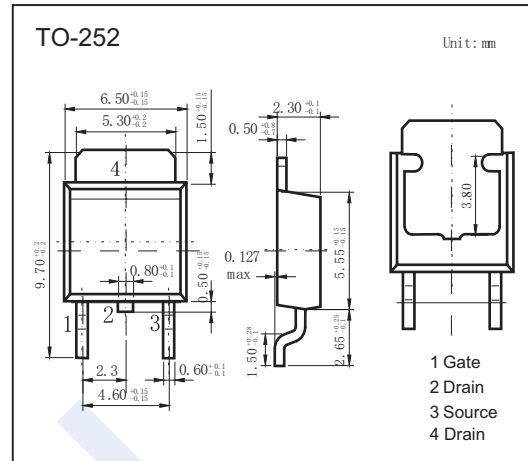
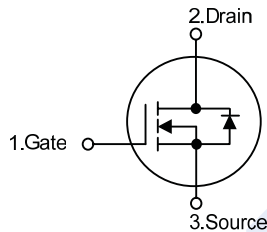


## N-Channel MOSFET

## NDT7N70

## ■ Features

- $V_{DS} (V) = 700V$
- $I_D = 7A$
- $R_{DS(ON)} < 1.2 \Omega$  @  $V_{GS} = 10V, I_D = 3.5A$
- Fast switching capability
- Avalanche energy specified
- Improved  $dv/dt$  capability, high ruggedness

■ Absolute Maximum Ratings ( $T_C = 25^\circ C$ , unless otherwise specified)

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DS}$	700	V	
Gate-Source Voltage	$V_{GS}$	$\pm 30$		
Continuous Drain Current	$I_D$	$T_C = 25^\circ C$	7.0	A
		$T_C = 100^\circ C$	4.7	
Pulsed Drain Current (Note 2)	$I_{DM}$	28		
Avalanche Energy, Single Pulsed (Note 3)	$E_{AS}$	40	mJ	
Avalanche Energy, Repetitive, Limited by $T_{JMAX}$	$E_{AR}$	14.2		
Peak Diode Recovery $dv/dt$ (Note 4)	$dv/dt$	4.5	V/ns	
Power Dissipation	$P_D$	60	W	
Thermal Resistance, Junction- to-Ambient	$R_{thJA}$	110	$^\circ C/W$	
Thermal Resistance, Junction- to-Case	$R_{thJC}$	2.08		
Junction Temperature	$T_J$	150	$^\circ C$	
Storage Temperature Range	$T_{stg}$	-55 to 150		

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by  $T_J$

3.  $L=20mH$ ,  $I_{AS}=2A$ ,  $V_{DD}=50V$ ,  $R_G=0 \Omega$ , Starting  $T_J=25^\circ C$

4.  $I_{SD} \leq 7.0A$ ,  $di/dt \leq 100A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ C$

## N-Channel MOSFET

## NDT7N70

■ Electrical Characteristics (T<sub>c</sub> = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	700			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =700V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =560V, T <sub>c</sub> =125°C			1	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±30V			±100	nA
Breakdown Voltage Temperature Coefficient	ΔB <sub>V<sub>DSS</sub></sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250mA Referenced to 25°C		0.67		V/°C
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A			1.2	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz		340		pF
Output Capacitance	C <sub>oss</sub>			120		
Reverse Transfer Capacitance	C <sub>rss</sub>			6.5		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =1.3A, I <sub>G</sub> =100μA, V <sub>GS</sub> =10V, (Note 1,2)		19		nC
Gate Source Charge	Q <sub>gs</sub>			5		
Gate Drain Charge	Q <sub>gd</sub>			5.2		
Turn-On DelayTime	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =0.5A (Note 1,2)		50		ns
Turn-On Rise Time	t <sub>r</sub>			70		
Turn-Off DelayTime	t <sub>d(off)</sub>			140		
Turn-Off Fall Time	t <sub>f</sub>			65		
Maximum Body-Diode Continuous Current	I <sub>S</sub>				7.0	A
Source Current Pulsed	I <sub>SM</sub>				28	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =7.0A, V <sub>GS</sub> =0V		0	1.4	V

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%  
2. Essentially independent of operating temperature

