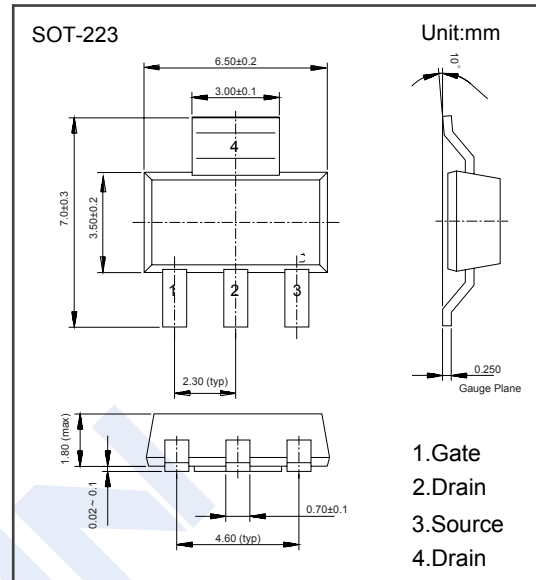
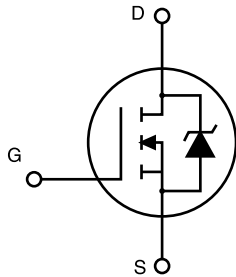


N-Channel MOSFET

NDT4N20L

■ Features

- $V_{DS} (V) = 200V$
- $I_D = 1 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 1.5 \Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 1.55 \Omega (V_{GS} = 5V)$
- Low gate charge



■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_c=25^\circ C$	1
		$T_c=70^\circ C$	0.63
Pulsed Drain Current	I_{DM}	4	A
Avalanche Current, Repetitive Or Not Repetitive	I_{AR}	1	A
Power Dissipation	P_D	3.3	W
Single Pulse Avalanche Energy (Note.1)	E_{AS}	90	mJ
Peak Diode Recovery Voltage Slope (Note.2)	dv/dt	20	V/ns
Thermal Resistance.Junction- to-Ambient (Note.3)	R_{thJA}	62.5	$^\circ C/W$
Thermal Resistance.Junction- to-Case (Note.4)	R_{thJC}	38	
Junction Temperature	T_J	150	$^\circ C$
Storage Temperature Range	T_{stg}	-55 to 150	

Note.1: Starting $T_J = 25^\circ C$, $I_D = I_{AR}$, $V_{DD} = 50 V$.

Note.2: $I_{sd} \leq 1 A$, $di/dt \leq 200 A/\mu s$, $V_{DD} \leq 80\% V_{(BR)DSS}$.

Note.3: When mounted on 1 inch² FR-4 board, 2 oz. Cu, ($t > 10$ sec).

Note.4: When mounted on 1 inch² FR-4 board, 2 oz. Cu, ($t < 10$ sec).

N-Channel MOSFET

NDT4N20L

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =250 μA, V _{GS} =0V	200			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =Max rating, V _{GS} =0V			1	μA
		V _{DS} =Max rating, V _{GS} =0V, T _J =125°C			50	
Gate-Body Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250 μA	1		3	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =0.5A			1.5	Ω
		V _{GS} =5V, I _D =0.5A			1.55	
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz		150		pF
Output Capacitance	C _{oss}			30		
Reverse Transfer Capacitance	C _{rss}			4		
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		5.5		Ω
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =160V, I _D =1A		0.9		nC
Gate Source Charge	Q _{gs}			2.6		
Gate Drain Charge	Q _{gd}			6.9		
Turn-On DelayTime	t _{d(on)}	V _{GS} =10V, V _{DS} =100V, I _D =0.5A, R _G =4.7 Ω		3.6		ns
Turn-On Rise Time	t _r			2		
Turn-Off DelayTime	t _{d(off)}			10.4		
Turn-Off Fall Time	t _f			15.4		
Reverse Recovery Time	t _{rr}			51		
Reverse Recovery Charge	Q _{rr}	I _F = 1A, di/dt= 100A/μs, V _{DD} =60V		90		nC
Reverse Recovery Current	I _{RRM}	I _F = 1A, di/dt= 100A/us, V _{DD} =60V, T _J =150°C		3.5		A
Reverse Recovery Time	t _{rr}			56		ns
Reverse Recovery Charge	Q _{rr}			105		nC
Reverse Recovery Current	I _{RRM}			3.7		A
Source-Drain Current	I _S	(Note.1)			1	A
Source-Drain Current-Plused	I _{SM}	(Note.1)			4	A
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V (Note.1)			1.6	V

