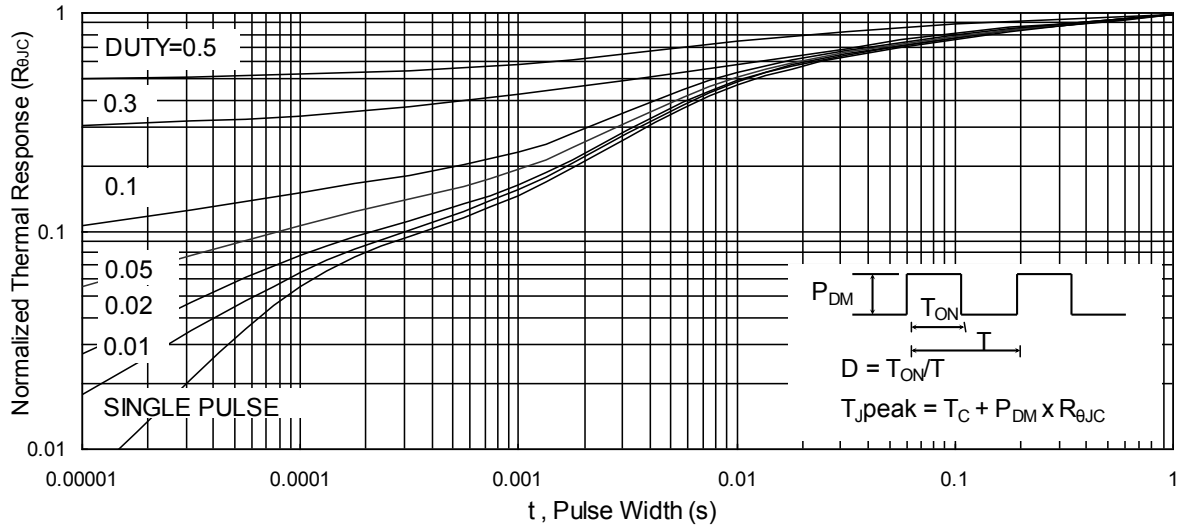


Fig.9 Normalized Maximum Transient Thermal Impedance

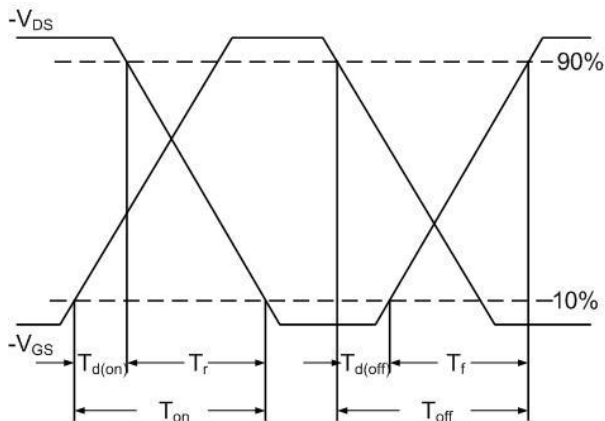


Fig.10 Switching Time Waveform

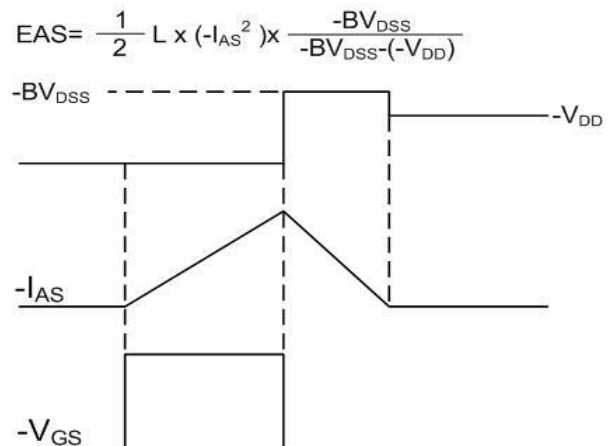
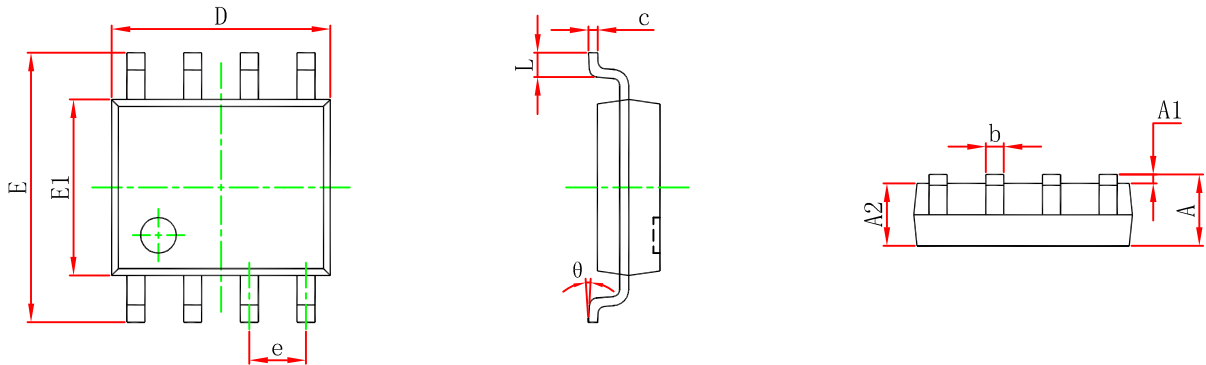


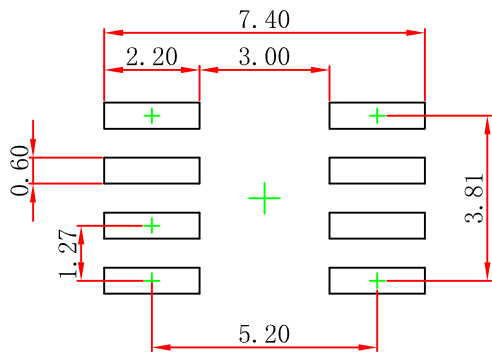
Fig.11 Unclamped Inductive Waveform



SOP-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
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.



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