

Features

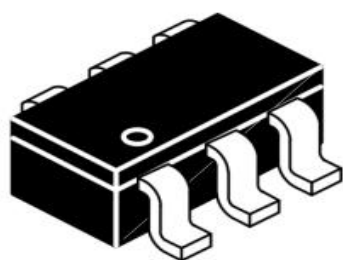
- ◆ Fast switching
- ◆ Green Device Available
- ◆ Suit for 4.5V Gate Drive Applications

Applications

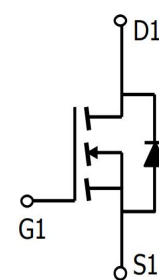
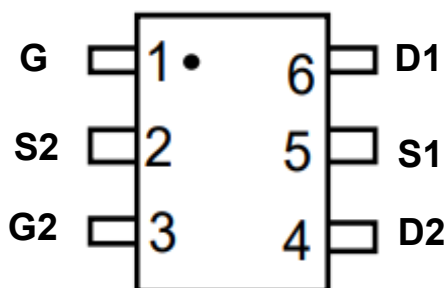
- ◆ DC Fan
 - ◆ Motor Drive Applications
 - ◆ Networking
- Half / Full Bridge Topology

General Description

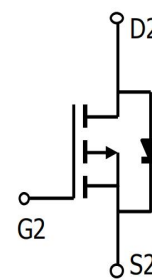
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.



PIN1



n-channel



p-channel

SOT-23-6L

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	4.0	-3	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	2.5	-1.9	A
I_{DM}	Drain Current – Pulsed ^{1,4}	16	-12	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.25		W
	Power Dissipation – Derate above 25°C	0.01		W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	100	$^\circ\text{C/W}$

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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =24V , V _{GS} =0V , T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V , I _D =3A	---	30	45	mΩ
		V _{GS} =4.5V , I _D =2A	---	40	55	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V , I _D =1.5A	---	2.3	---	S