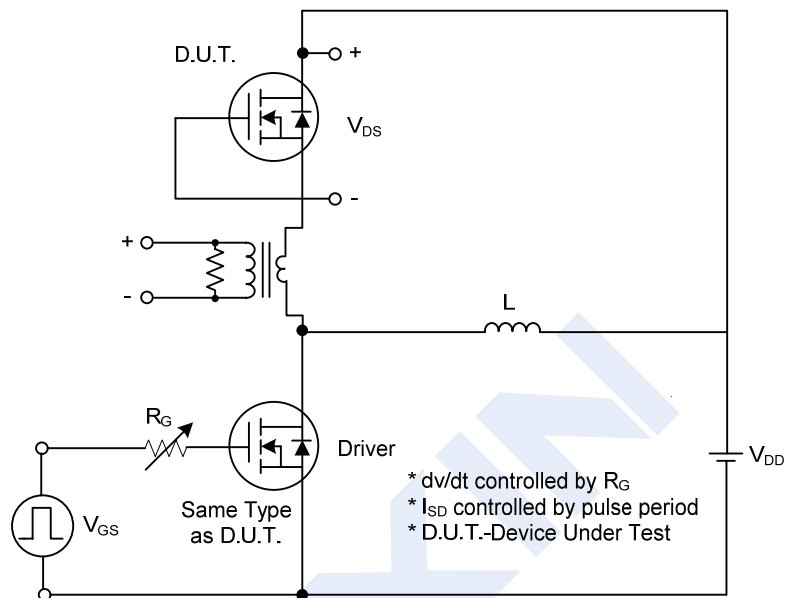
## ■ Marking

Marking	7N70 K****
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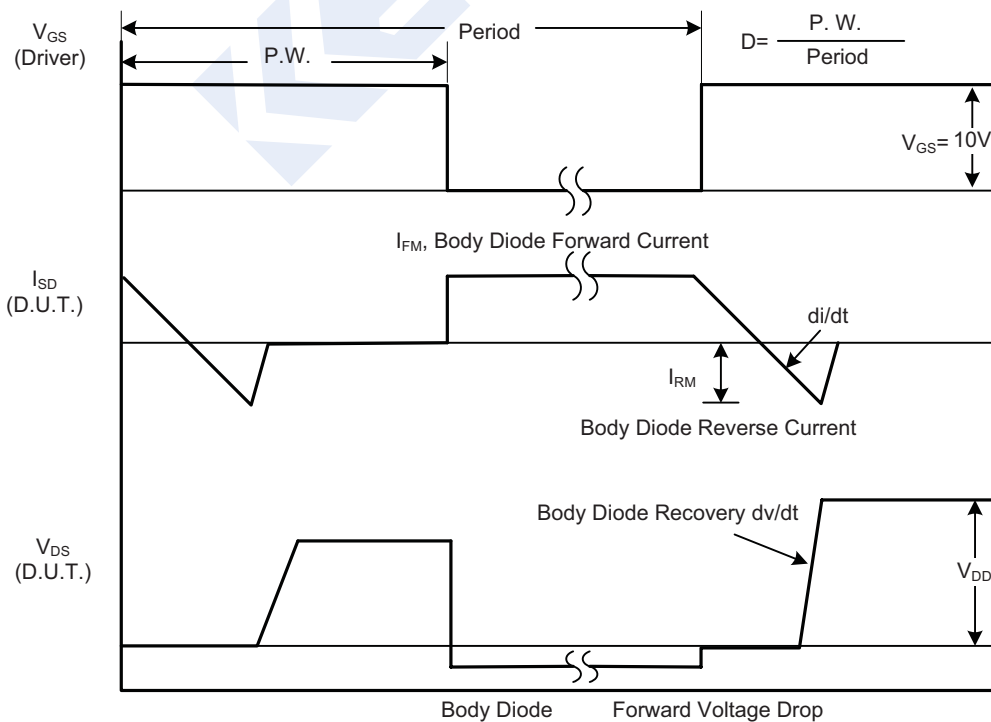
## N-Channel MOSFET