Note.1: Pulsed: pulse duration = 300 μs, duty cycle 1.5%

■ Marking

Marking	4N20L
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N-Channel MOSFET NDT4N20L

■ Typical Characteristics

Figure 1. Safe operating area

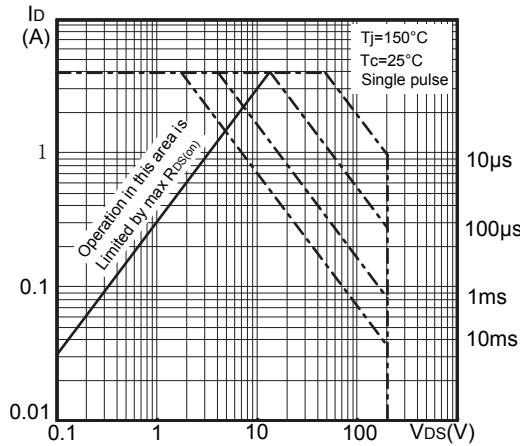


Figure 2. Thermal impedance

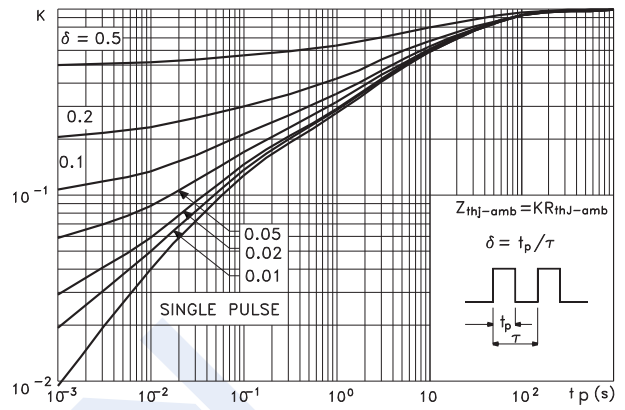


Figure 3. Output characteristics

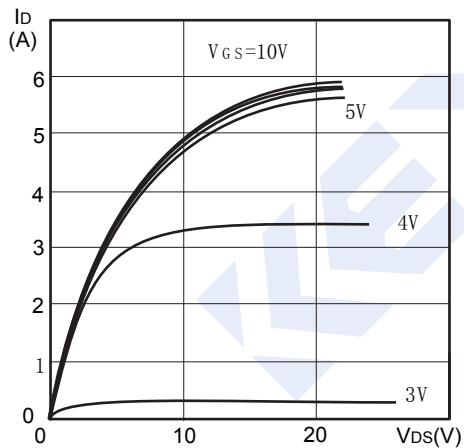


Figure 4. Transfer characteristics

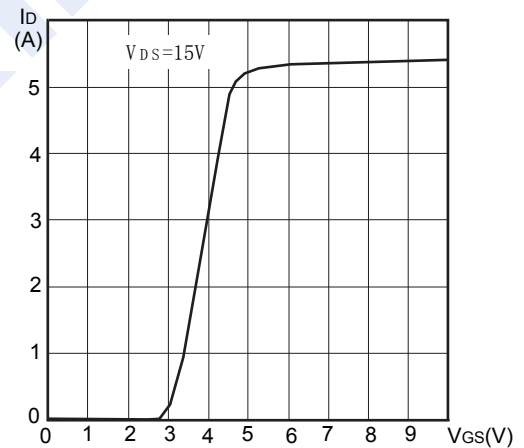


Figure 5. Normalized $B_{V_{DS}}$ vs temperature

