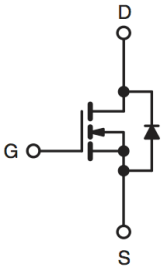
MSF7N65 650V N-Channel MOSFET

GENERAL DESCRIPTION

The MSF7N65 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

Symbol	Parameter	Value	Units
V_{DSS}	Drain to Source Voltage	650	V
V_{GS}	Gate to Source Voltage	±30	V
I_D	Continuous Drain Current(@T_C = 25 °C)	7.0	A
	Continuous Drain Current(@T_C = 100 °C)	4.2	A
I_{DM}	Drain Current Pulsed	28	A
E_{AS}	Single Pulsed Avalanche Energy	230	mJ
I_{AR}	Avalanche Current	7.0	A
E_{AR}	Repetitive Avalanche Energy	14.7	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
T_L	Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	300	°C
TPKG	Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
P_D	Total Power Dissipation(@T_C = 25 °C)	48	W
	Derating Factor above 25 °C	0.38	W/°C
T_{STG}	Operating Junction Temperature	-55 ~ 150	°C
T_J	Storage Temperature	150	°C

Note:

1.Repetitive rating; pulse width limited by maximum junction temperature.

2. IAS≤7A, VDD=50V, L=7mH, VG=10V, starting TJ=+25°C.

3. ISD≤7A, dI/dt≤200A/μs, VDD≤BVDSS, starting TJ=+25°C.

MSF7N65 650V N-Channel MOSFET

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	2.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	62.5	°C/W

Electrical Characteristics (T_C = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	650	-	-	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature coefficient	I_D = 250 uA, referenced to 25 °C	-	0.70	-	V/°C
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	2.0	-	4.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 650 V, V_{GS} = 0 V	-	-	1	uA
		V_{DS} = 520 V, T_C = 125 °C	-	-	10	uA
I_{GSS}	Gate-Source Leakage, Forward	VGS=±30	-	-	±100	nA
$R_{DS(ON)}$	Static Drain-Source On-state Resistance	V_{GS} = 10 V, I_D = 3.5 A	-	1.2	1.4	Ω
Dynamic Characteristics						
Q_g	Total Gate Charge	ID=7A, VDD=520V, VGS=10V	-	29	-	nC
Q_{gs}	Gate-Source Charge		-	4.7	-	
Q_{gd}	Gate-Drain Charge (Miller Charge)		-	12.5	-	
$t_{d(on)}$	Turn-on Delay Time	ID=7A, VDD=325V, VGS=10V RG=10Ω	-	20	-	ns
t_r	Rise Time		-	50	-	
$t_{d(off)}$	Turn-off Delay Time		-	80	-	
t_f	Fall Time		-	70	-	
C_{iss}	Input Capacitance	VGS=0V, VDS=25V, f=1MHz	-	1482	-	pF
C_{oss}	Output Capacitance		-	121.7	-	
C_{rss}	Reverse Transfer Capacitance		-	14	-	

MSF7N65 650V N-Channel MOSFET

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Source-Drain Diode						
VSD		IS=7.0A, VGS=0V	-	-	1.4	V
IS		VD=VG=0,	-	-	7.0	A
ISM		VS=1.3V	-	-	28	A
trr		VGS=0, IF=7A, dI/dt=100A/us	-	350	-	ns
Qrr			-	3.3	-	uC

