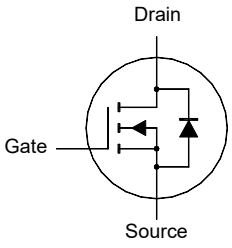
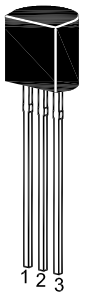
2N7000-HAF

N-Channel Enhancement Mode MOSFET

Features

• Halogen and Antimony Free(HAF), RoHS compliant





1. Source 2.Gate 3.Drain
TO-92 Plastic Package

Absolute Maximum Ratings (T_a = 25℃)

Parameter		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage (R_{GS} = 1 MΩ)		V_{DGR}	60	V
Gate-source Voltage	Continuous	V_{GS}	± 20	V
	Non-repetitive (tp ≤ 50 μs)	V_{GSM}	± 40	V
Continuous Drain Current		I_D	200	mA
Peak Drain Current, Pulsed [1)]		I_{DM}	500	mA
Total Power Dissipation		P_D	350	mW
Operating Junction Temperature		T_j	150	℃
Storage Temperature Range		T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	357	℃/W

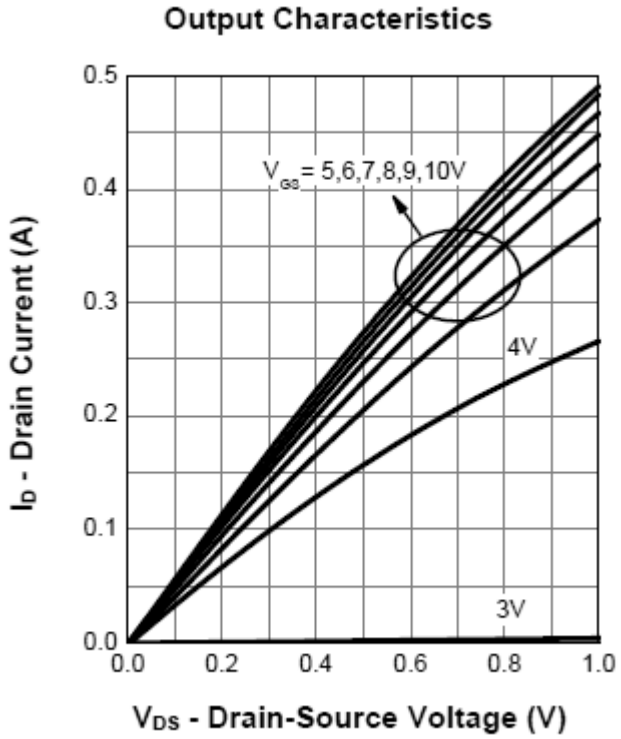
[1)] Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%,Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