### NDT7N70

■ Test Circuits and Waveforms



Peak Diode Recovery  $dv/dt$  Test Circuit

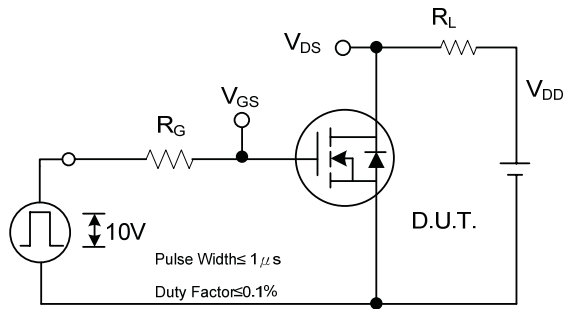


Peak Diode Recovery  $dv/dt$  Waveforms

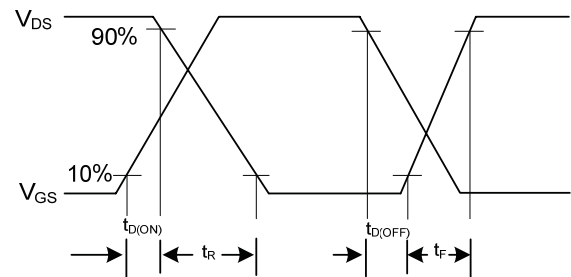
### N-Channel MOSFET

### NDT7N70

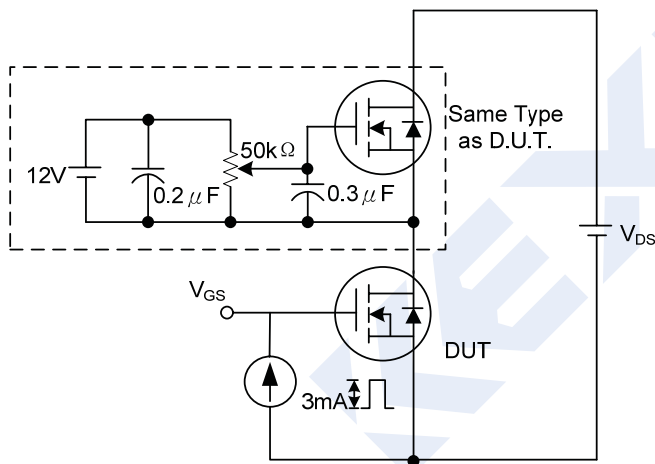
■ Test Circuits and Waveforms (Cont.)



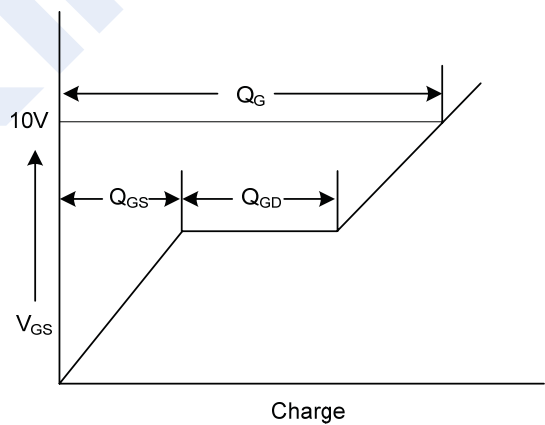
Switching Test Circuit



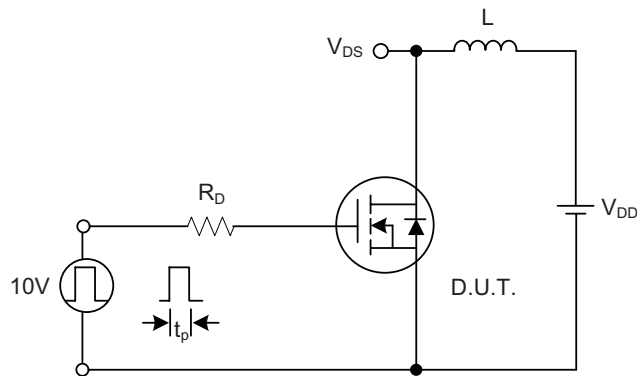
Switching Waveforms



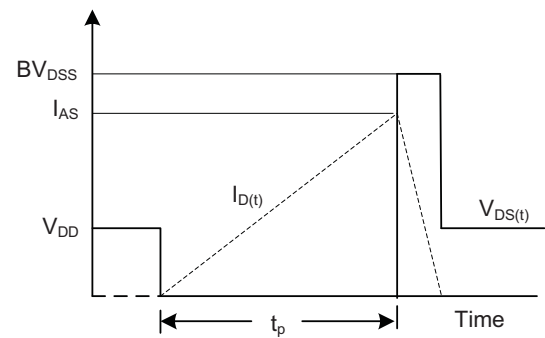
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms