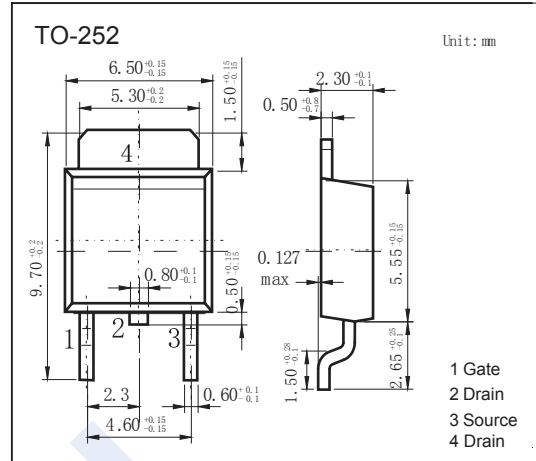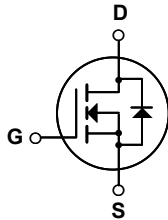# N-Channel MOSFET
NDT20N06

■ Features

● $V_{DS (V)}$ = 60V

● I_D = 16.8 A (V_{GS} = 10V)

● $R_{DS(ON)} <$ 63m Ω (V_{GS} = 10V)

● Low Gate Charge (Typ.11.5 nC)

● Low Crss (Typ. 25 pF)

TO-252   Unit: mm

1 Gate
2 Drain
3 Source
4 Drain

■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	$\pm$25	
Continuous Drain Current	Tc=25℃	I_D	16.8	A
	Tc=70℃		10.6	
Pulsed Drain Current		I_{DM}	67.2	
Avalanche Current		I_{AR}	16.8	
Single Pulsed Avalanche Energy	(Note.1)	E_{AS}	155	mJ
Repetitive Avalanche Energy		E_{AR}	3.8	
Peak Diode Recovery dv/dt	(Note.2)	dv/dt	7	V/ns
Power Dissipation	Ta=25℃	P_D	2.5	W
	Tc=25℃		38	
Derate above 25°C			0.3	W/℃
Thermal Resistance.Junction- to-Ambient		R_{thJA}	50	℃/W
Thermal Resistance, Junction-to-Ambient, Max.			110	
Thermal Resistance.Junction- to-Case		R_{thJC}	3.28	
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	℃
Junction Temperature		T_J	150	
Storage Temperature Range		T_{stg}	-55 to 150	

Note.1: L= 640uH, I_{AS}=16.8A, V_{DD}=25V, R_G=25Ω Starting T_J = 25°C

Note.2: $I_{SD} \leqslant$20A, di/dt$\leqslant$300A/us, $V_{DD} \leqslant BV_{DSS}$, Starting T_J = 25°C

N-Channel MOSFET
NDT20N06

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250uA, V_{GS}=0V	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	uA
		V_{DS}=48V, V_{GS}=0V, T_J=125℃			10	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±25V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	2		4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8.4A			63	mΩ
Forward Transconductance	g_{FS}	V_{DS}=25V, I_D=8.4A		10		S
Input Capacitance	C_{iss}				590	
Output Capacitance	C_{oss}	V_{GS}=0V, V_{DS}=25V, f=1MHz			220	pF
Reverse Transfer Capacitance	C_{rss}				35	
Total Gate Charge	Q_g				15	
Gate Source Charge	Q_{gs}	V_{GS}=10V, V_{DS}=48V, I_D=20A		3		nC
Gate Drain Charge	Q_{gd}			4.5		
Turn-On DelayTime	$t_{d(on)}$				20	
Turn-On Rise Time	t_r				100	
Turn-Off DelayTime	$t_{d(off)}$	V_{DS}=30V, I_D=10A, R_G=25Ω			50	ns
Turn-Off Fall Time	t_f				60	
Body Diode Reverse Recovery Time	t_{rr}			43		
Body Diode Reverse Recovery Charge	Q_{rr}	I_F= 20A, dI/dt=100A/us, V_{GS}=0V		50		nC
Continuous Drain-Source Diode Forward Current	I_S				16.8	A
Pulsed Drain-Source Diode Forward Current	I_{SM}				67.2	
Diode Forward Voltage	V_{SD}	I_S=16.8A, V_{GS}=0V			1.5	V