Dynamic and switching Characteristics

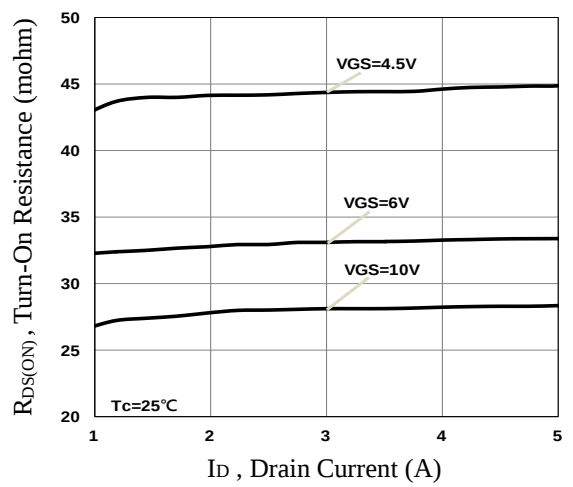
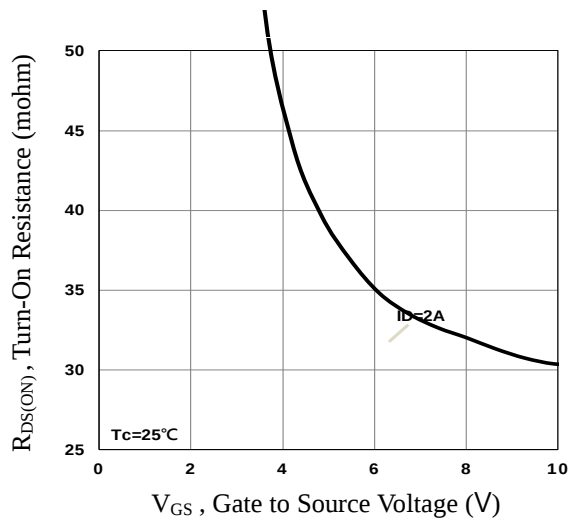
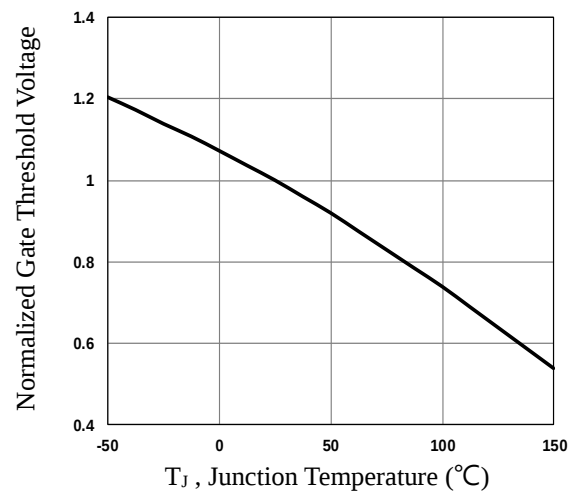
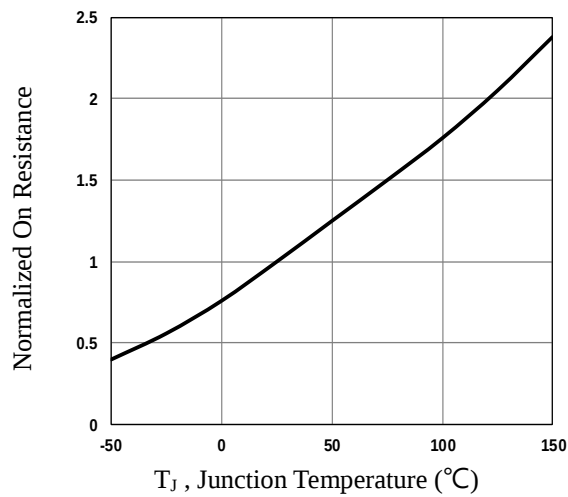
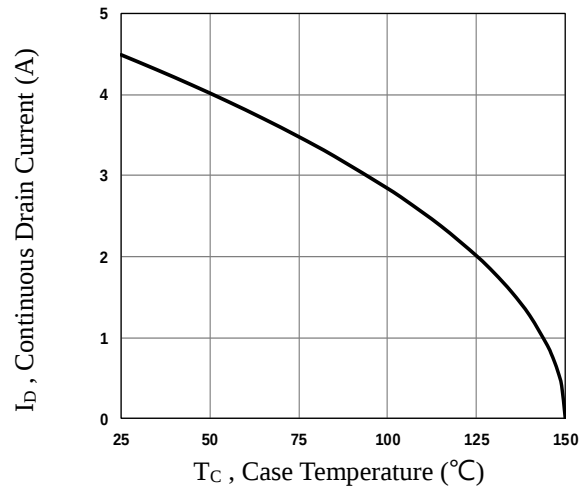
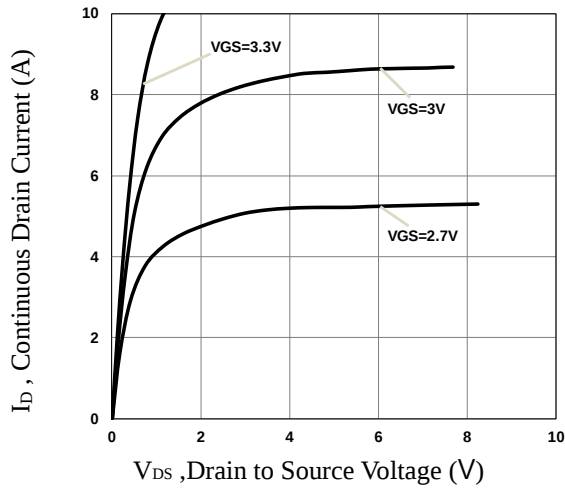
Q _g	Total Gate Charge ^{2, 3}	V _{DS} =15V , V _{GS} =10V , I _D =2.5A	---	7.7	---	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.3	---	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.7	---	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =15V , V _{GS} =10V , R _G =6Ω I _D =2.5A	---	2	---	ns
T _r	Rise Time ^{2, 3}		---	3	---	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	9	---	
T _f	Fall Time ^{2, 3}		---	6	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , F=1MHz	---	245	---	pF
C _{oss}	Output Capacitance		---	33	---	
C _{rss}	Reverse Transfer Capacitance		---	28	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	4.0	A
I _{SM}	Pulsed Source Current		---	---	8.0	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