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

- **Characteristic Curves**

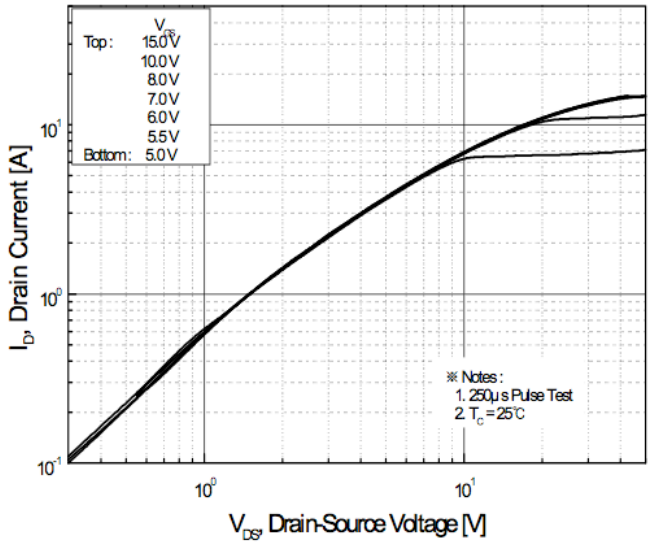


Figure 1. On Region Characteristics

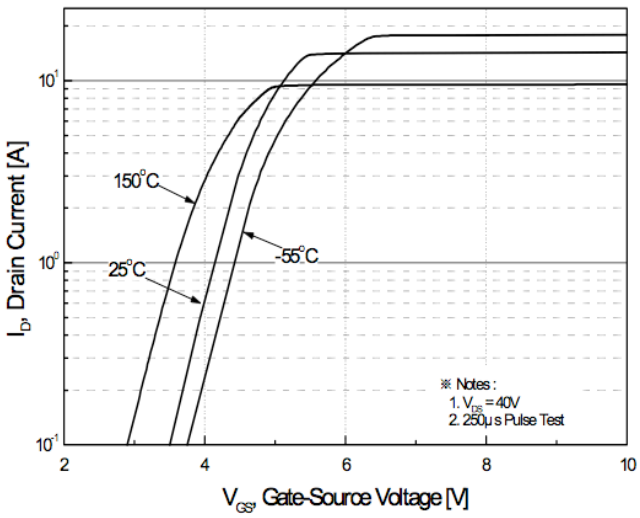


Figure 2. Transfer Characteristics

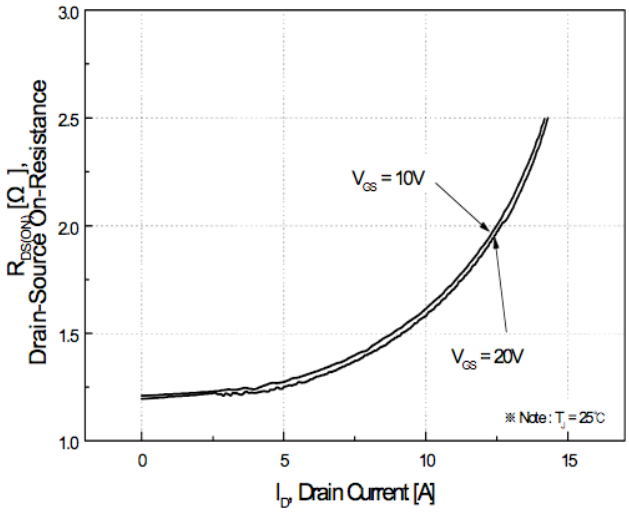


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

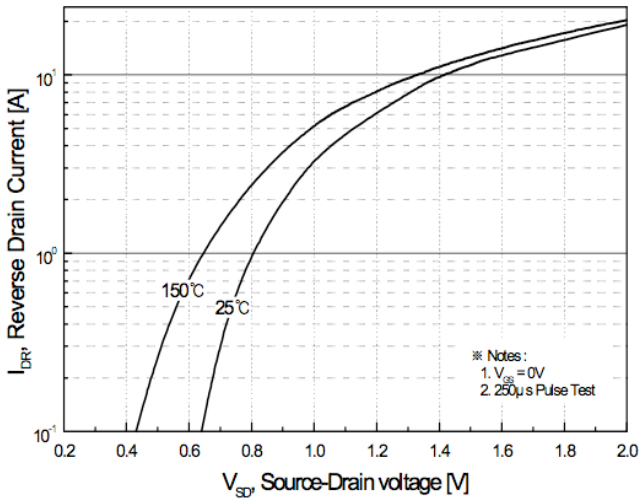


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

