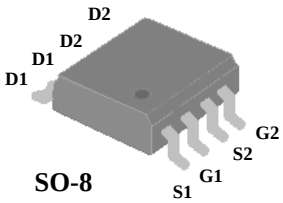
AP9960GM-HF

Halogen-Free Product

Advanced Power Electronics Corp.

DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET

- **Low On-Resistance**
- **Fast Switching Speed**
- **Surface Mount Package**
- **RoHS Compliant & Halogen-Free**



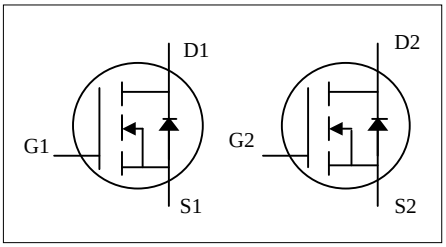
SO-8

BV_{DSS}	40V
$R_{DS(ON)}$	20mΩ
I_D	7.8A

Description

AP9960 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The SO-8 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for voltage conversion or switch applications.



Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D@T_A=25℃	Drain Current, V_{GS} @ 10V[3]	7.8	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 10V[3]	6.2	A
I_{DM}	Pulsed Drain Current[1]	20	A
P_D@T_A=25℃	Total Power Dissipation	2	W
	Linear Derating Factor	0.016	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-amb	Maximum Thermal Resistance, Junction-ambient[3]	62.5	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	40	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.032	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=7A	-	-	20	mΩ
		V_{GS}=4.5V, I_D=5A	-	-	32	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=7A	-	25	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=70°C)	V_{DS}=32V ,V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge	I_D=7A	-	14.7	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=20V	-	7.1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	6.8	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=20V	-	11.5	-	ns
t_r	Rise Time	I_D=1A	-	6.3	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=10V	-	28.2	-	ns
t_f	Fall Time	R_D=20Ω	-	12.6	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1725	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	235	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	145	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)	V_D=V_G=0V , V_S=1.3V	-	-	1.54	A
V_{SD}	Forward On Voltage[2]	T_j=25℃, I_S=2.3A, V_{GS}=0V	-	-	1.3	V

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse width ≤300us , duty cycle ≤2%.

3.Surface mounted on 1 in^2 copper pad of FR4 board, t ≤10sec ; 135℃/W when mounted on Min. copper pad.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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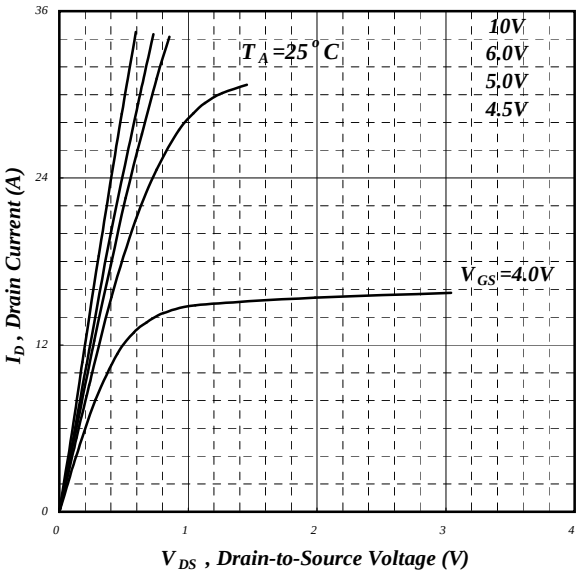