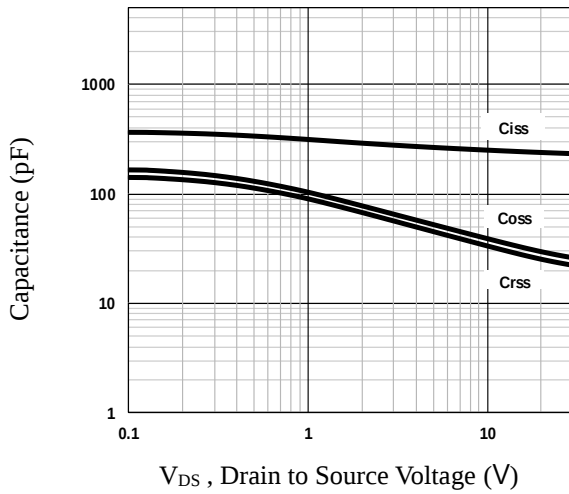


Fig.7 Capacitance Characteristics

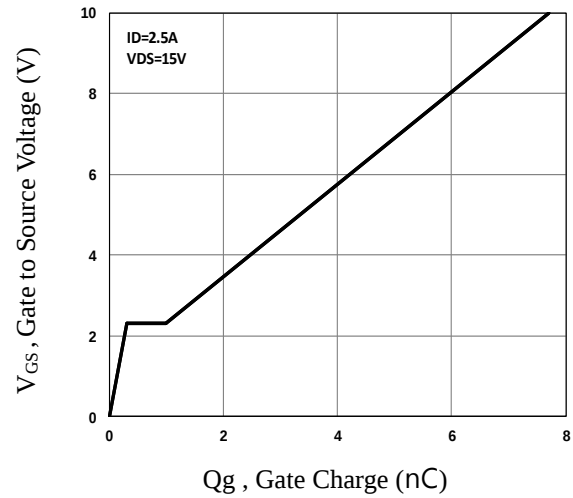


Fig.8 Gate Charge Characteristics

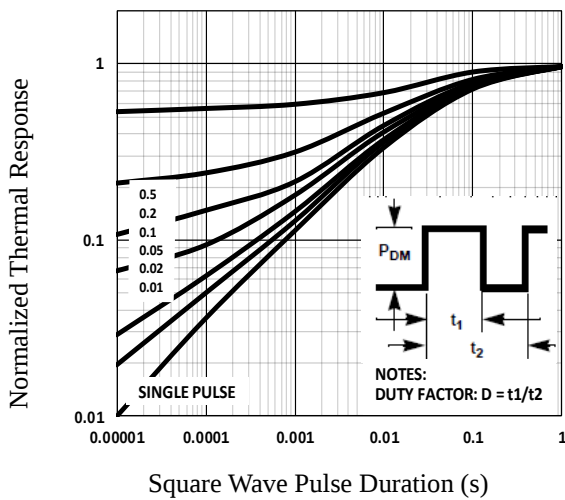


Fig.9 Normalized Transient Impedance

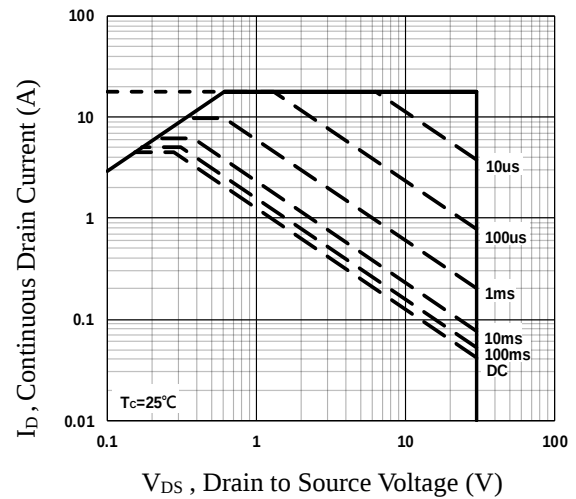


Fig.10 Maximum Safe Operation Area

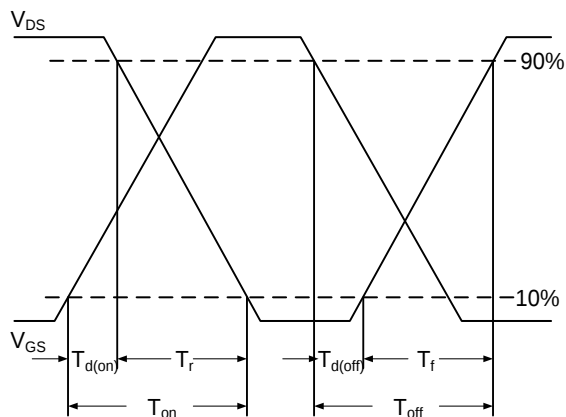


Fig.11 Switching Time Waveform

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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-30V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-2A	---	95	125	mΩ
		V _{GS} =-4.5V, I _D =-1A	---	150	190	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	-1.6	-2.5	V
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-1A	---	2	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{5,6}	V _{DS} =-10V, V _{GS} =-10V, I _D =-1.5A	---	7.3	---	nC
Q _{gs}	Gate-Source Charge ^{5,6}		---	2.1	---	
Q _{gd}	Gate-Drain Charge ^{5,6}		---	1.3	---	
T _{d(on)}	Turn-On Delay Time ^{5,6}	V _{DD} =-10V, V _{GS} =-10V, R _G =6Ω I _D =-1.5A	---	4	---	ns
T _r	Rise Time ^{5,6}		---	6	---	
T _{d(off)}	Turn-Off Delay Time ^{5,6}		---	12	---	
T _f	Fall Time ^{5,6}		---	8	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, F=1MHz	---	250	---	pF
C _{oss}	Output Capacitance		---	37	---	
C _{rss}	Reverse Transfer Capacitance		---	30	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	-3	A
I _{SM}	Pulsed Source Current		---	---	-6	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

Note :

4. Repetitive Rating : Pulsed width limited by maximum junction temperature.
5. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
6. Essentially independent of operating temperature.

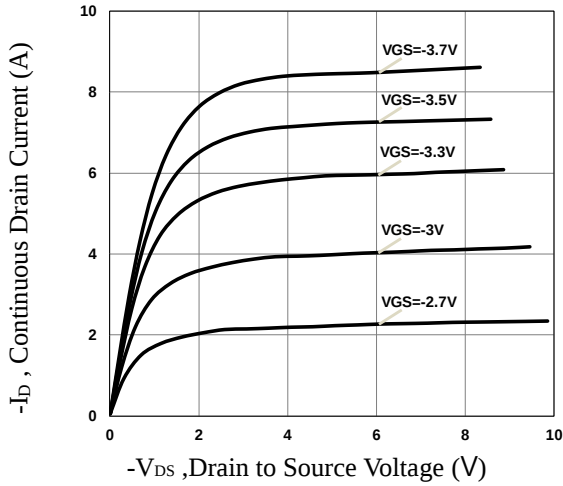


Fig.13 Typical Output Characteristics

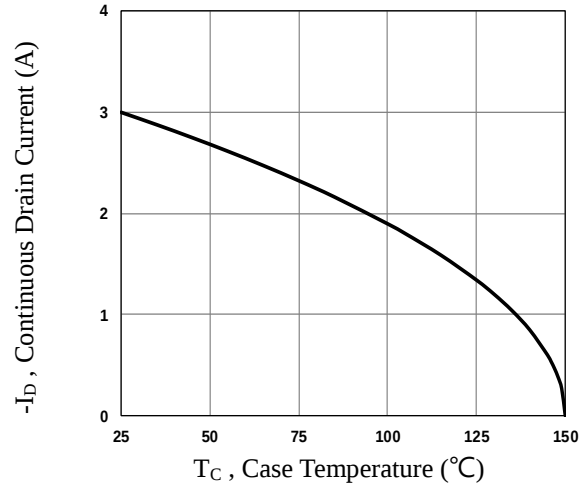


Fig.14 Continuous Drain Current vs. T_C

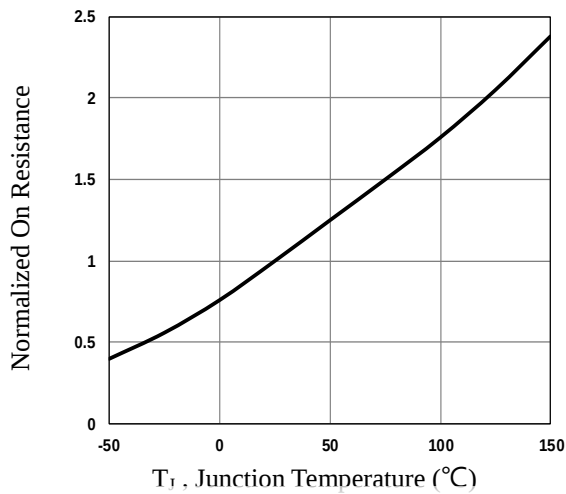


Fig.15 Normalized $R_{DS(on)}$ vs. T_J

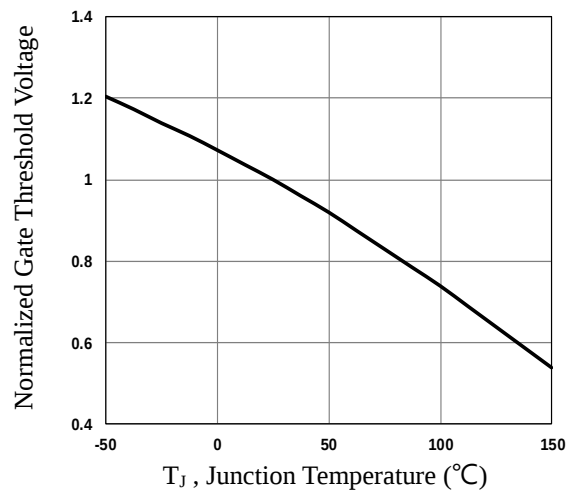


Fig.16 Normalized V_{th} vs. T_J