N-Channel MOSFET
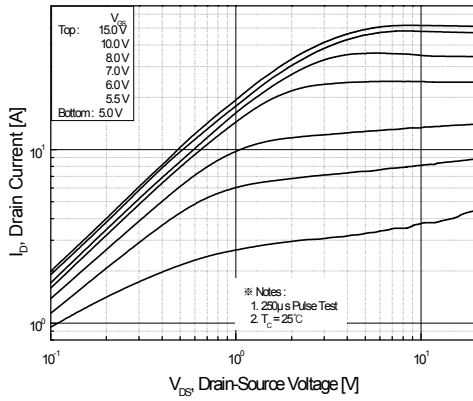## NDT20N06

■ Typical Characterisitics

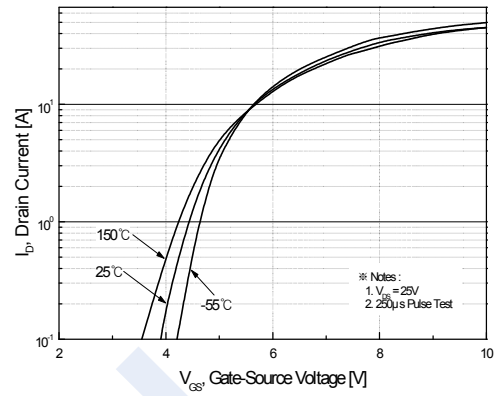**Figure 1. On-Region Characteristics**

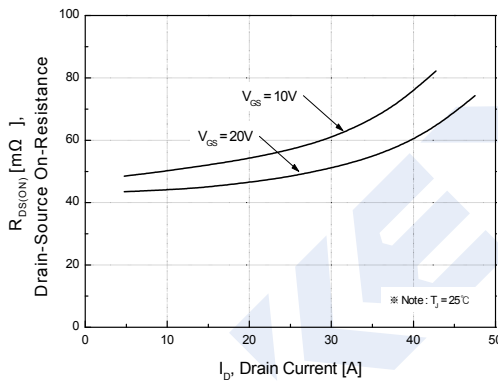**Figure 2. Transfer Characteristics**

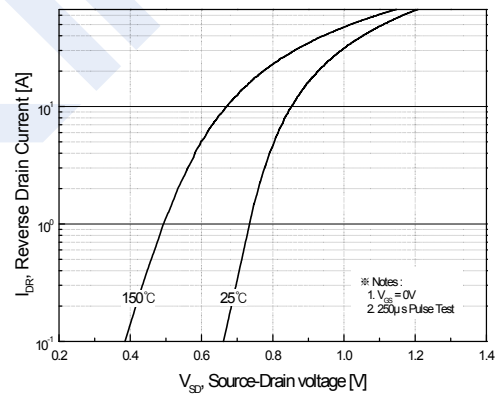**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**

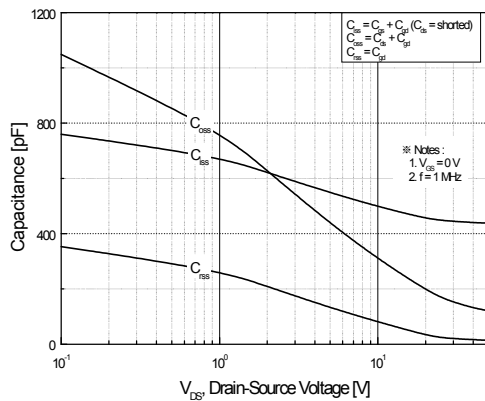**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**
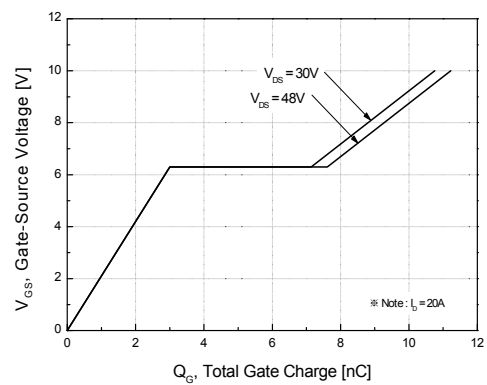

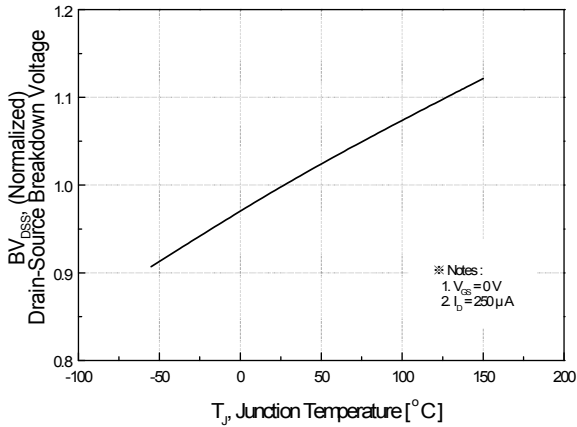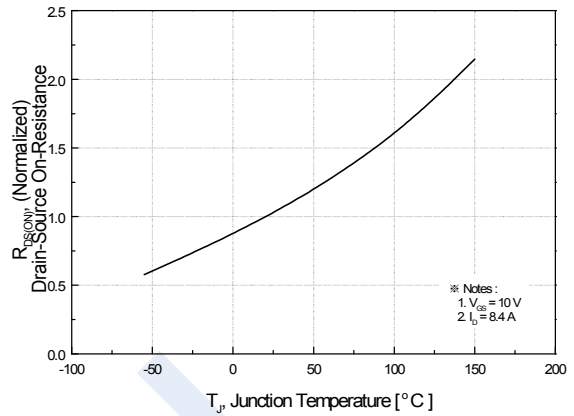**Figure 5. Capacitance Characteristics**