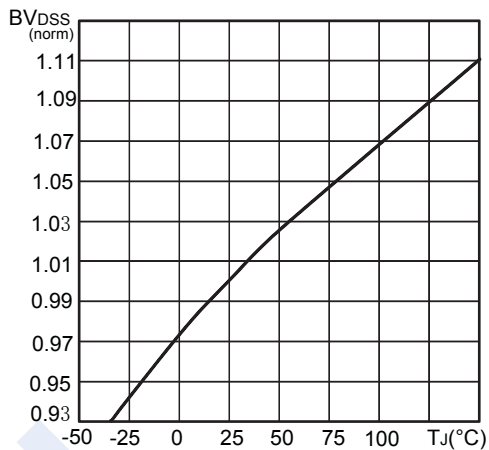
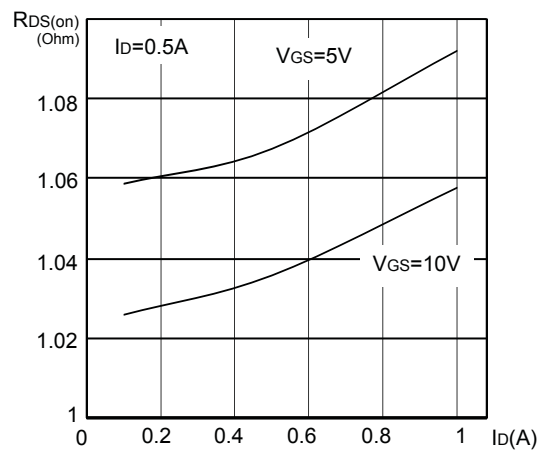


Figure 6. Static drain-source on resistance



N-Channel MOSFET NDT4N20L

■ Typical Characteristics

Figure 7. Gate charge vs gate-source voltage Figure 8. Capacitance variations

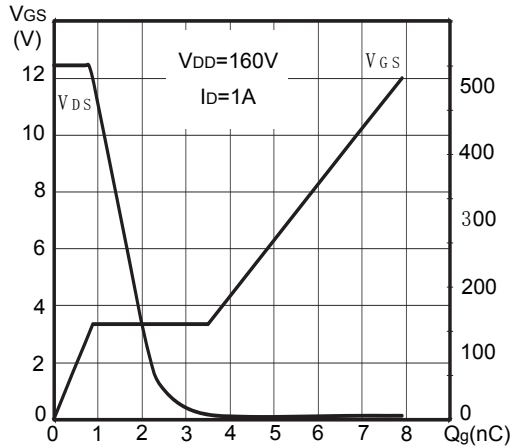


Figure 9. Normalized gate threshold voltage vs temperature

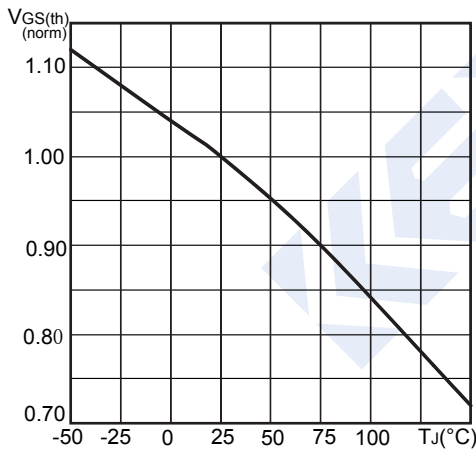


Figure 11. Switching times test circuit for resistive load

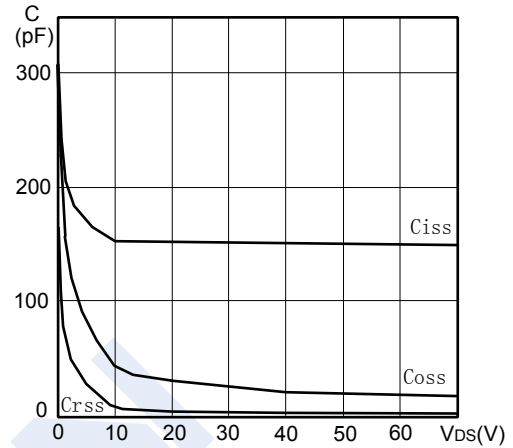
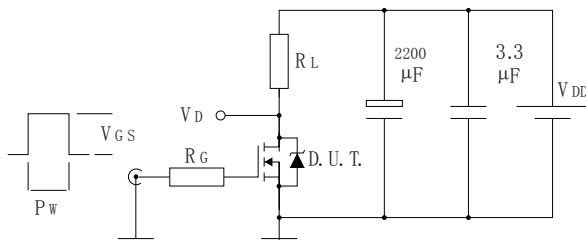