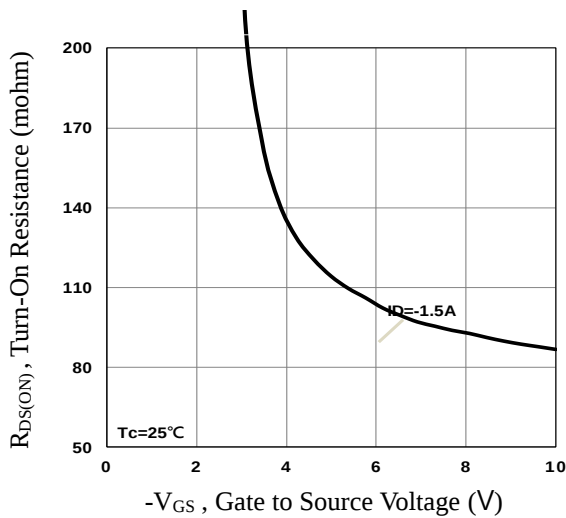


Fig.17 Turn-On Resistance vs. V_{GS}

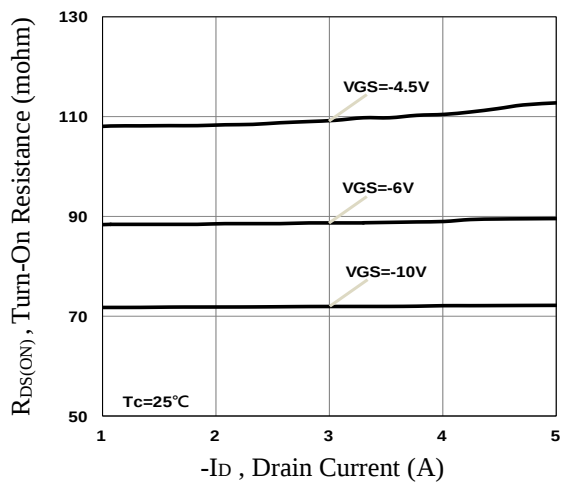


Fig.18 Turn-On Resistance vs. I_D

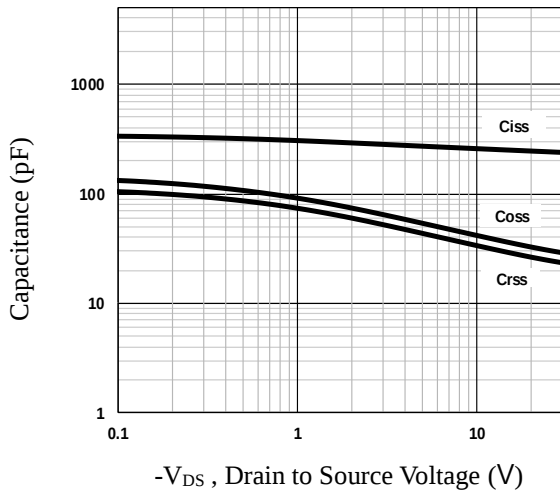


Fig.19 Capacitance Characteristics

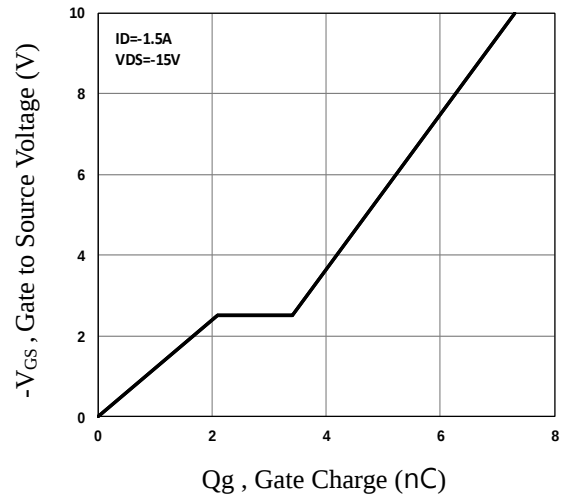


Fig.20 Gate Charge Characteristics

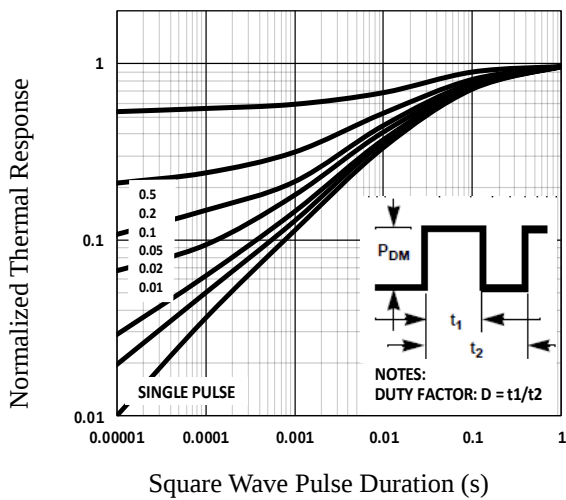