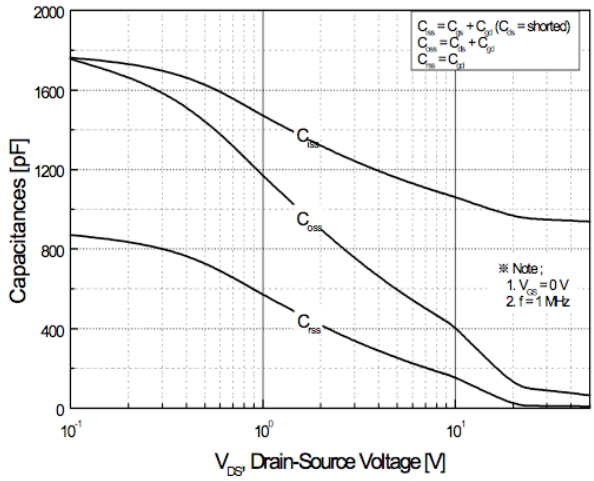


Figure 5. Capacitance Characteristics

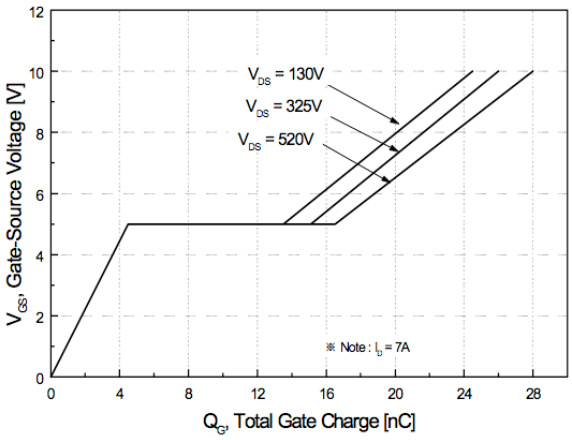


Figure 6. Gate Charge Characteristics

- **Characteristic Curves**

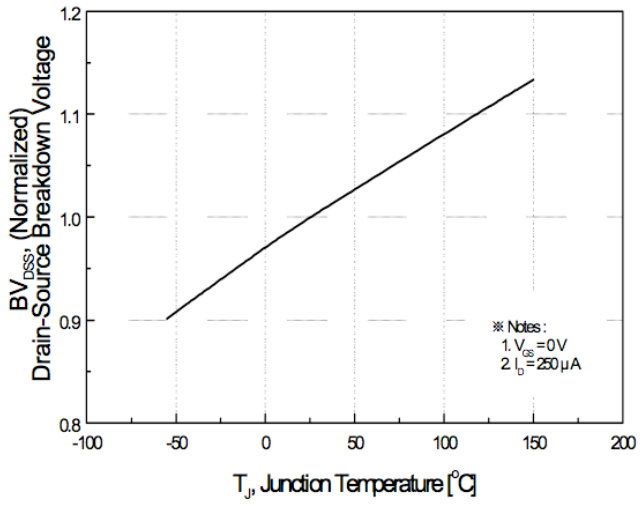


Figure 7. Breakdown Voltage Variation vs. Temperature

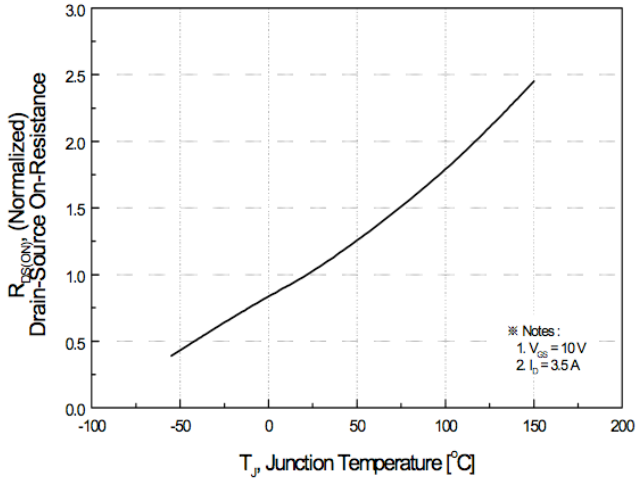


Figure 8. On-Resistance Variation vs. Temperature

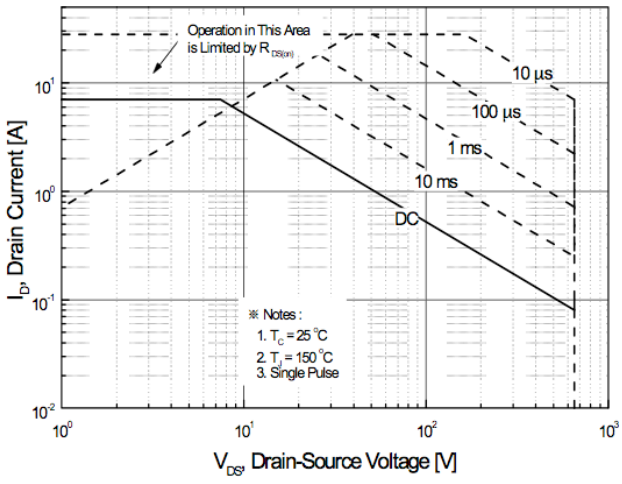


Figure 9. Maximum Safe Operating Area

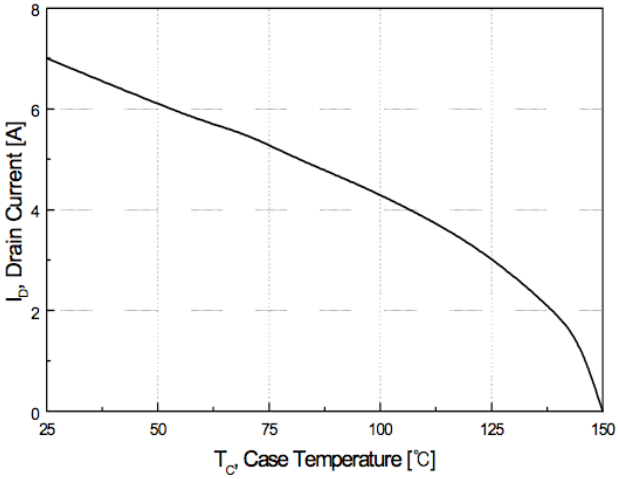


Figure 10. Maximum Drain Current vs. Case Temperature

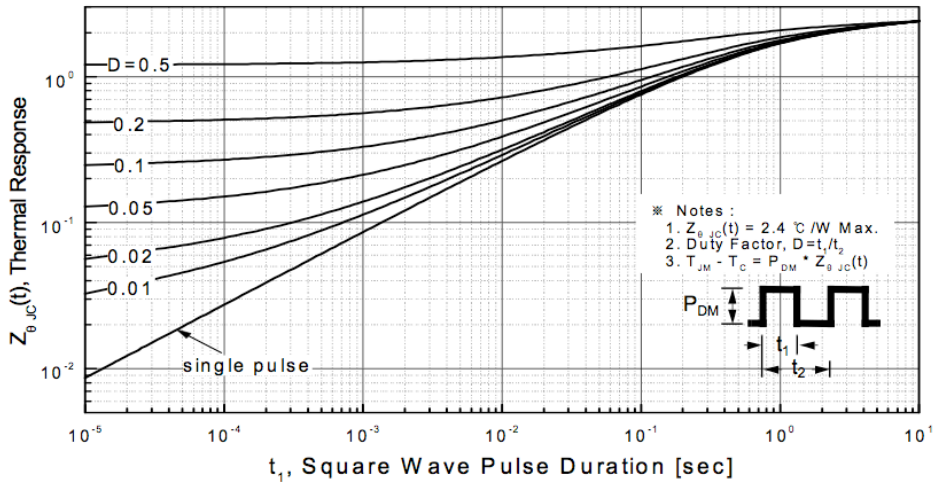


Figure 11. Transient Thermal Response Curve

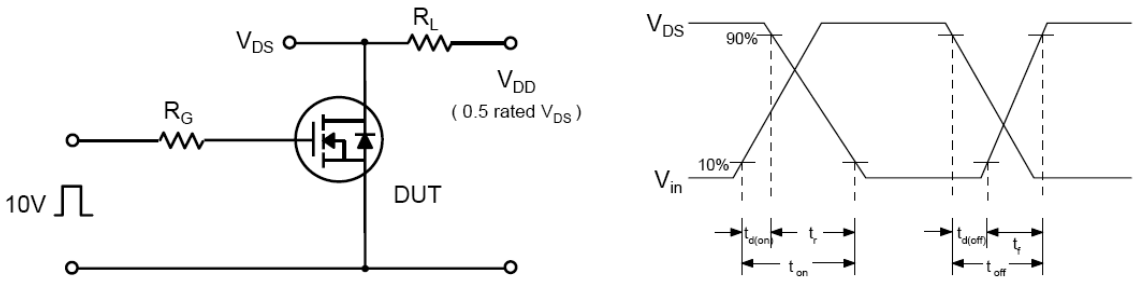


Fig 12. Resistive Switching Test Circuit & Waveforms

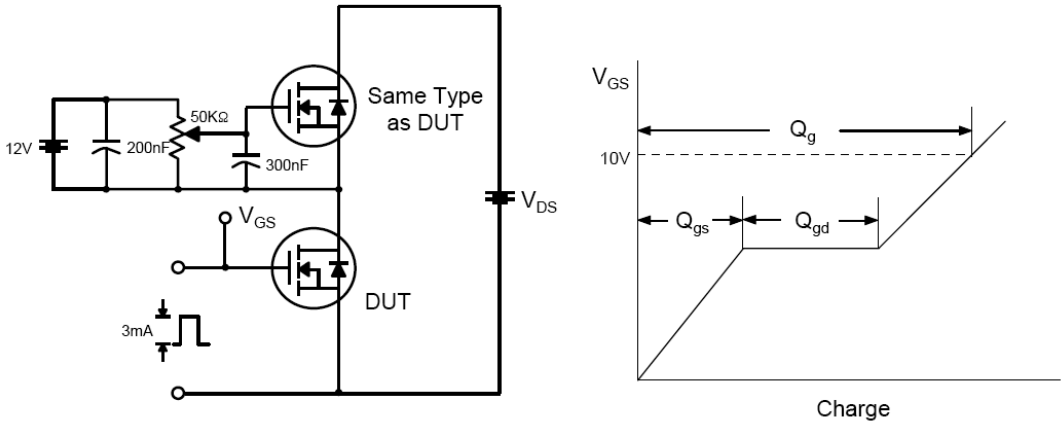


Fig 13. Gate Charge Test Circuit & Waveform

