

Description:

This N-Channel and P-Channel MOSFET use advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.

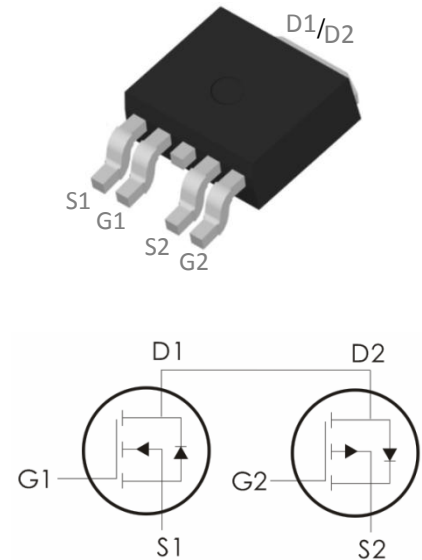
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=30V, I_D=30A, R_{DS(ON)}<10m\ \Omega @V_{GS}=10V$

P-Channel: $V_{DS}=-30V, I_D=-25A, R_{DS(ON)}<20m\ \Omega @V_{GS}=-10V$

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra low $R_{DS(ON)}$.
- 4) Excellent package for good heat dissipation.



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

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current $T_C=25^\circ C^1$	30	-25	A
	Continuous Drain Current- $T_C=100^\circ C$	24	-22	
	Pulsed Drain Current ²	100	-90	
P_D	Power Dissipation $T_C=25^\circ C^4$	22	25	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ¹	6	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ¹	62	

Package Marking and Ordering Information:

Part NO.	Marking	Package
DOD617	D617	TO-252-4

N-CH Electrical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.2	---	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance ²	$V_{GS}=10V, I_D=30A$	---	7.5	10	m Ω
		$V_{GS}=4.5V, I_D=15A$	---	11	18	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	900	---	pF
C_{oss}	Output Capacitance		---	121	---	
C_{rss}	Reverse Transfer Capacitance		---	98	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, I_D=15A,$ $R_{GEN}=3.3\ \Omega, V_{GS}=10V$	---	4	---	ns
t_r	Rise Time		---	8	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	31	---	ns
t_f	Fall Time		---	4	---	ns
Q_g	Total Gate Charge	$V_{GS}=4.5V, V_{DS}=15V,$ $I_D=15A$	---	9.8	---	nC
Q_{gs}	Gate-Source Charge		---	4.2	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	3.6	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	---	---	1	V
LS	Continuous Source Current ^{1.5}	$V_G=V_D=0V$, Force Current	---	---	43	A

I_{sm}	Pulsed Source Current ^{2,5}	$V_G=V_D=0V$, Force Current	---	----	112	A
T_{rr}	Reverse Recovery Time	$I_F=30A$, $dI/dt=100A/\mu s$, $T_J=25^\circ C$	---	8.5	---	Ns
Q_{rr}	Reverse Recovery Charge		---	2.2	---	Ns

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

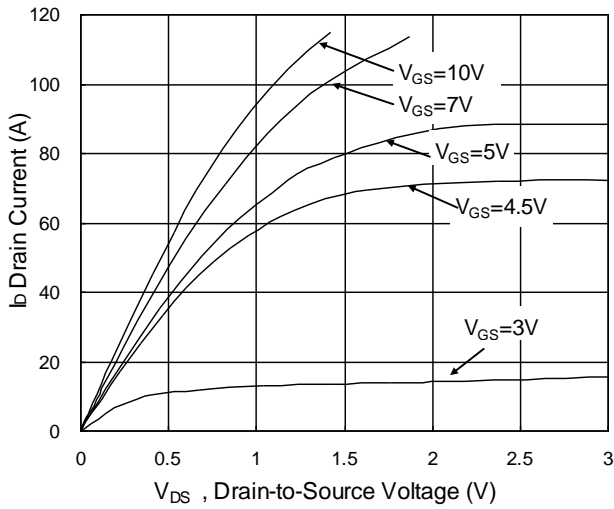


Fig.1 Typical Output Characteristics

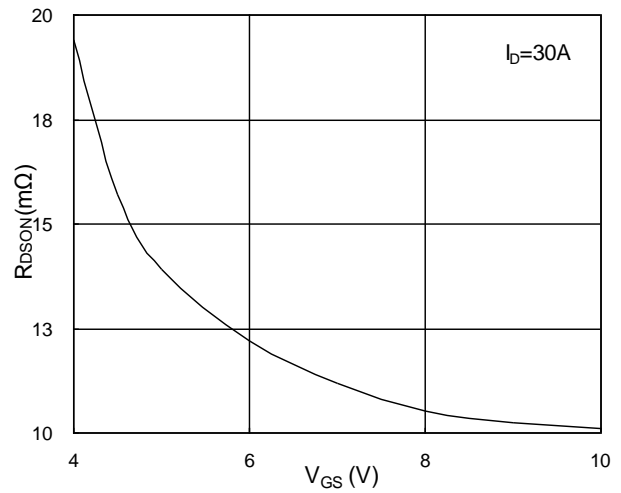


Fig.2 On-Resistance vs. G-S Voltage

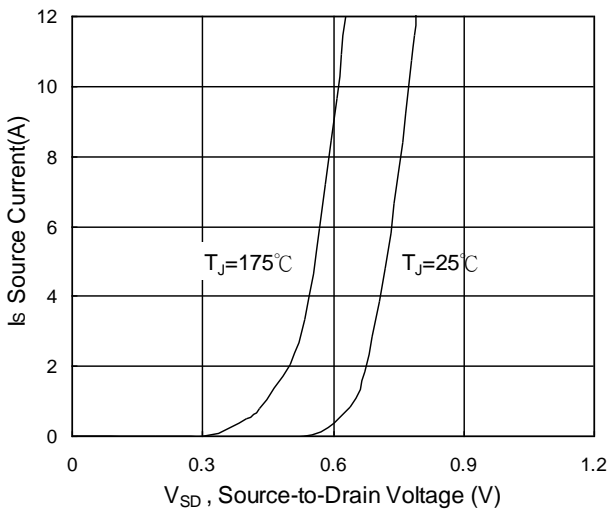


Fig.3 Forward Characteristics of Reverse

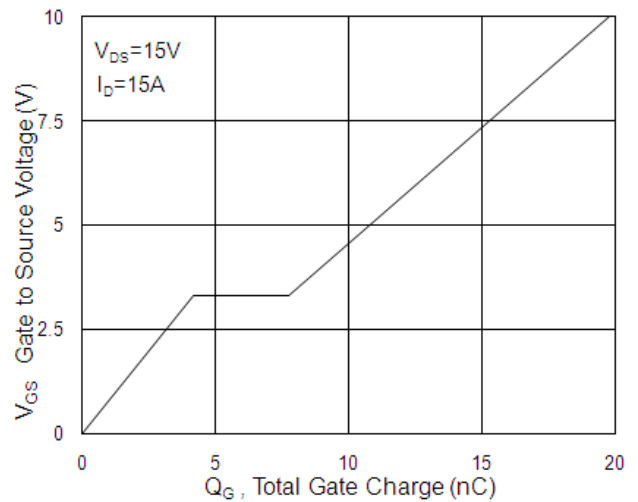


Fig.4 Gate-Charge Characteristics

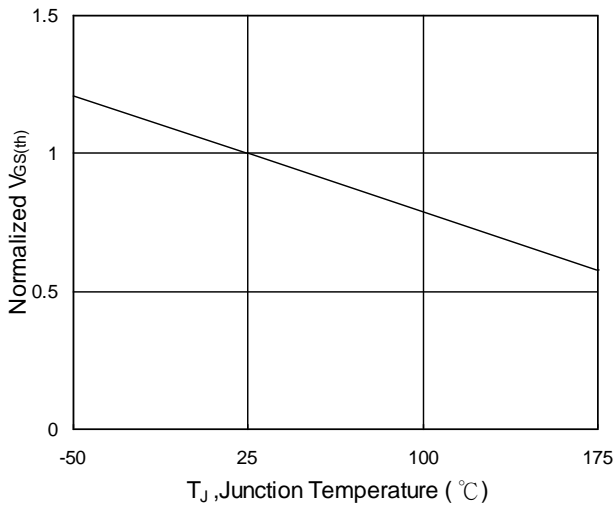


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

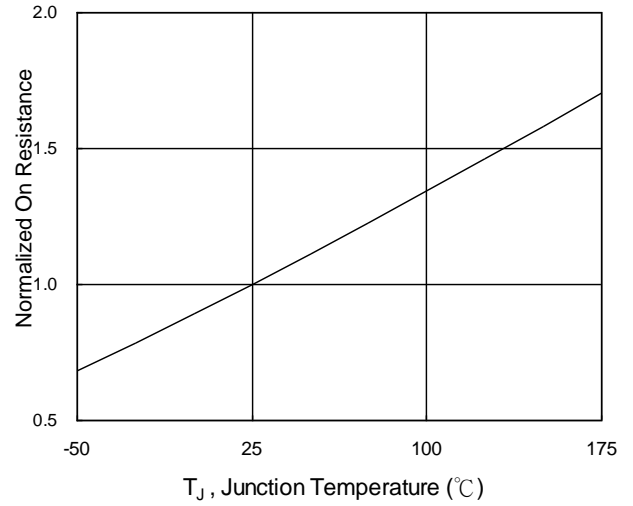


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

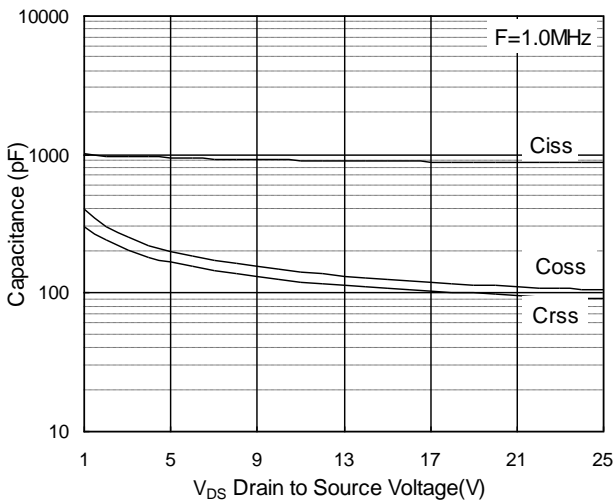


Fig.7 Capacitance

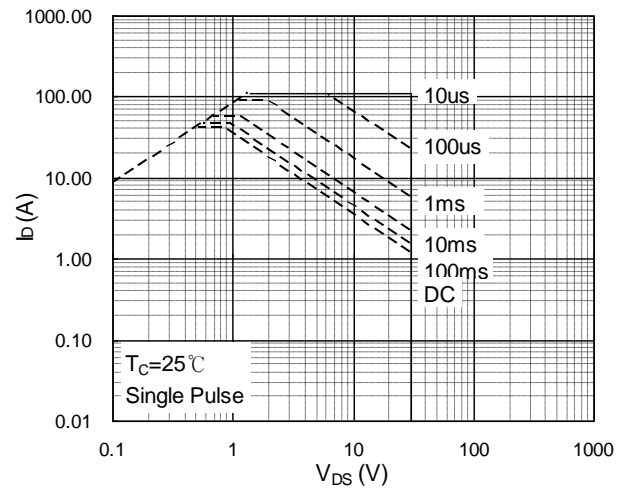


Fig.8 Safe Operating Area

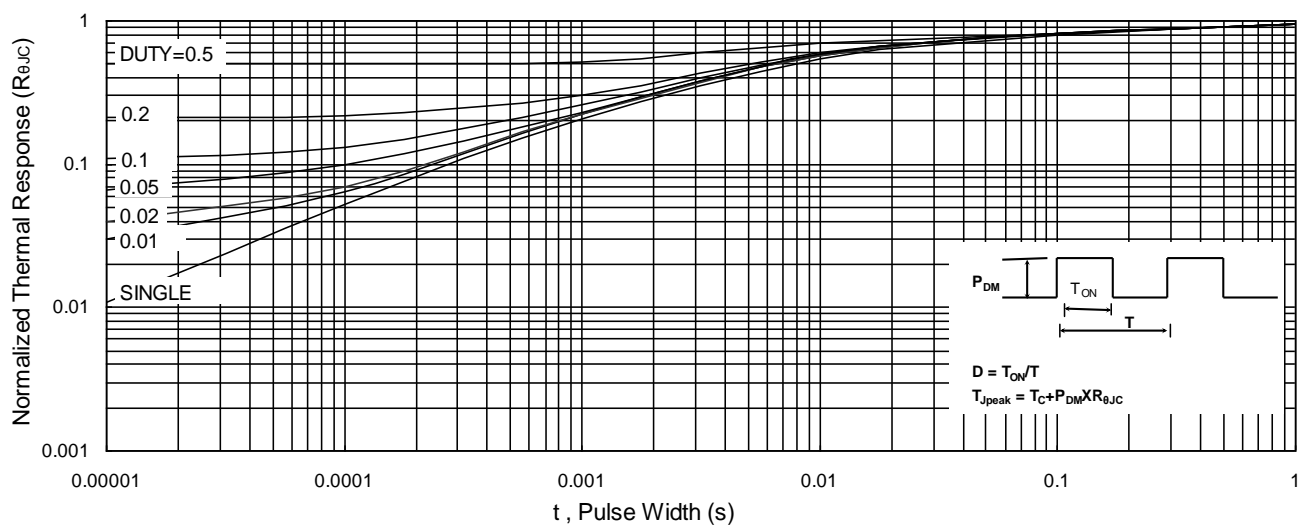


Fig.9 Normalized Maximum Transient Thermal Impedance

P-CH Electrical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	-30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-30V, T_J=25^\circ\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
V_{GS(th)}	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	-1	-1.6	-2.5	V
R_{DS(ON)}	Drain-Source On Resistance	$V_{GS}=-10V, I_D=-8A$	---	16.5	20	$\text{m}\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	---	25.6	32	
G_{FS}	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	6.8	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	1150	1600	pF
C_{oss}	Output Capacitance		---	140	205	
C_{rss}	Reverse Transfer Capacitance		---	85	120	
Switching Characteristics						
t_{d(on)}	Turn-On Delay Time ^{2,3}	$V_{DS}=-15V, I_D=-1A,$ $R_{GEN}=6\ \Omega, V_{GS}=-10V$	---	5.8	11	ns
t_r	Rise Time ^{2,3}		---	18.8	36	ns
t_{d(off)}	Turn-Off Delay Time ^{2,3}		---	46.9	89	ns
t_f	Fall Time ^{2,3}		---	12.3	23	ns
Q_g	Total Gate Charge ^{2,3}	$V_{GS}=-4.5V, V_{DS}=-15V,$ $I_D=-5A$	---	11	17	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	3.4	6	nC
Q_{gd}	Gate-Drain "Miller" Charge ^{2,3}		---	4.2	8	nC
Drain-Source Diode Characteristics						
V_{SD}	Source Drain Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

Notes:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\cong 300\mu s$, duty cycle $\cong 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=22A$
- 4.The power dissipation is limited by $175^{\circ}C$ 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.

Typical Characteristics: ($T_C=25^{\circ}C$ unless otherwise noted)

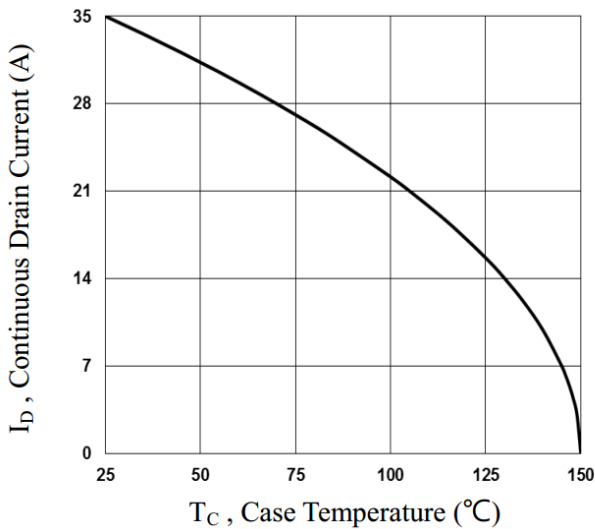


Fig.1 Continuous Drain Current vs. T_C

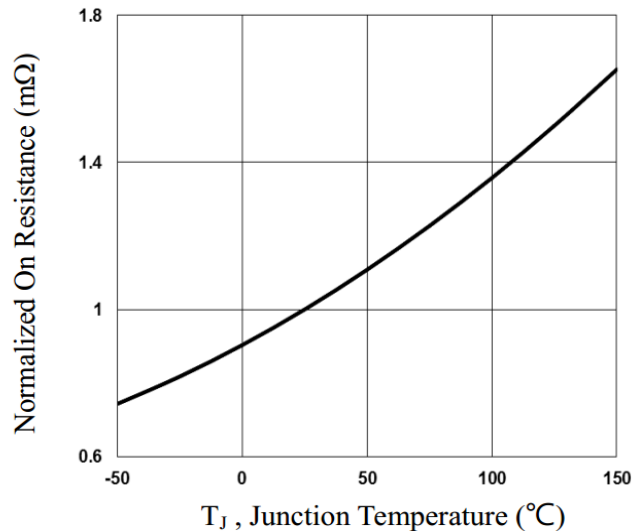


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

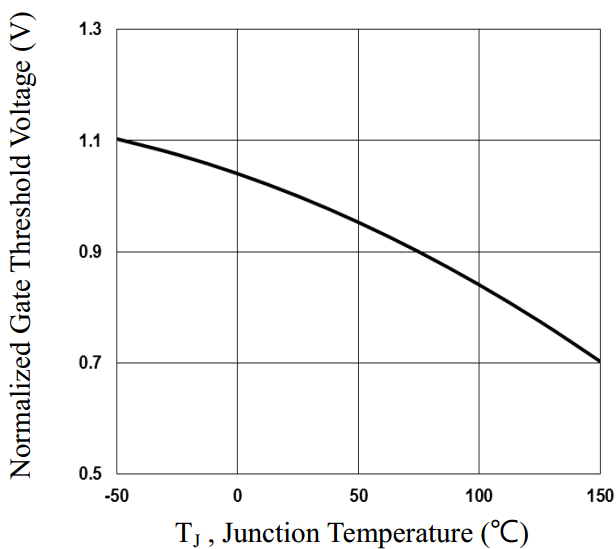


Fig.3 Normalized V_{th} vs. T_J

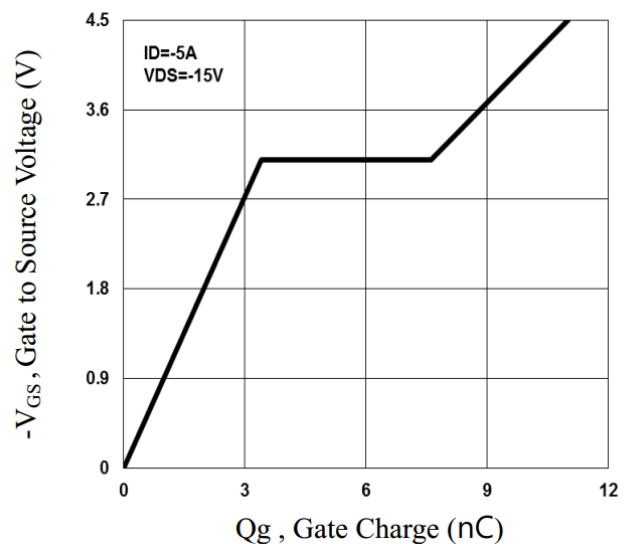


Fig.4 Gate Charge Waveform

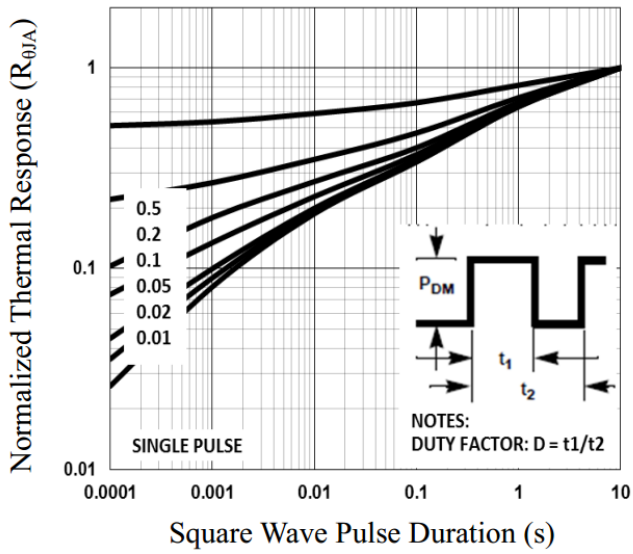


Fig.5 Normalized Transient Impedance

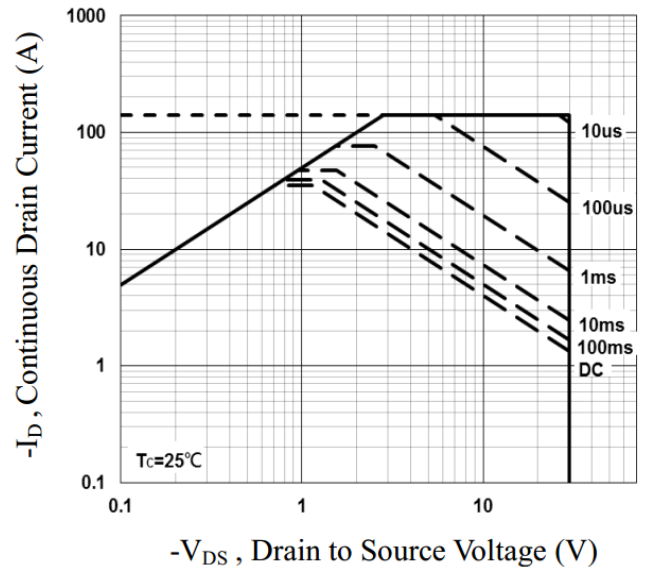


Fig.6 Maximum Safe Operation Area

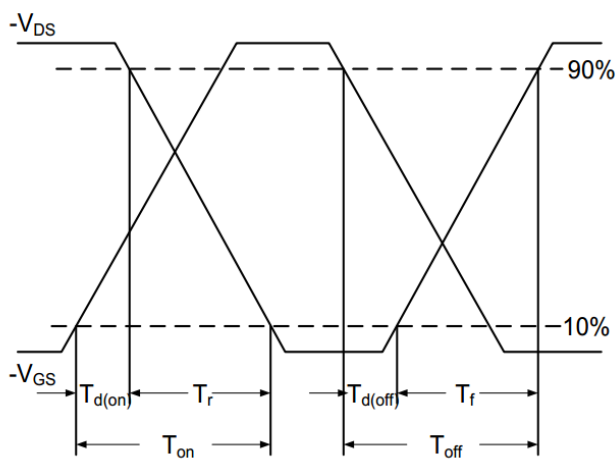


Fig.7 Switching Time Waveform

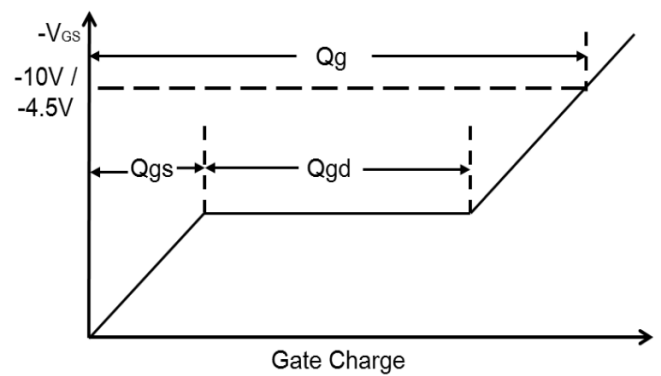


Fig.8 Gate Charge Waveform