Fig.21 Normalized Transient

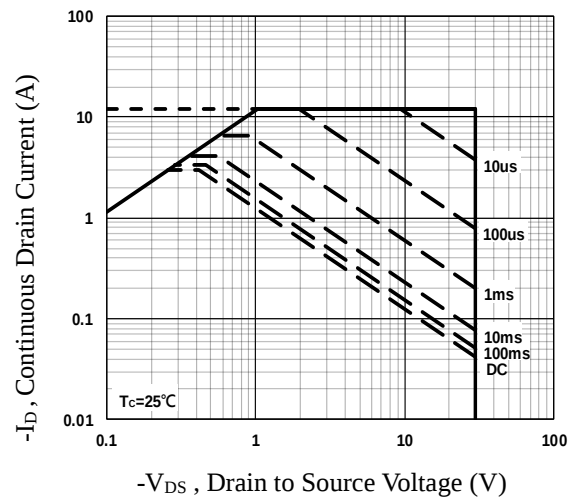


Fig.22 Maximum Safe Operation Area

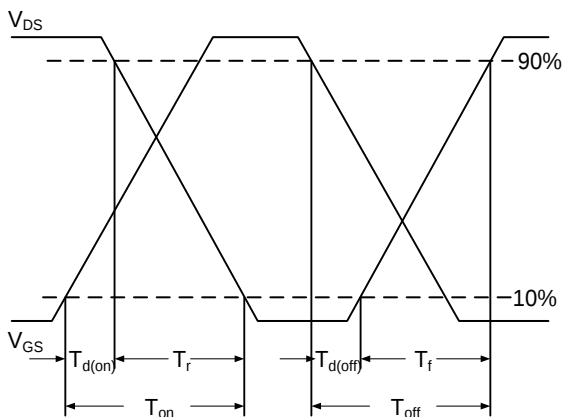


Fig.23 Switching Time Waveform

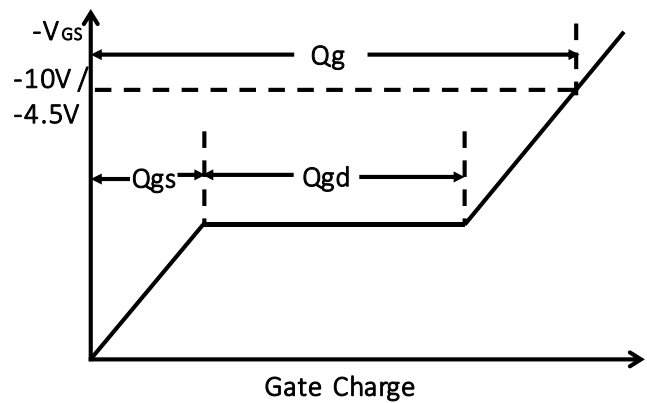
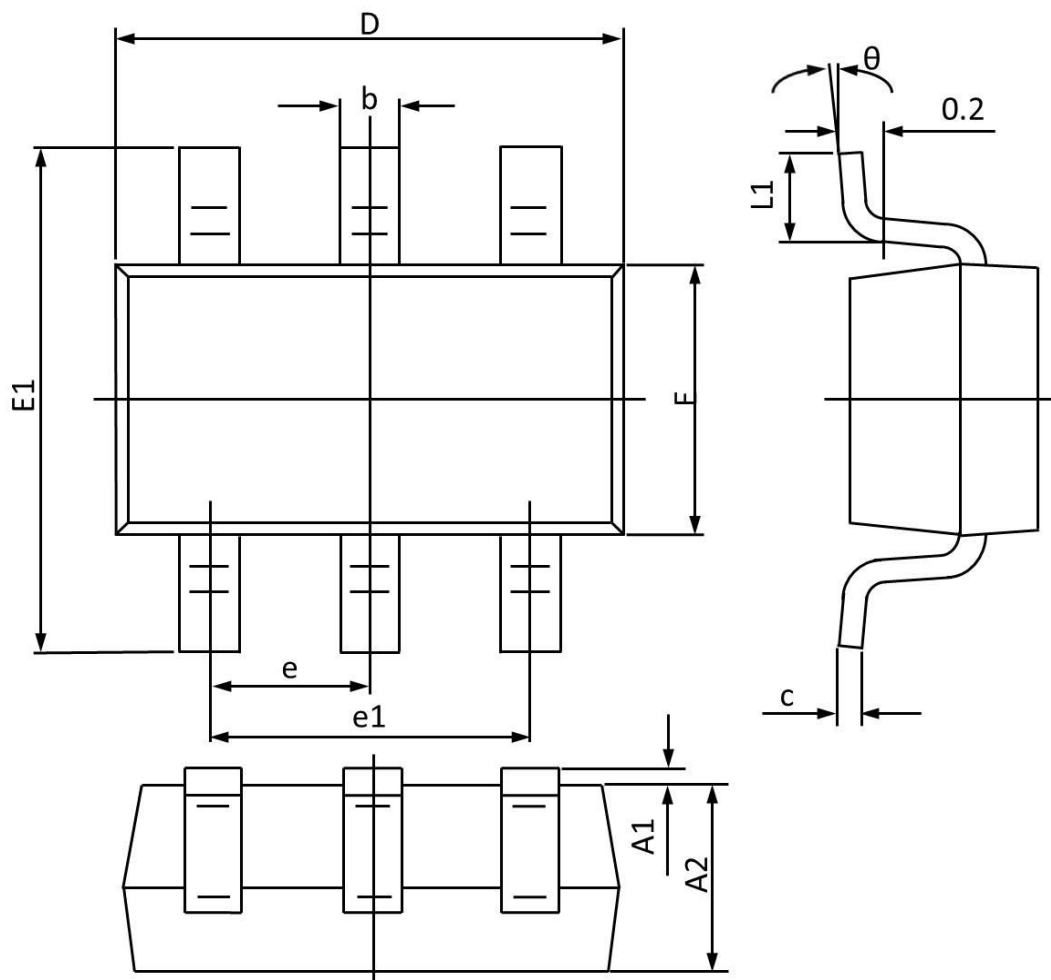


Fig.24 Gate Charge Waveform

SOT23-6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	---	0.150	---	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.500	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.800	3.050	0.110	0.120
E1	2.600	3.000	0.103	0.118
F	1.500	1.800	0.059	0.071
e	0.950 TYP		0.037 TYP	
e1	1.900 TYP		0.075 TYP	
L1	0.250	0.600	0.010	0.024
θ	0°	8°	0°	8°