Fig 1. Typical Output Characteristics

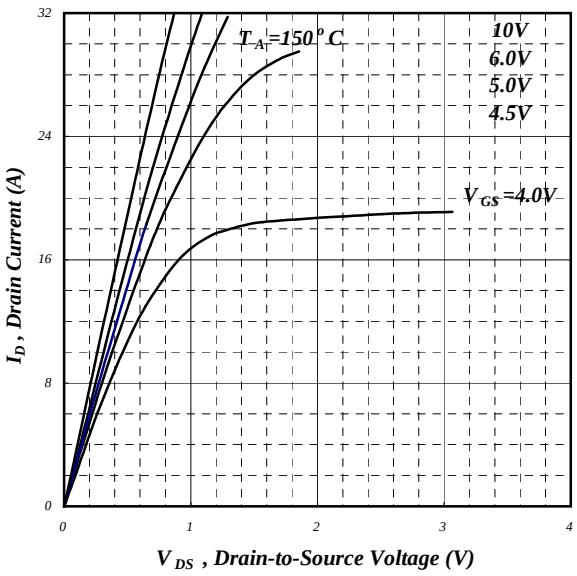


Fig 2. Typical Output Characteristics

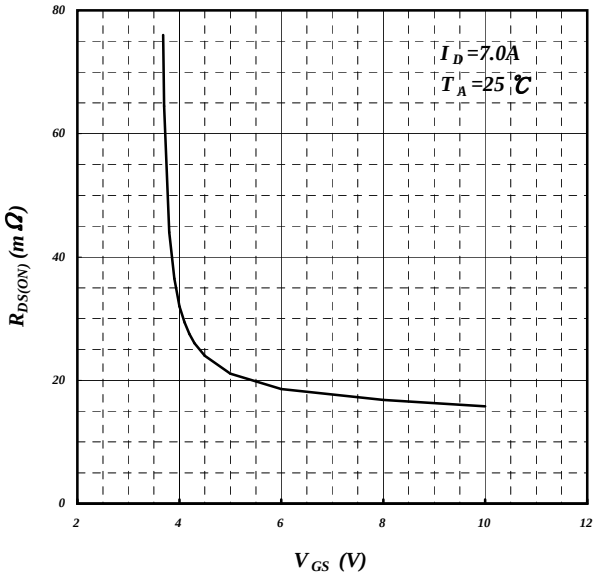


Fig 3. On-Resistance v.s. Gate Voltage

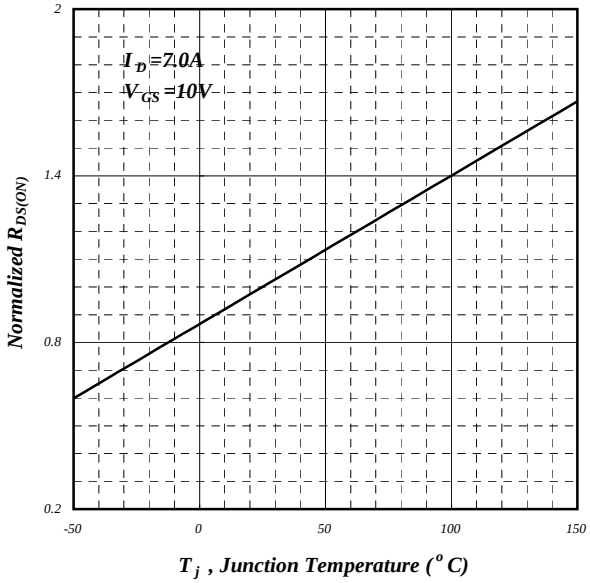


Fig 4. Normalized On-Resistance v.s. Junction Temperature

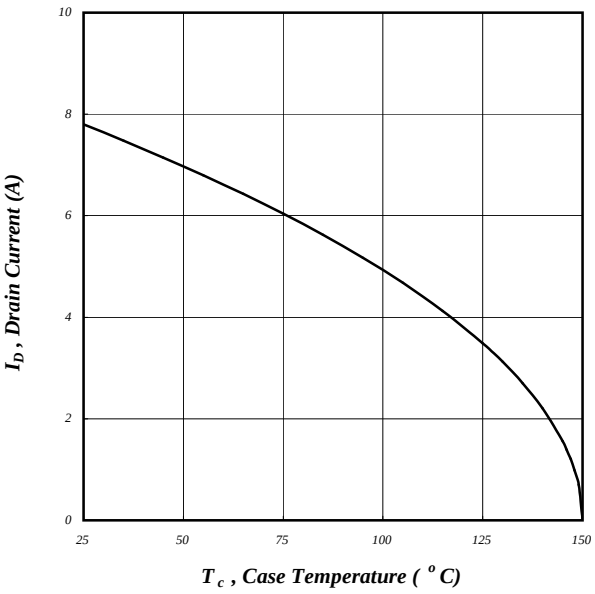