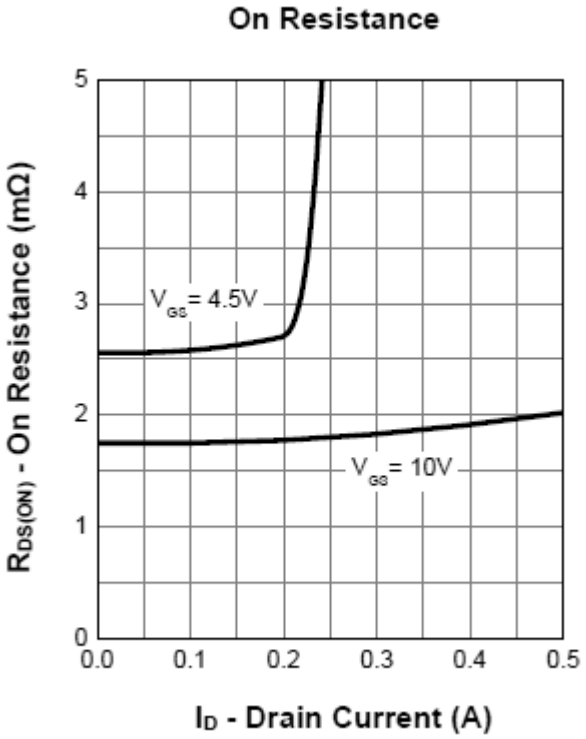
Dated : 22/08/2022 Rev:05

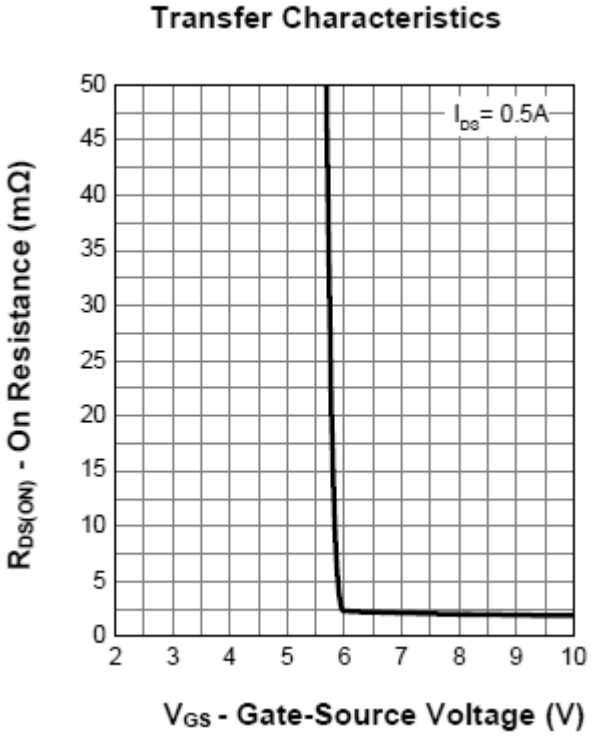
Characteristics at T_a = 25℃ unless otherwise specified

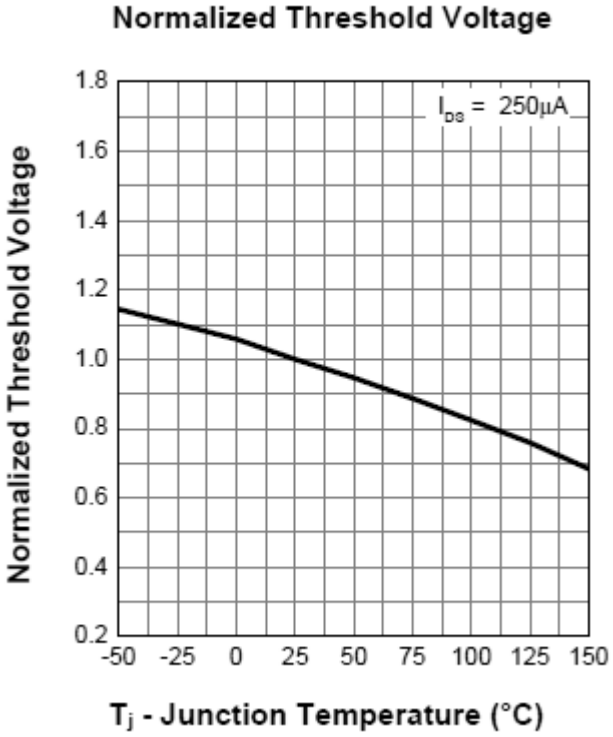
Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 µA	$V_{(BR)DSS}$	60	-	-	V
Zero Gate Voltage Drain Current at V_{DS} = 48 V	I_{DSS}	-	-	1	µA
Gate-Source Leakage at V_{GS} = ± 15 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{DS}, I_D = 250 µA	$V_{GS(th)}$	1	-	2.5	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 500 mA at V_{GS} = 4.5 V, I_D = 75 mA	$R_{DS(on)}$	- -	- -	5 6	Ω
Drain-Source On-Voltage at V_{GS} = 10 V, I_D = 500 mA at V_{GS} = 4.5 V, I_D = 75 mA	$V_{DS(on)}$	- -	- -	2.5 0.45	V
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 10 V, I_D = 0.2 A	g_{FS}	-	340	-	mS
Input Capacitance at V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{iss}	-	25.6	-	pF
Output Capacitance at V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{oss}	-	3.3	-	pF
Reverse Transfer Capacitance at V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{rss}	-	0.12	-	pF
Gate Charge Total at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.4 A	Q_g	-	1.1	-	nC
Gate to Source Charge at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.4 A	Q_{gs}	-	0.3	-	nC
Gate to Drain Charge at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.4 A	Q_{gd}	-	0.1	-	nC
Turn-On Delay Time at V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.4 A, R_G = 4.5 Ω	$t_{d(on)}$	-	3	-	ns
Turn-On Rise Time at V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.4 A, R_G = 4.5 Ω	t_r	-	17	-	ns
Turn-Off Delay Time at V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.4 A, R_G = 4.5 Ω	$t_{d(off)}$	-	9	-	ns
Turn-Off Fall Time at V_{DD} = 30 V, V_{GS} = 10 V, I_D = 0.4 A, R_G = 4.5 Ω	t_f	-	28	-	ns
Body-Diode PARAMETERS					
Diode Forward Voltage at I_S = 0.4 A	V_{SD}	-	-	1.2	V

Electrical Characteristics Curves

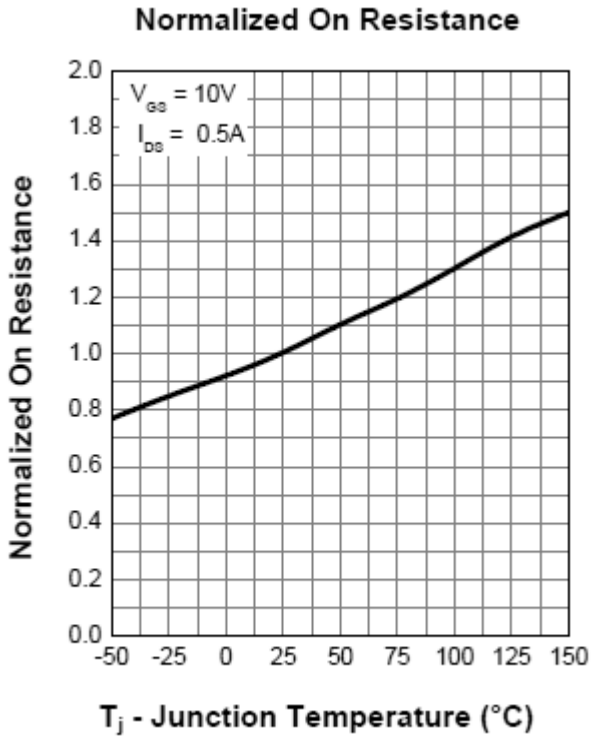


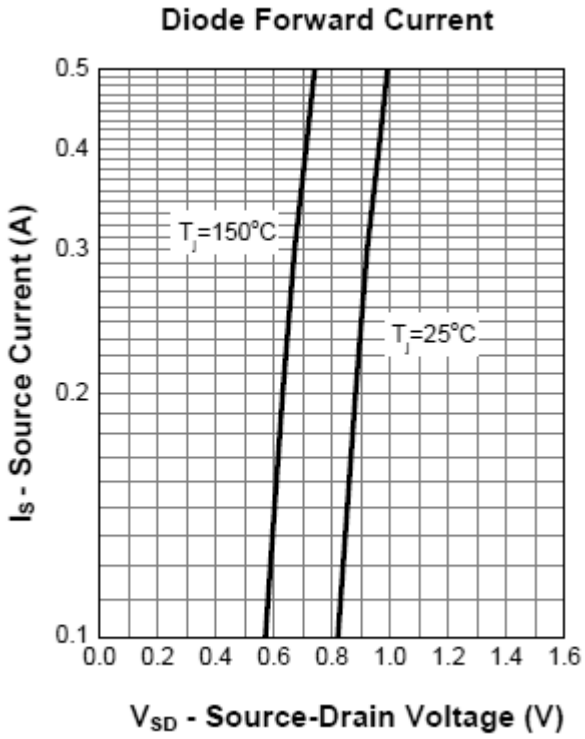


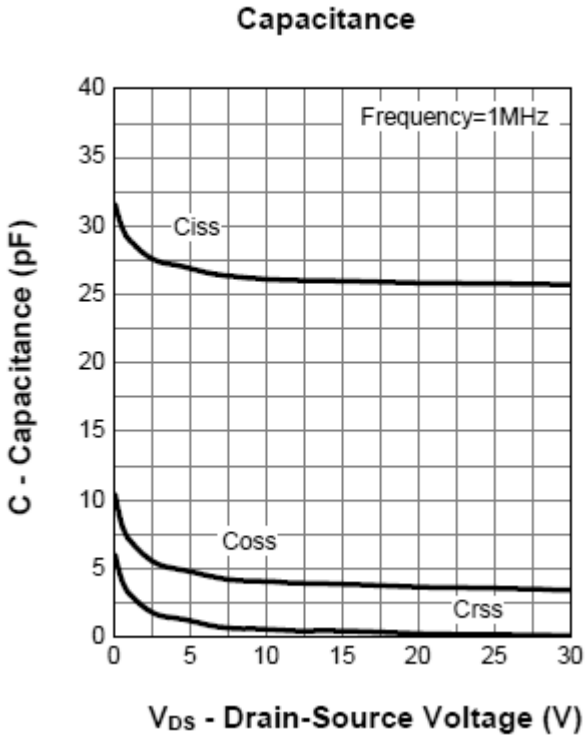


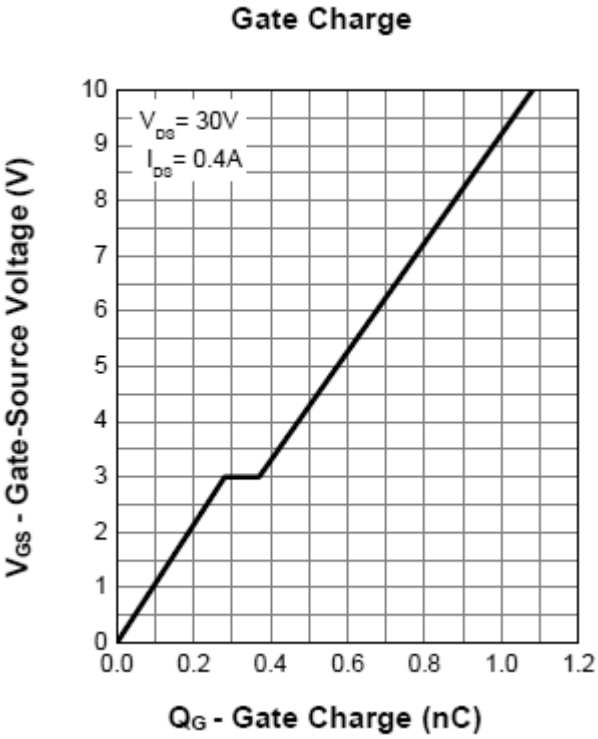


Electrical Characteristics Curves









Test Circuits

Fig.1-1 Switching times test circuit

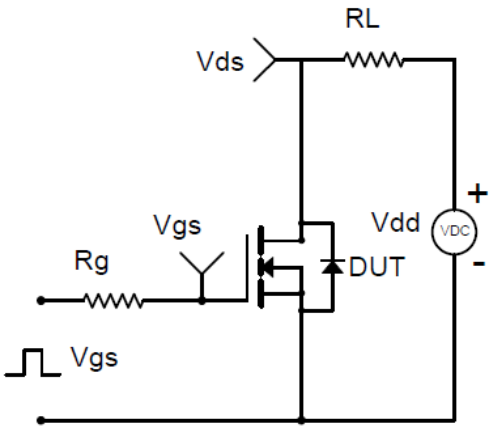


Fig.1-2 Switching Waveform

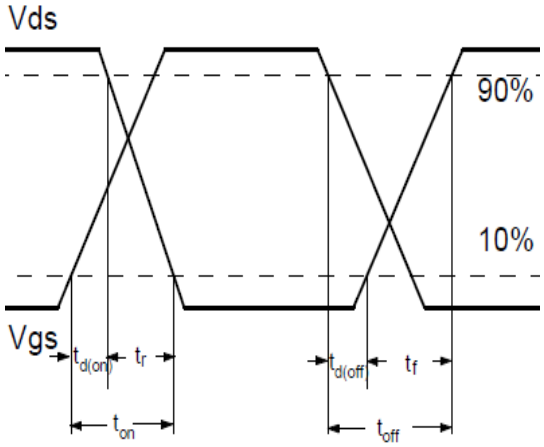


Fig.2-1 Gate charge test circuit

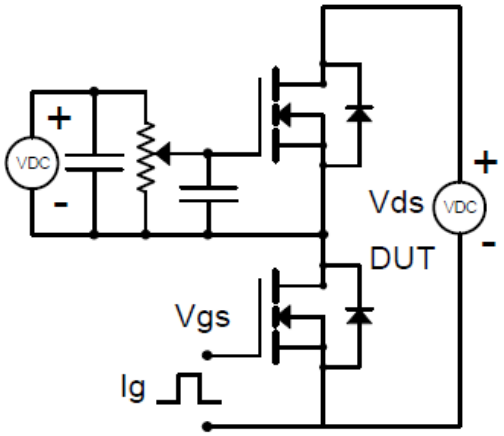
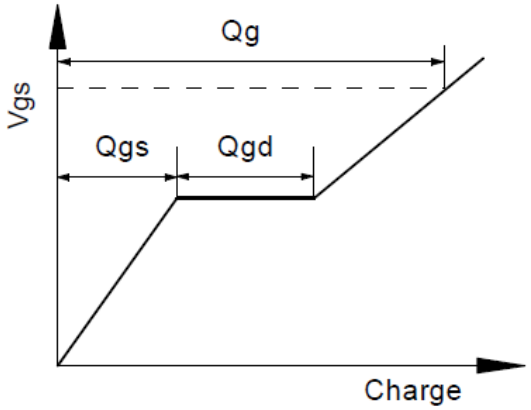
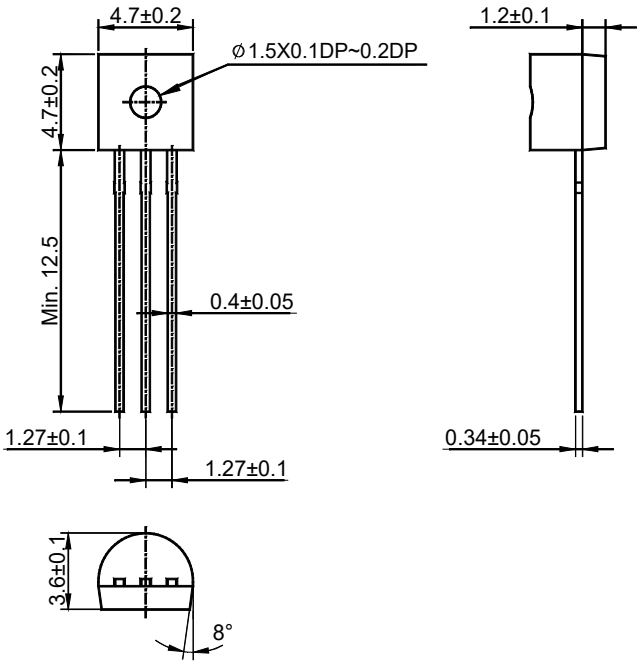


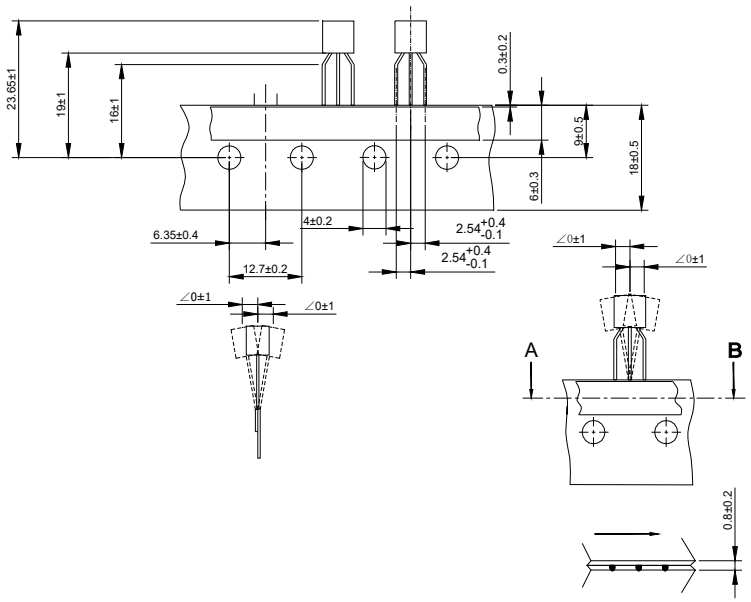
Fig.2-2 Gate charge waveform



TO-92 Package Outline (Dimensions in millimeters)



TO-92 Ammo-Pack Outline (Dimensions in millimeters)



SECTION A–B

Packing information

Package	Bulk Packing			Ammo-Packing	
	Per Bag Qty	Per Box Qty	Per Carton Qty	Per Box Qty	Per Carton Qty
TO-92	1,000	5,000	50,000	4,000	20,000