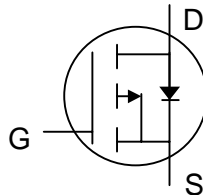


# P-channel Enhancement-mode Power MOSFET

- 2.5V low gate drive capability
- Simple drive requirement
- Fast switching

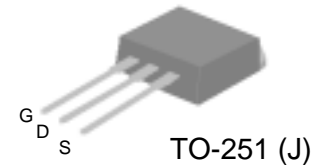
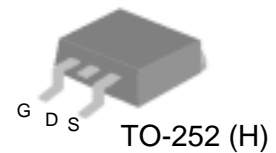
 **Pb-free; RoHS compliant.**



$BV_{DSS}$	-20V
$R_{DS(ON)}$	150m $\Omega$
$I_D$	-10A

## DESCRIPTION

The SSM3310GH is in a TO-252 package, which is widely used for commercial and industrial surface mount applications, and is well suited for use in low voltage battery applications. The through-hole version, the SSM3310GJ in TO-251, is available for low-footprint vertical mounting. These devices are manufactured with an advanced process, providing improved on-resistance and switching performance.



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_C=25^\circ\text{C}$	Continuous Drain Current	-10	A
$I_D @ T_C=100^\circ\text{C}$	Continuous Drain Current	-6.2	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-24	A
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation	25	W
	Linear Derating Factor	0.2	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 DATA

Symbol	Parameter	Value	Unit
Rthj-c	Thermal Resistance Junction-case	Max. 5	$^\circ\text{C}/\text{W}$
Rthj-a	Thermal Resistance Junction-ambient	Max. 110	$^\circ\text{C}/\text{W}$

**Electrical Characteristics @ T<sub>j</sub>=25°C (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	-	-0.1	-	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.8A	-	-	150	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.0A	-	-	250	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.5	-	-	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-2.8A	-	4.4	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current (T <sub>j</sub> =25°C)	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-	-1	uA
	Drain-Source Leakage Current (T <sub>j</sub> =150°C)	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V	-	-	-25	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> = ± 12V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =-2.8A V <sub>DS</sub> =-6V V <sub>GS</sub> =-5V	-	6	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge		-	0.6	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>	V <sub>DS</sub> =-6V I <sub>D</sub> =-1A	-	25	-	ns
t <sub>r</sub>	Rise Time		-	60	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =6Ω, V <sub>GS</sub> =-5V	-	70	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =6Ω	-	60	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	300	-	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =-6V	-	180	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	60	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I <sub>S</sub>	Continuous Source Current ( Body Diode )	V <sub>D</sub> =V <sub>G</sub> =0V , V <sub>S</sub> =-1.2V	-	-	-10	A
I <sub>SM</sub>	Pulsed Source Current ( Body Diode ) <sup>1</sup>		-	-	-24	A
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	T <sub>j</sub> =25°C, I <sub>S</sub> =-10A, V <sub>GS</sub> =0V	-	-	-1.2	V

**Notes:**

- 1.Pulse width limited by safe operating area.
- 2.Pulse width ≤300us , duty cycle ≤2%.

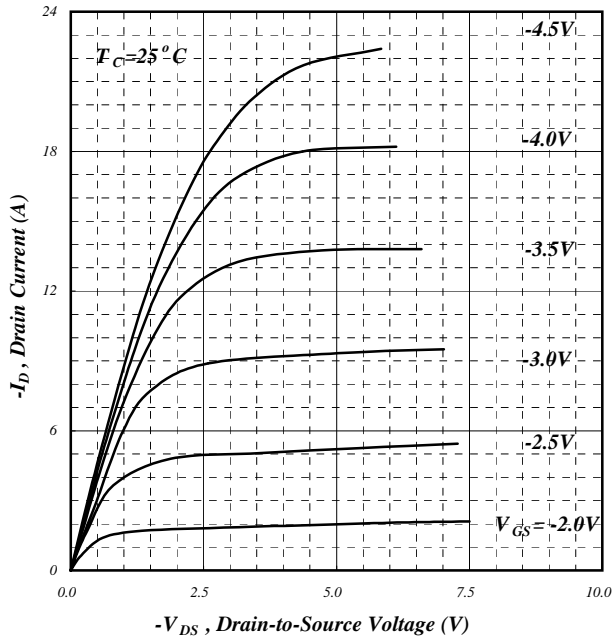


Fig 1. Typical Output Characteristics

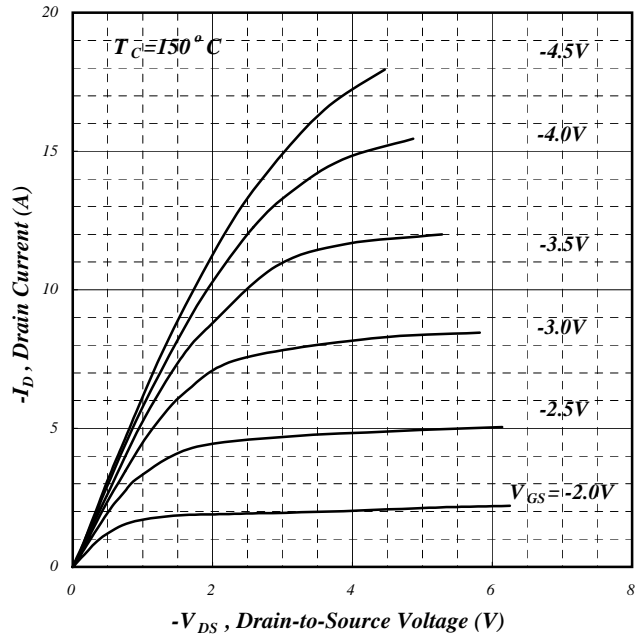


Fig 2. Typical Output Characteristics

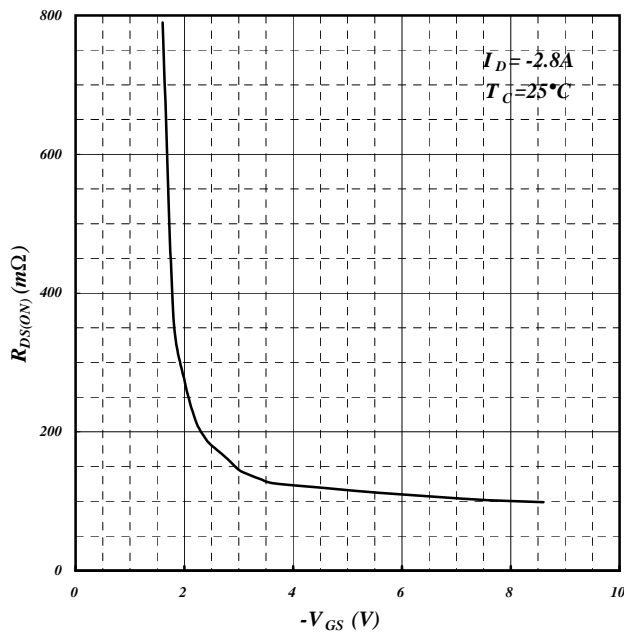


Fig 3. On-Resistance vs. Gate Voltage

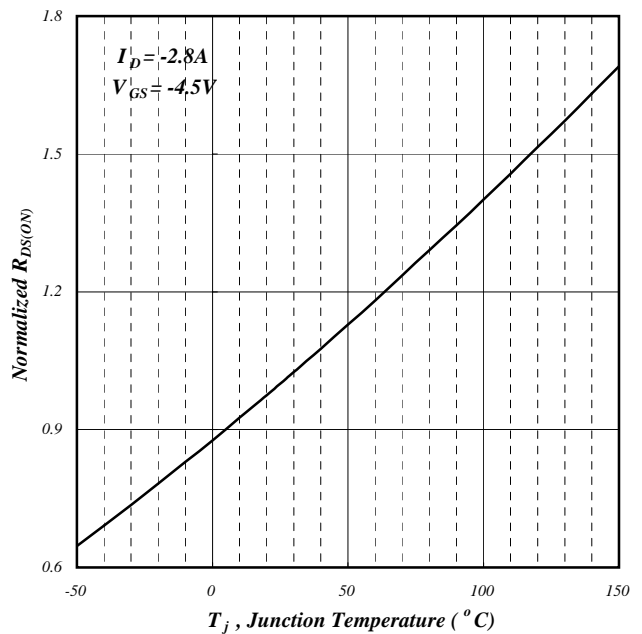


Fig 4. Normalized On-Resistance vs. Junction Temperature

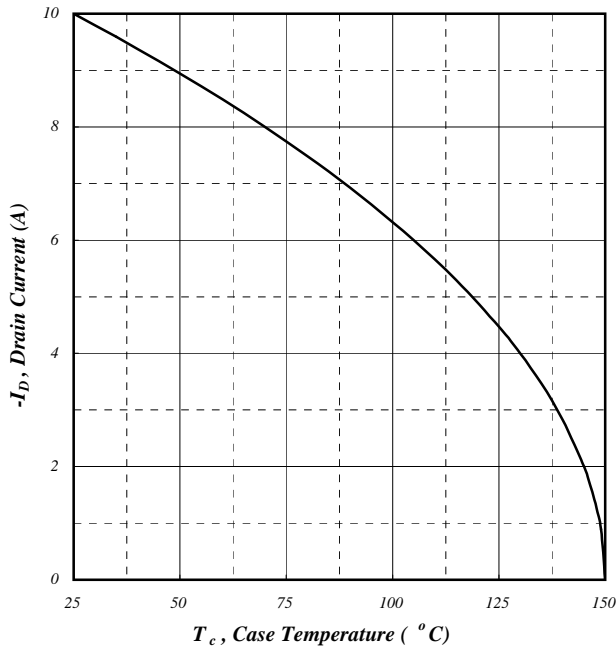


Fig 5. Maximum Drain Current vs. Case Temperature

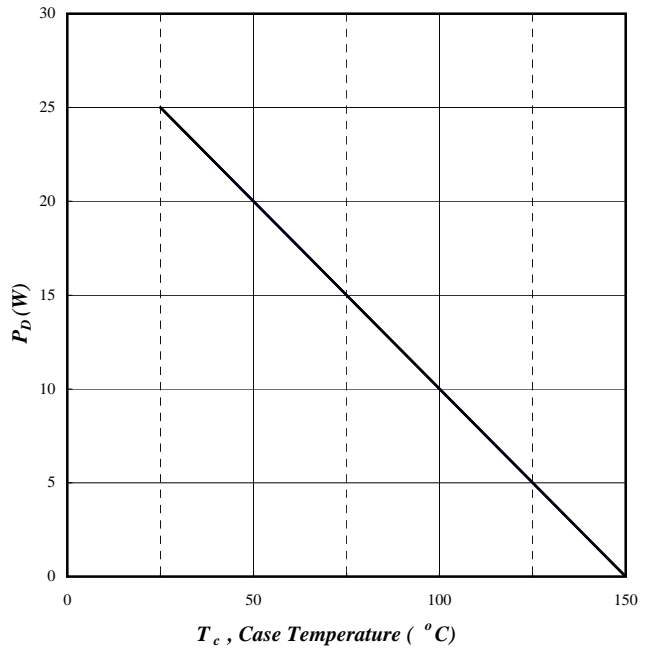


Fig 6. Typical Power Dissipation

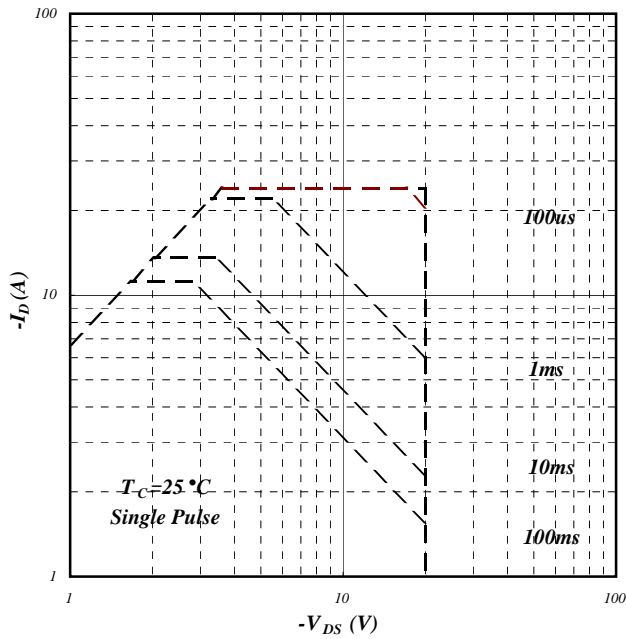


Fig 7. Maximum Safe Operating Area

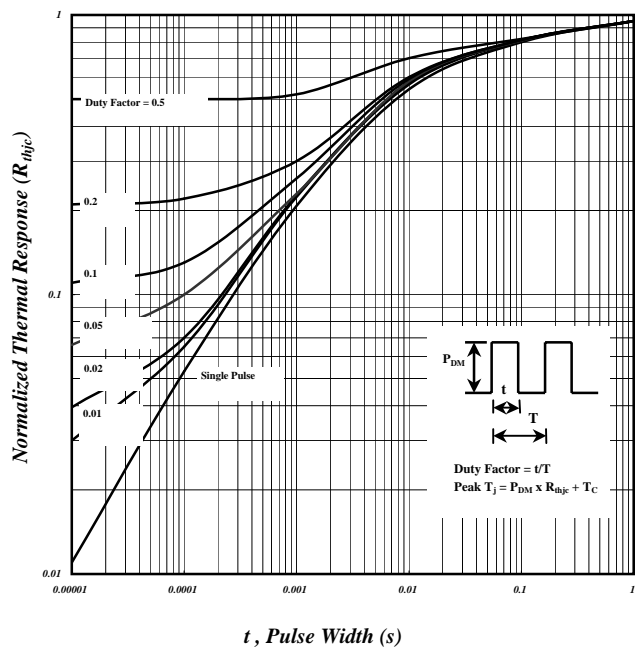


Fig 8. Effective Transient Thermal Impedance

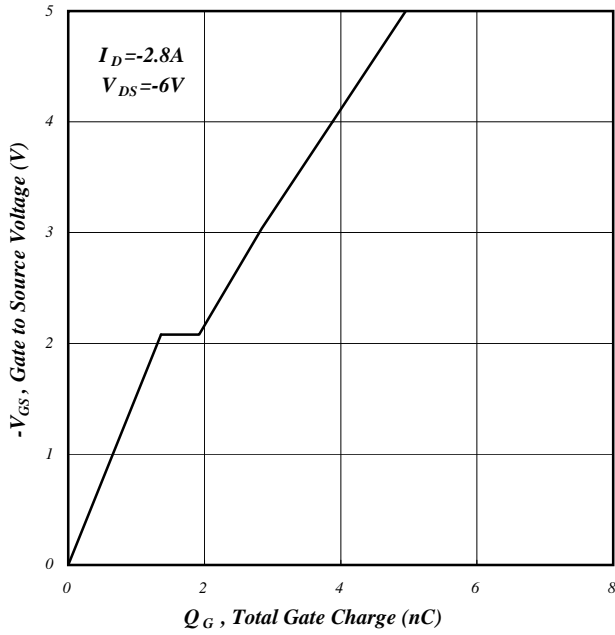


Fig 9. Gate Charge Characteristics

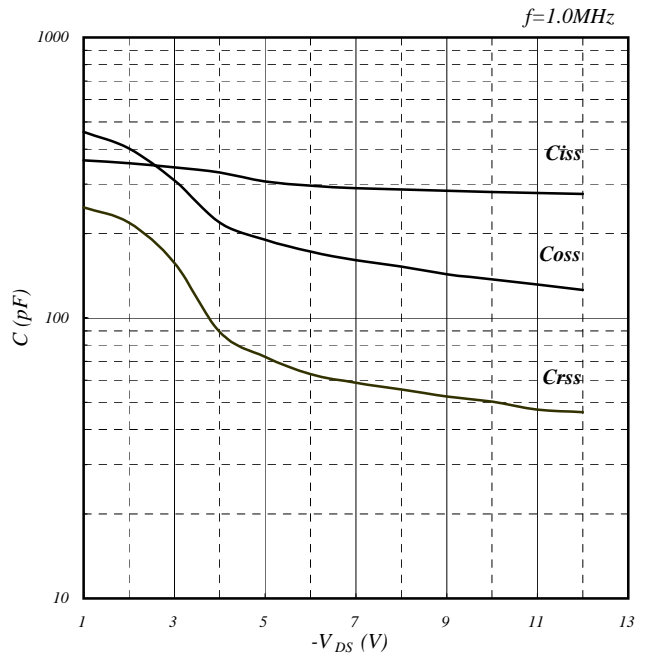


Fig 10. Typical Capacitance Characteristics

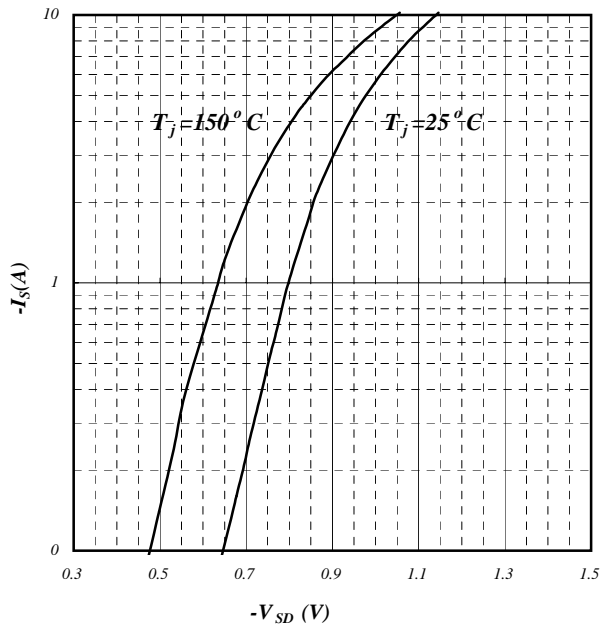


Fig 11. Forward Characteristic of Reverse Diode

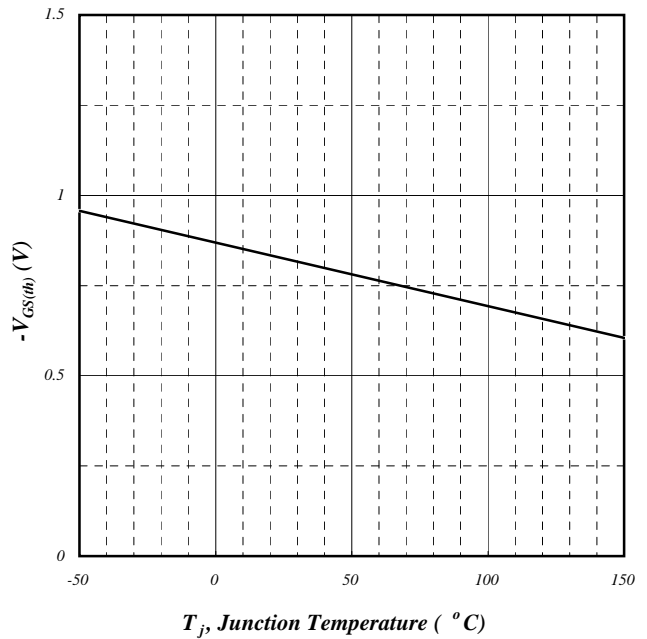


Fig 12. Gate Threshold Voltage vs. Junction Temperature

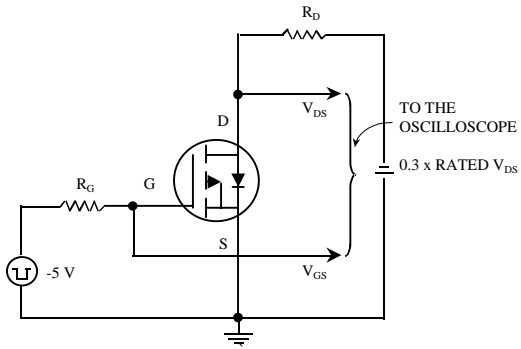


Fig 13. Switching Time Circuit

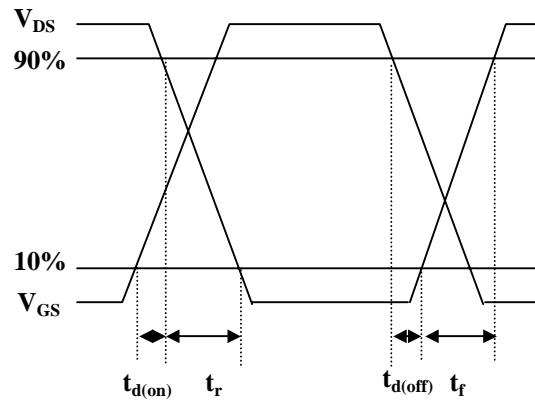


Fig 14. Switching Time Waveform

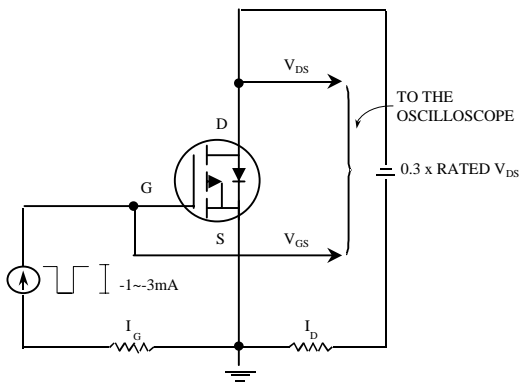


Fig 15. Gate Charge Circuit

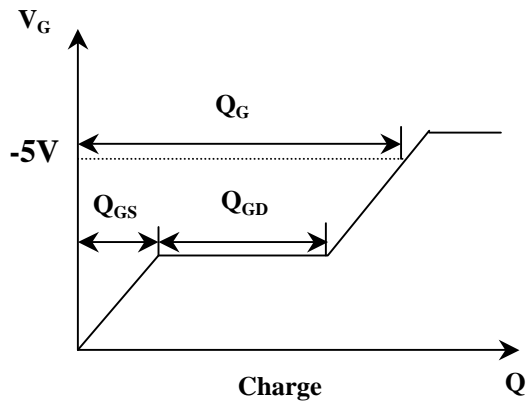


Fig 16. Gate Charge Waveform

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