Fig 5. Maximum Drain Current v.s. Case Temperature

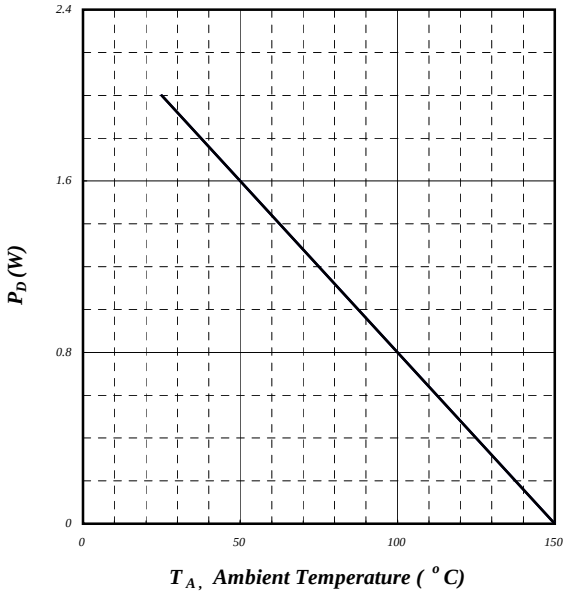


Fig 6. Typical Power Dissipation

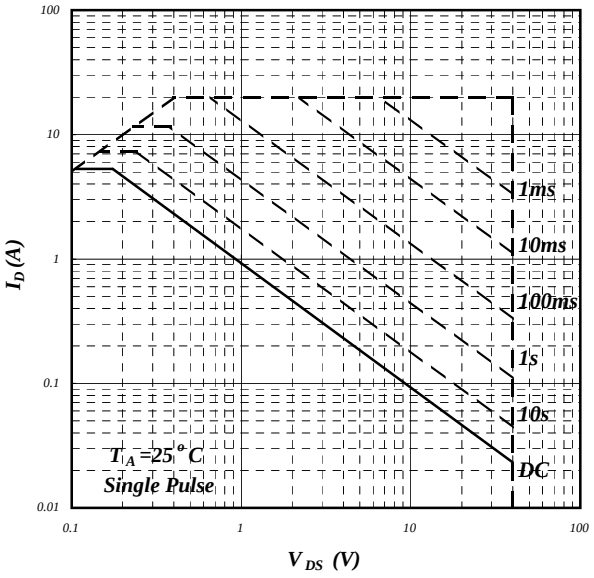


Fig 7. Maximum Safe Operating Area

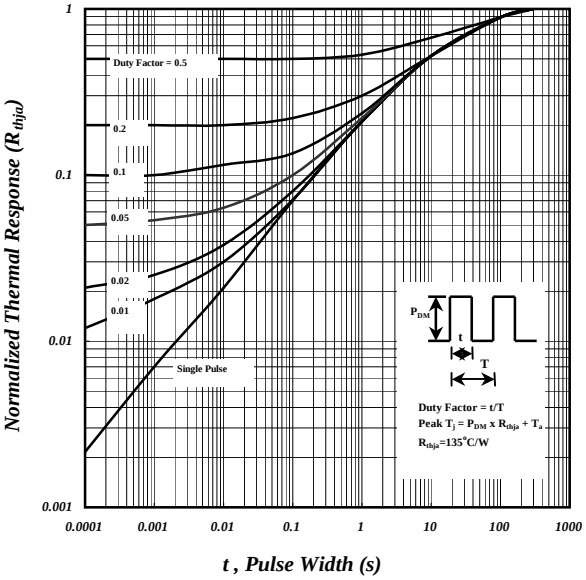


Fig 8. Effective Transient Thermal Impedance

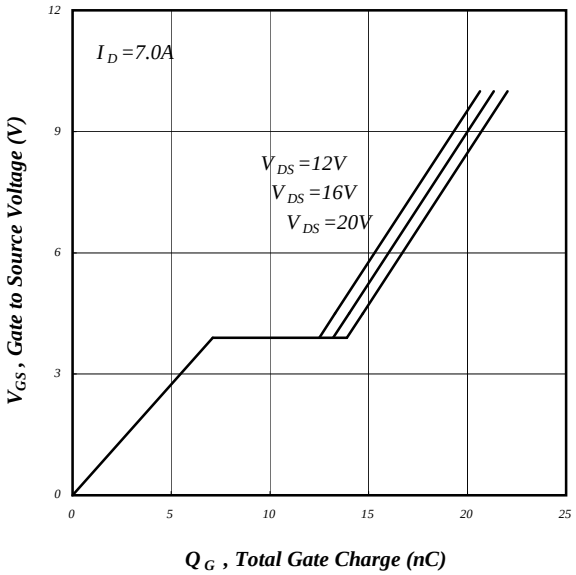


Fig 9. Gate Charge Characteristics