Figure 10. Normalized on resistance vs temperature

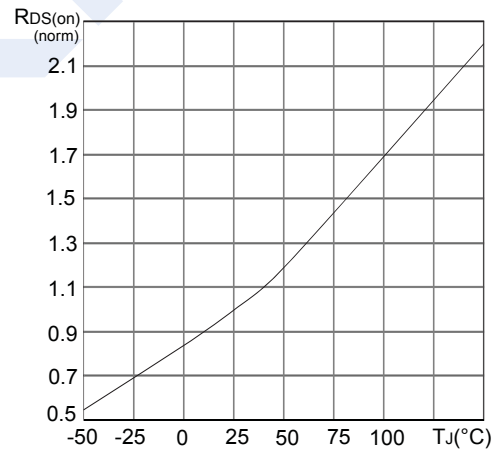
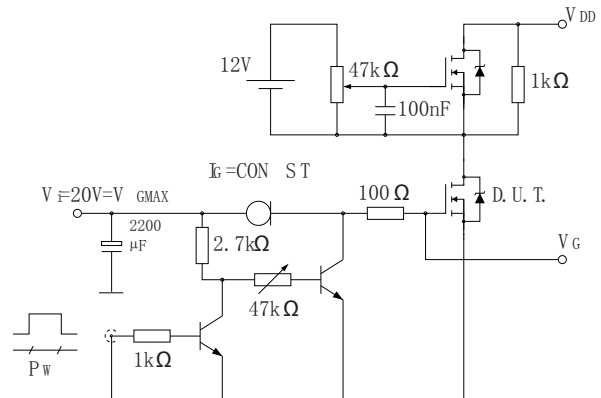


Figure 12. Gate charge test circuit



N-Channel MOSFET NDT4N20L

■ Typical Characteristics

Figure 13. Test circuit for inductive load switching and diode recovery times

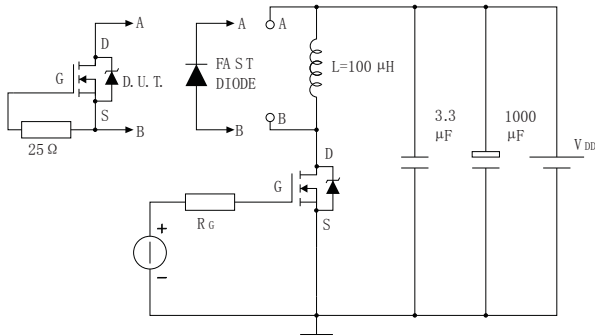


Figure 14. Unclamped inductive load test circuit

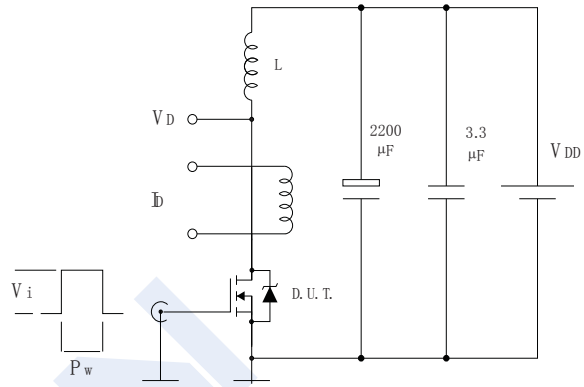


Figure 15. Unclamped inductive waveform

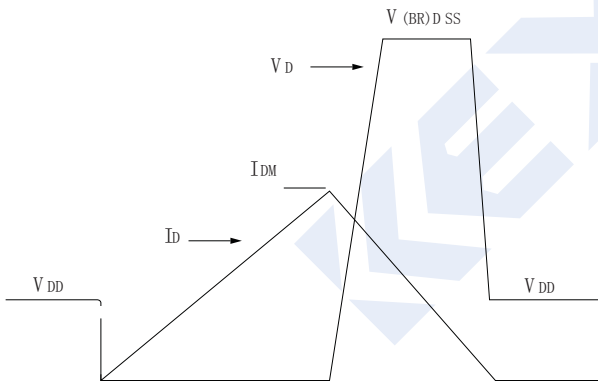


Figure 16. Switching time waveform

