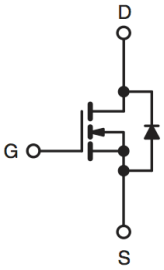
MSF6N70 700V N-Channel MOSFET

GENERAL DESCRIPTION

The MSF6N70 is a N-channel enhancement-mode MOSFET , providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220F package is universally preferred for all commercial-industrial applications



RoHS COMPLIANT

HALOGEN FREE Avaliable

FEATURES

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant / Halogen free package available

Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	700	V
Continuous Drain Current @ TC=25°C	ID	6.0	A
Continuous Drain Current @ TC=100°C	ID	3.5	A
Pulsed Drain Current	IDM	22	A
Gate-Source Voltage	VGS	±30	V
Single Pulsed Avalanche Energy	EAS	350	mJ
Avalanche Current	IAR	5.5	A
Repetitive Avalanche Energy	EAR	14.7	mJ
Peak Diode Recovery dV/dt	dV/dt	5.5	V/ns
Power Dissipation (TC=25°C)	PD	48	W
Power Dissipation (TC=100°C)		0.38	W
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. IAS=5.5A, VDD=50V, RG=25Ω, Starting TJ =25°C
3. ISD≤5.5A, di/dt≤300A/μs, VDD≤BVDSS , Starting TJ =25 °C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

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Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics					
VGS	VDS = VGS, ID=250μA	2.0	-	4.0	V
*RDS(ON)	VGS =10V,ID =2.8A	-	1.5	1.8	Ω
BVDSS	VGS=0, ID=250μA	700	-	-	V
ΔBVDSS/ΔTj	Reference to 25°C, ID=250μA		0.70		
IDSS	VDS =700V,VGS =0V	-	-	1	uA
	VDS =560V, VGS =0, Tj=125°C	-	-	10	
IGSSF	VGS =30V,VDS =0V	-	-	100	nA
IGSSR	VGS =-30V,VDS =0V	-	-	-100	nA
Dynamic Characteristics					
Ciss	VGS=0V, VDS=25V, f=1MHz	-	1100	1500	pF
Coss		-	110	150	
Crss		-	12	16	
td(ON)	VDS =350V,ID =5.5A, RG = 25 Ω	-	10	30	ns
tr		-	35	80	
td(OFF)		-	45	100	
tf		-	40	90	
Qg	VDS =560V,ID =5.5A, VGS =10V	-	29	37	nC
Qgs		-	5	-	
Qgd		-	11	-	
Source-Drain Diode Characteristics					
IS		-	-	5.5	A
ISM		-	-	22	
VSD	IS = 5.5A, VGS = 0 V	-	-	1.5	V
trr	IS = 5.5 A, VGS = 0 V diF/dt = 100 A/μs	-	390	-	nS
Qrr		-	3.6	-	nC

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- **Characteristic Curves**

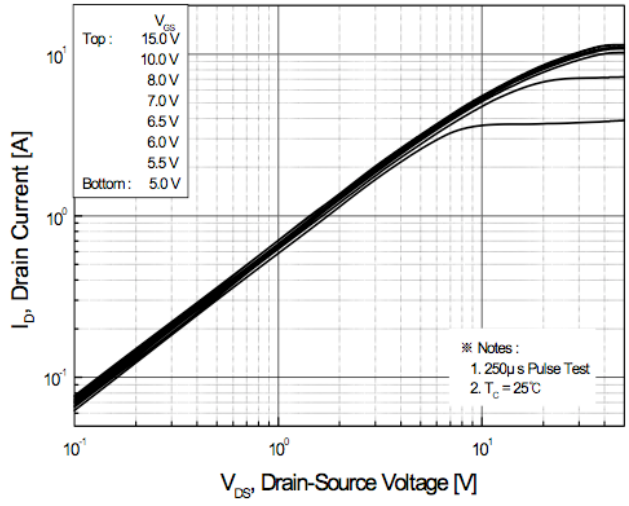

Figure 1. On Region Characteristics

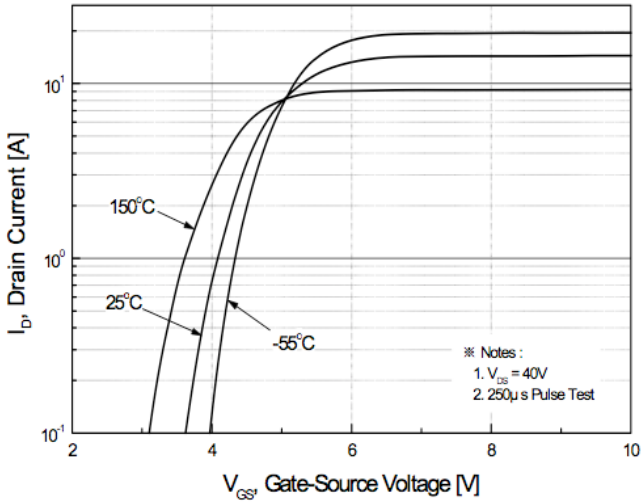

Figure 2. Transfer Characteristics

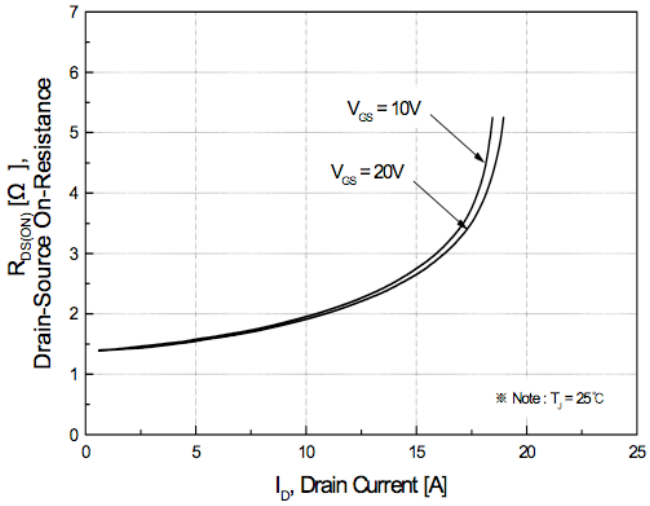

Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

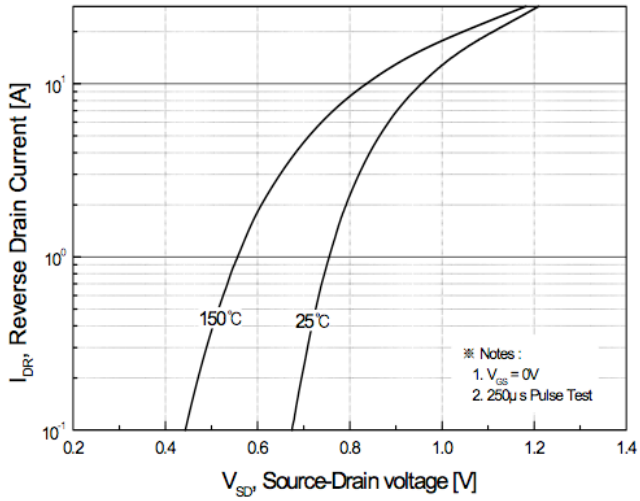

Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

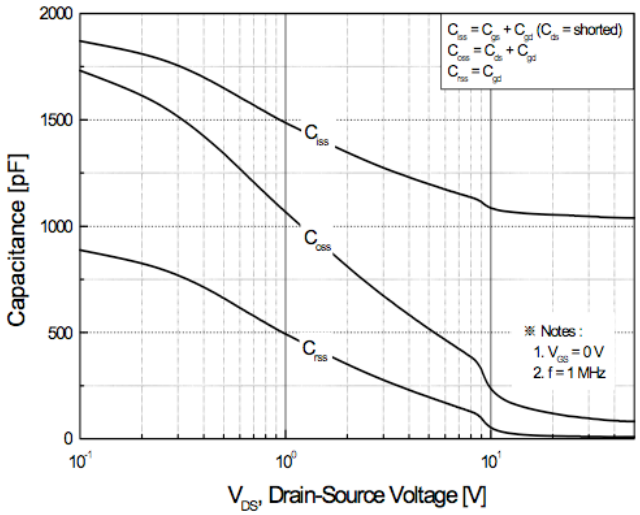

Figure 5. Capacitance Characteristics

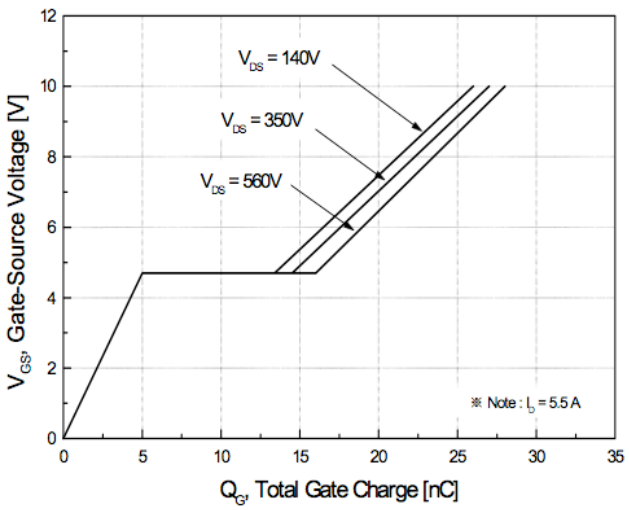

Figure 6. Gate Charge Characteristics

- **Characteristic Curves**

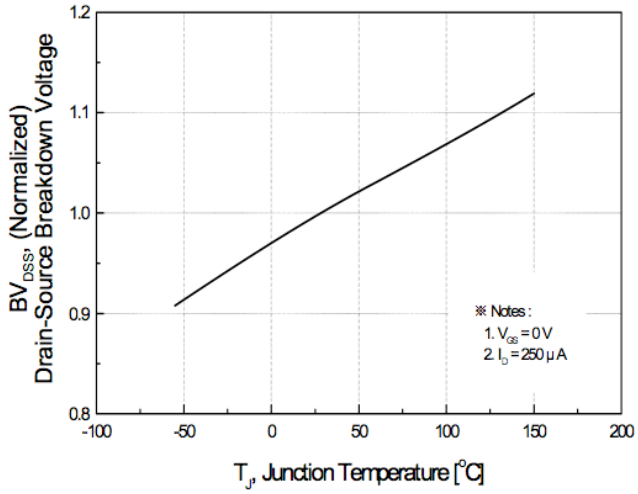

Figure 7. Breakdown Voltage Variation vs. Temperature

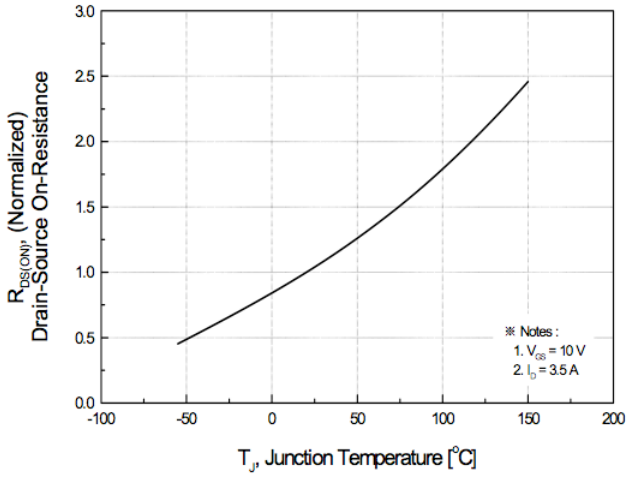

Figure 8. On-Resistance Variation vs. Temperature

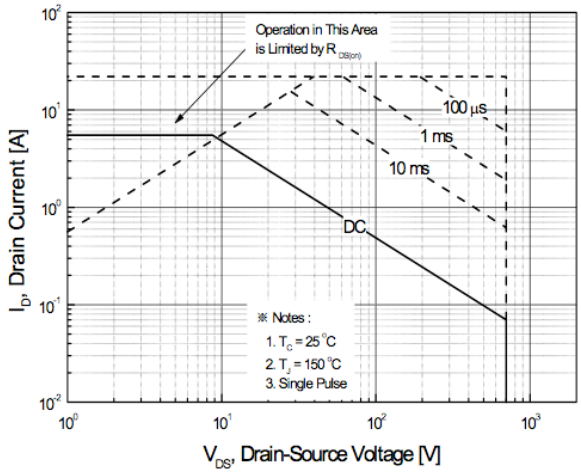

Figure 9. Maximum Safe Operating Area

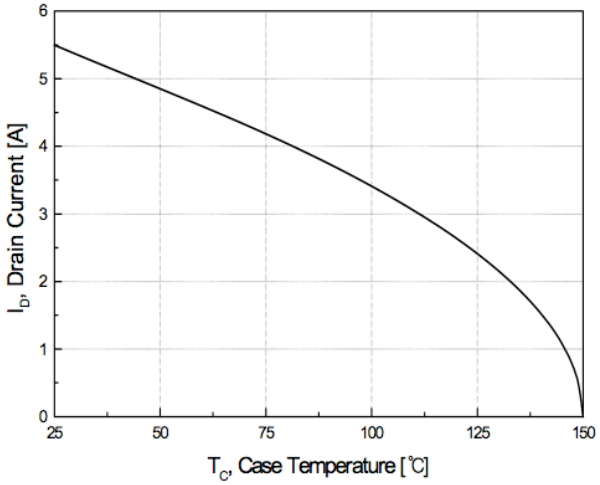

Figure 10. Maximum Drain Current vs. Case Temperature

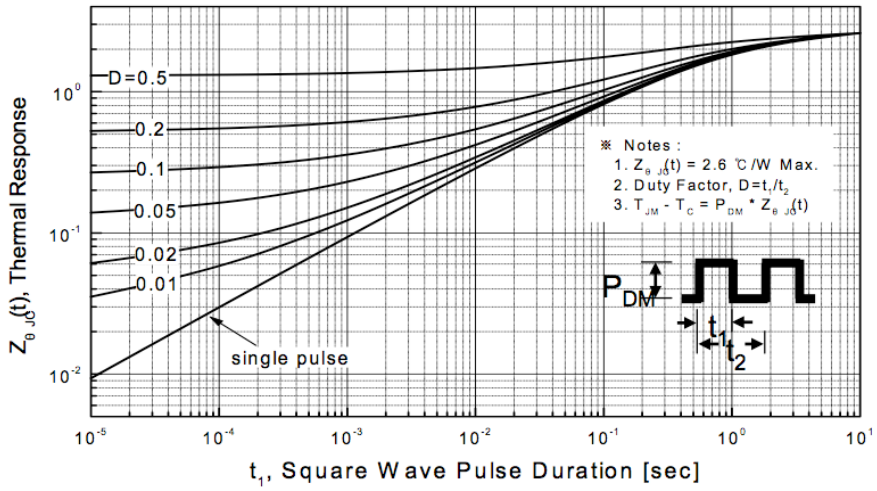

Figure 11. Transient Thermal Response Curve

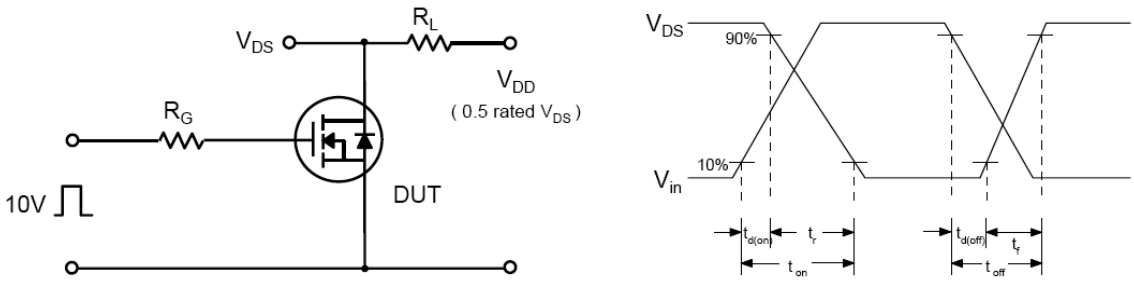

Fig 12. Resistive Switching Test Circuit & Waveforms

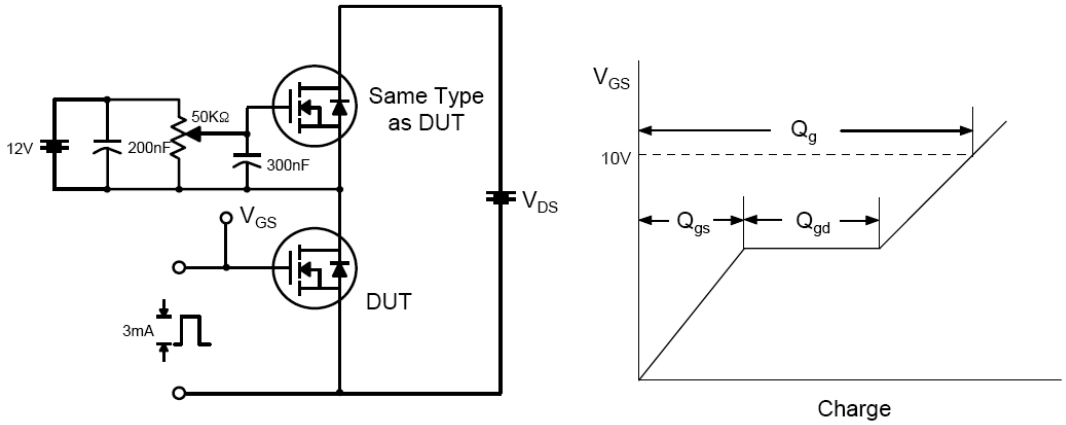

Fig 13. Gate Charge Test Circuit & Waveform

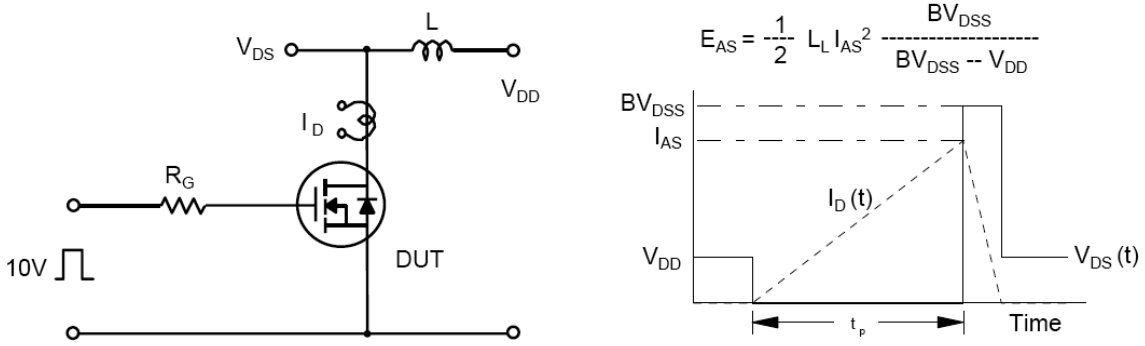

Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

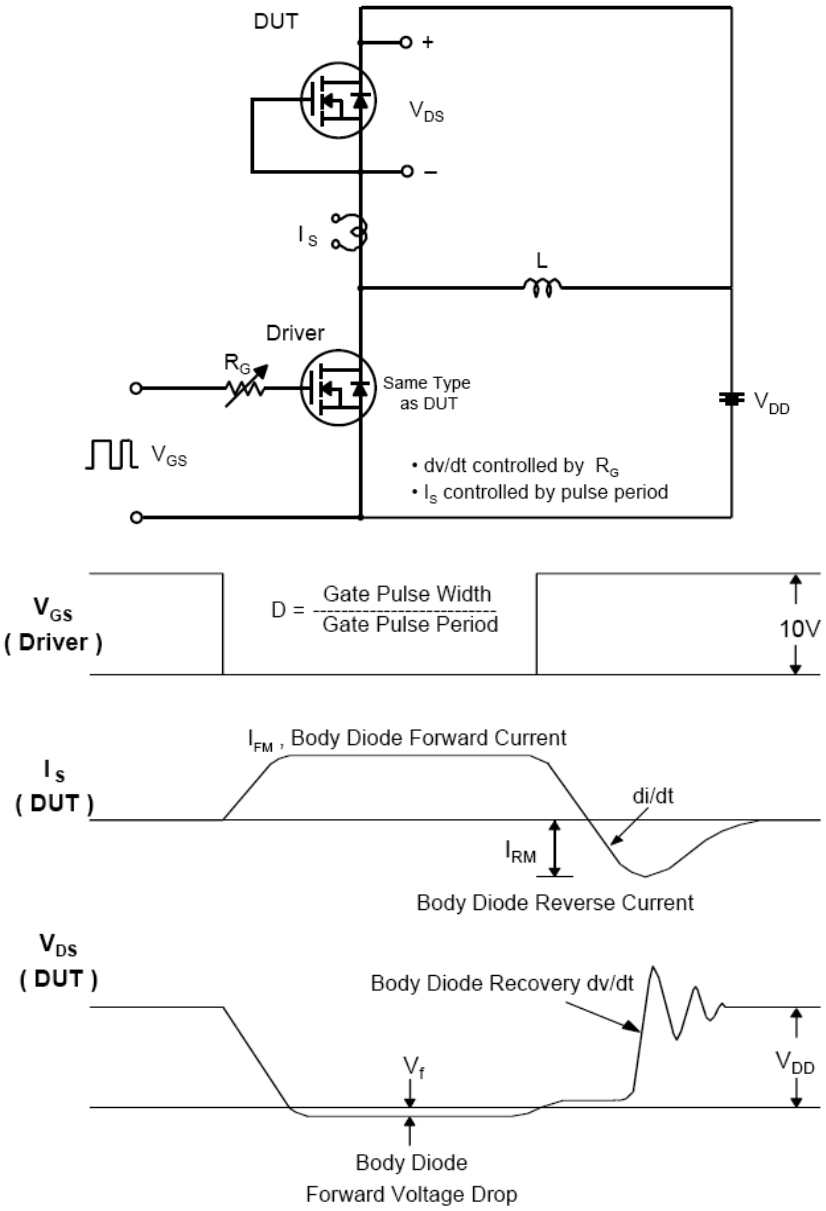

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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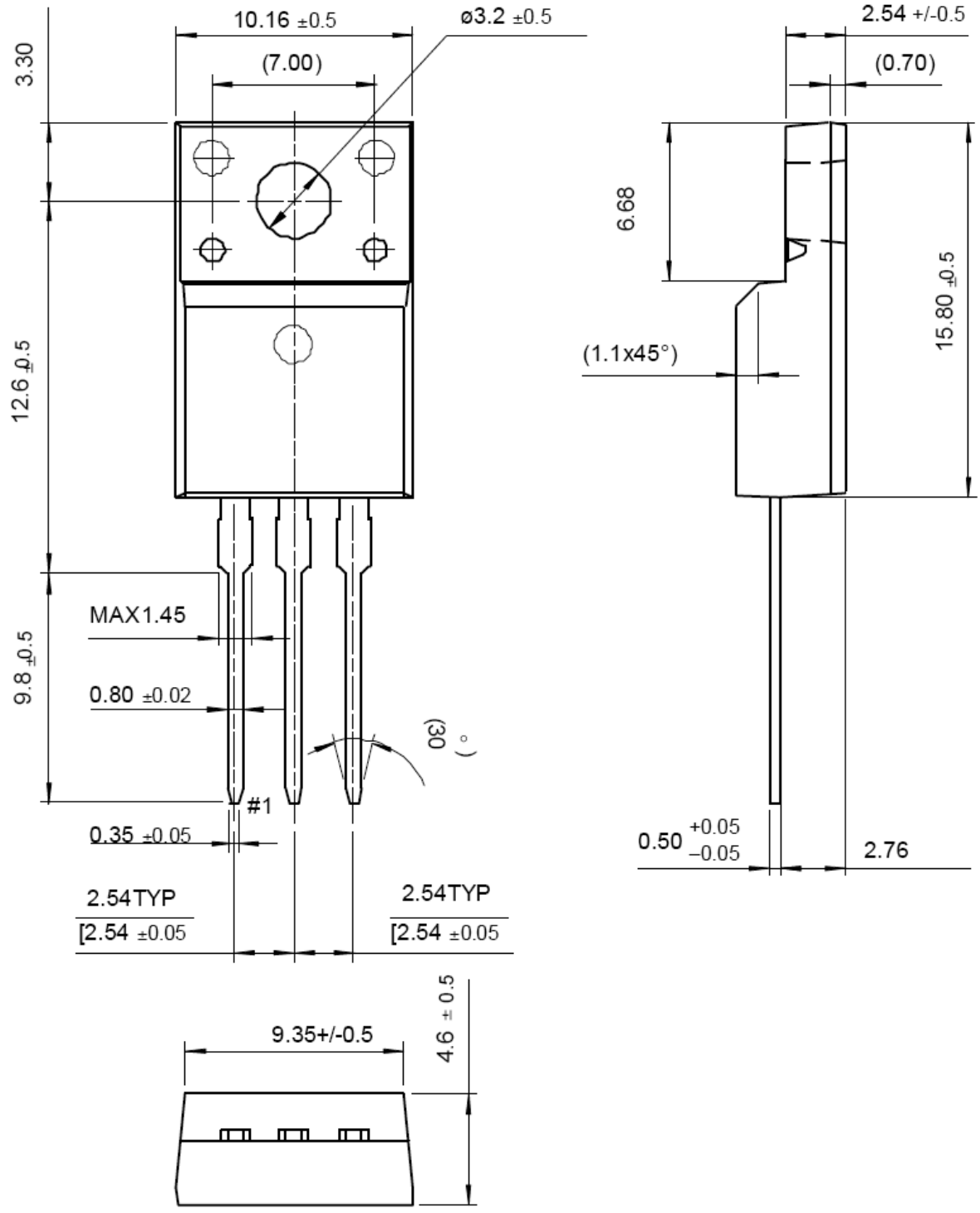
Package Dimensions

Dimensions in Millimeters



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