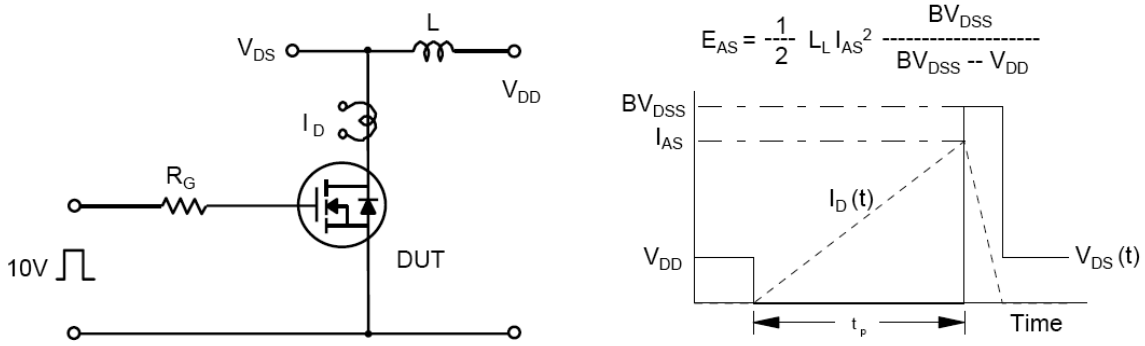


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

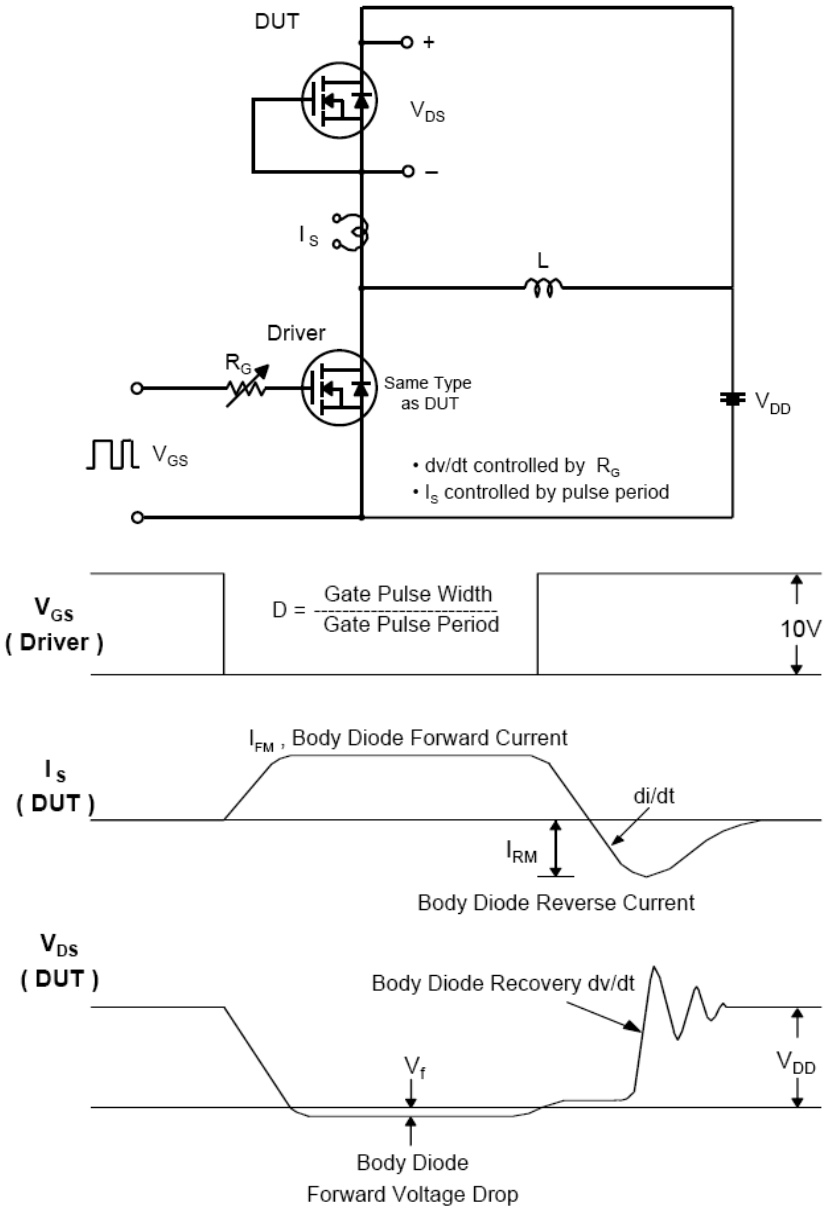
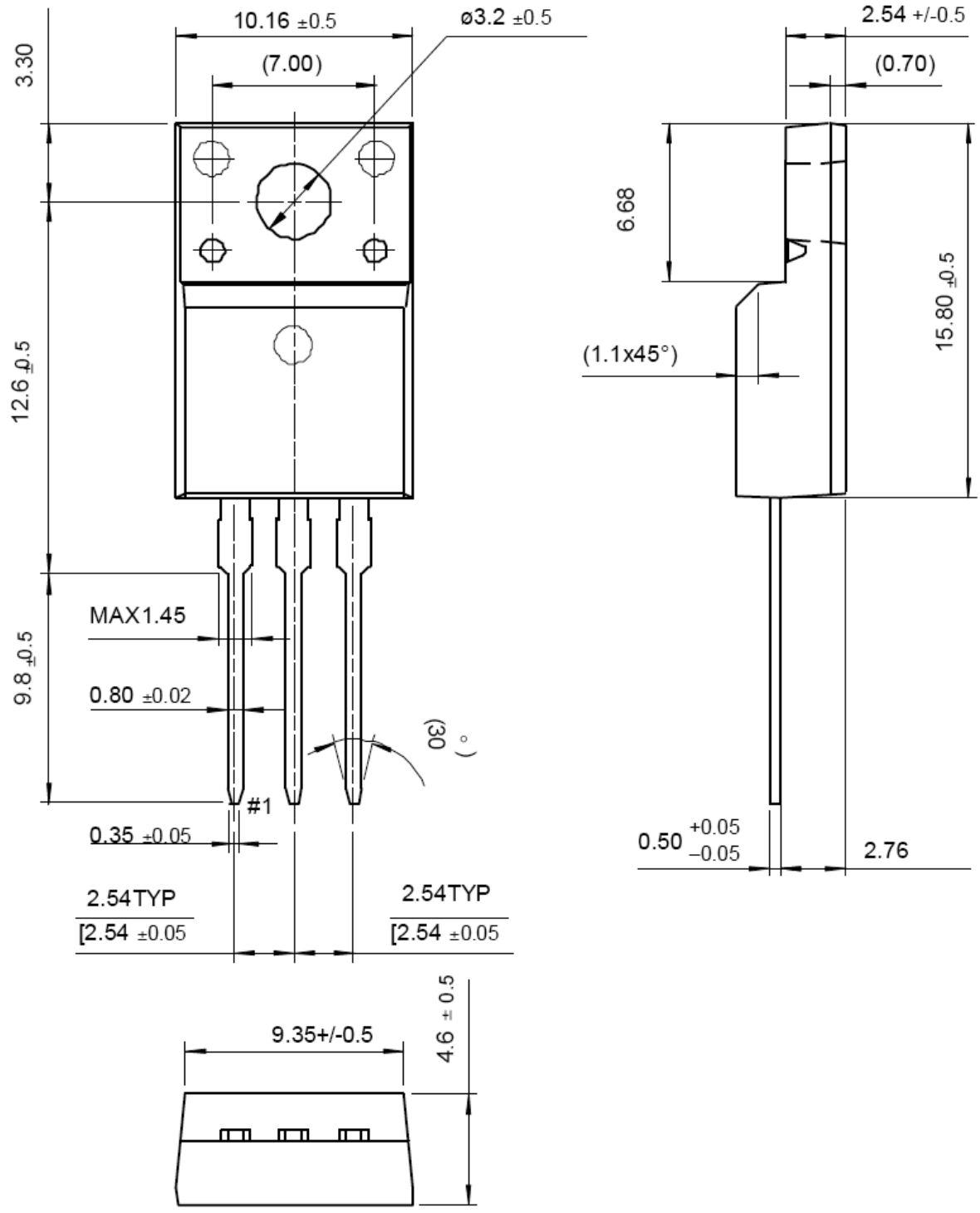


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

MSF7N65 650V N-Channel MOSFET

Package Dimensions

Dimensions in Millimeters



MSF7N65 650V N-Channel MOSFET

Legal Disclaimer Notice

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Bruckewell Technology Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Bruckewell”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Bruckewell makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Bruckewell disclaims

(i) Any and all liability arising out of the application or use of any product.

(ii) Any and all liability, including without limitation special, consequential or incidental damages.

(iii) Any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Bruckewell’s knowledge of typical requirements that are often placed on Bruckewell products in generic applications.

Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time.

Product specifications do not expand or otherwise modify Bruckewell’s terms and conditions of purchase, including but not limited to the warranty expressed therein.