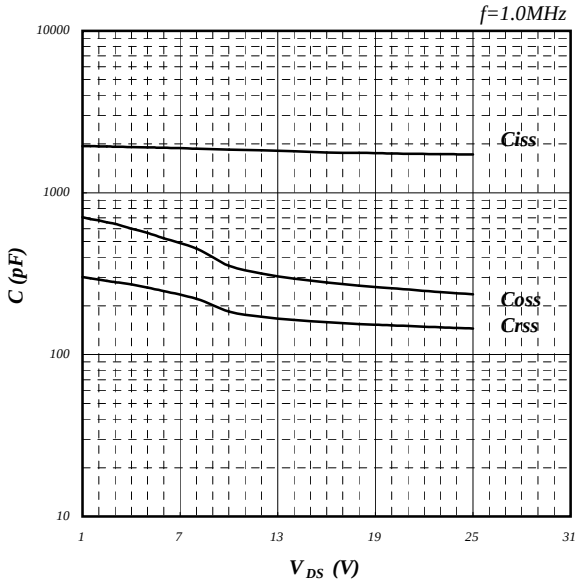


Fig 10. Typical Capacitance Characteristics

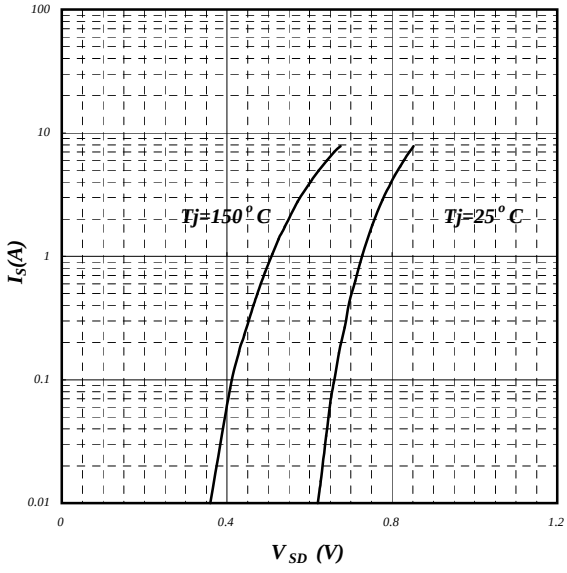


Fig 11. Forward Characteristic of Reverse Diode

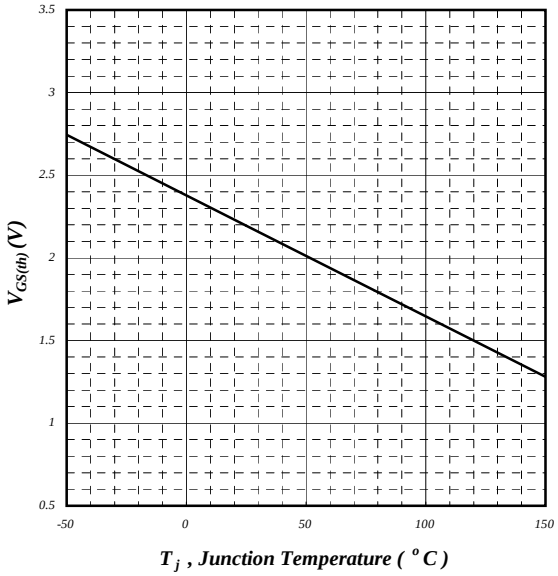


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

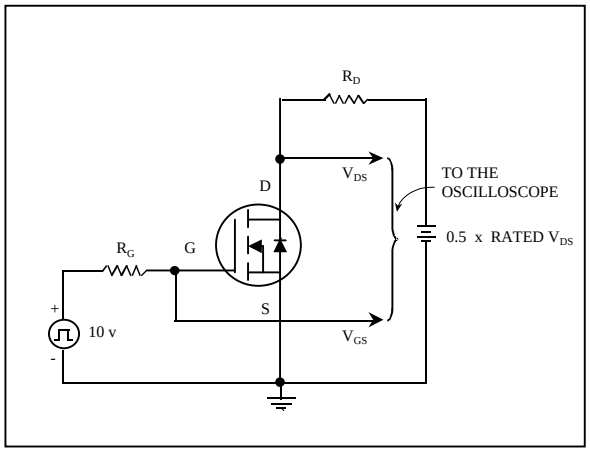


Fig 13. Switching Time Circuit

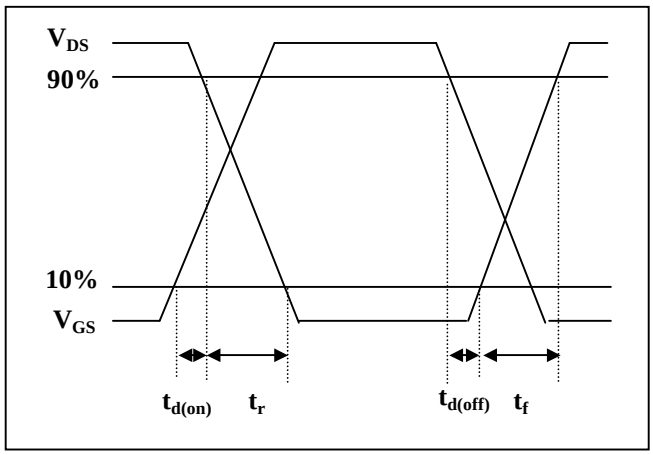


Fig 14. Switching Time Waveform

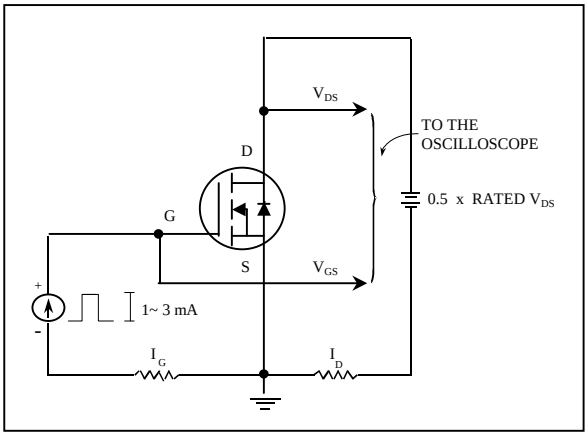


Fig 15. Gate Charge Circuit

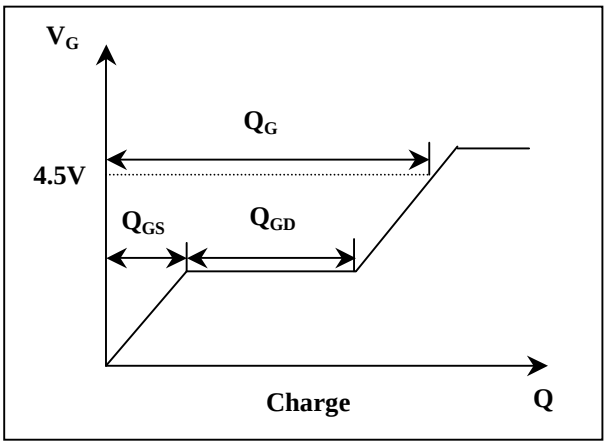
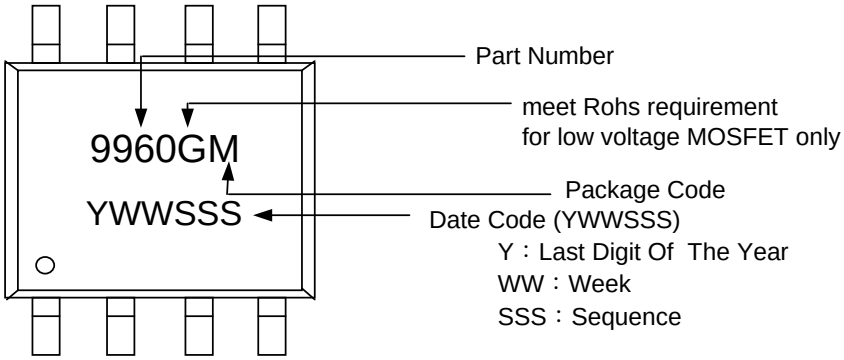
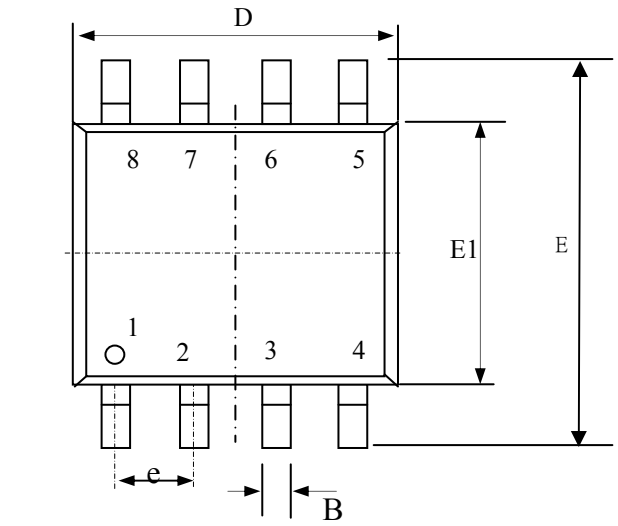


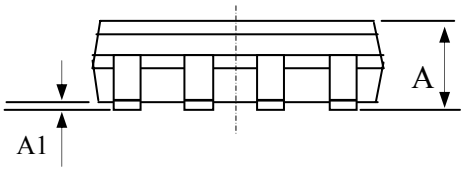
Fig 16. Gate Charge Waveform

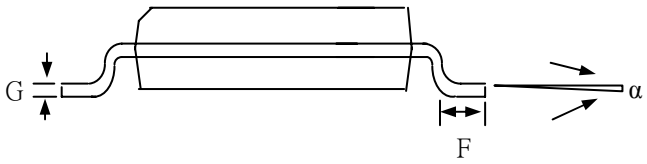
MARKING INFORMATION



Package Outline : SO-8







SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
B	0.30	0.41	0.51
D	4.80	5.05	5.30
E	5.79	6.00	6.20
E1	3.70	3.90	4.10
e	1.27 TYP		
G	0.17	0.21	0.25
F	0.38	0.83	1.27
α	0°	4°	8°

1.All Dimension Are In Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Draw No. M1-M8-G-v03

SO-8 FOOTPRINT：