Figure 6. Gate Charge Characteristics
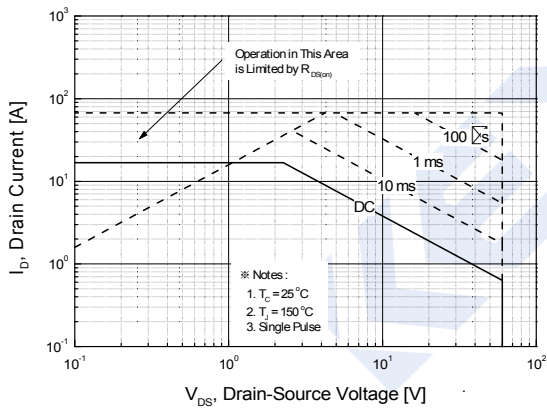
N-Channel MOSFET
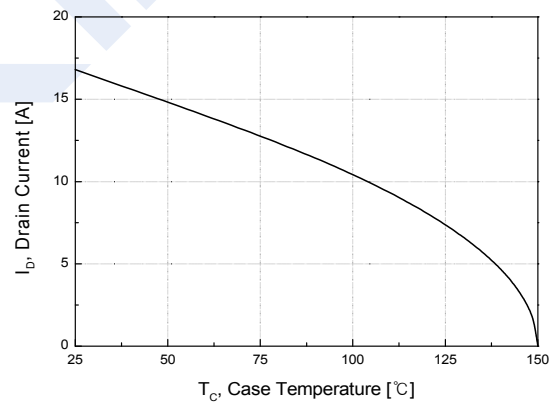## NDT20N06

■ Typical Characterisitics

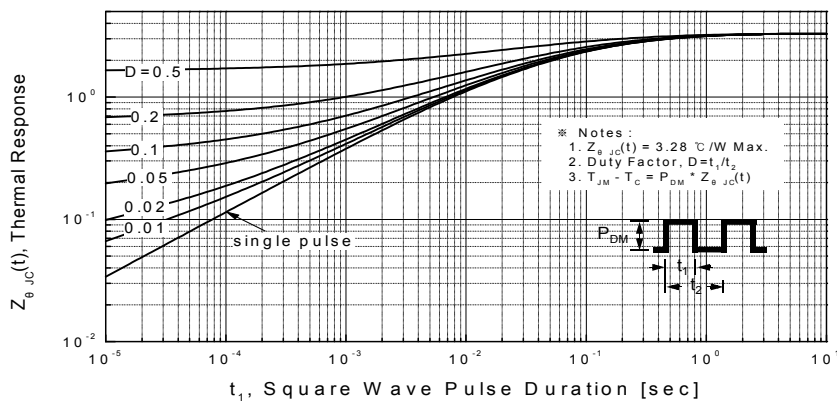**Figure 7. Breakdown Voltage Variation vs. Temperature**

Figure 8. On-Resistance Variation vs. Temperature

Figure 9. Maximum Safe Operating Area

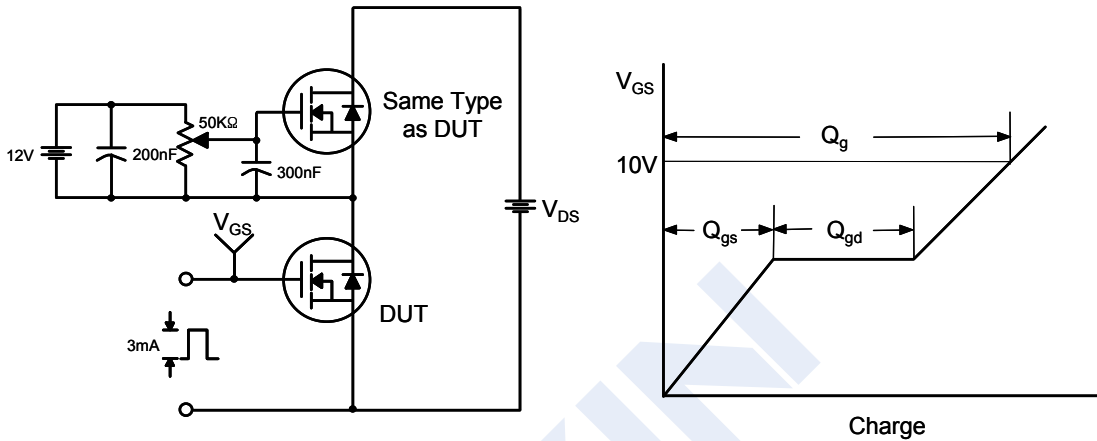**Figure 10. Maximum Drain Current vs. Case Temperature**

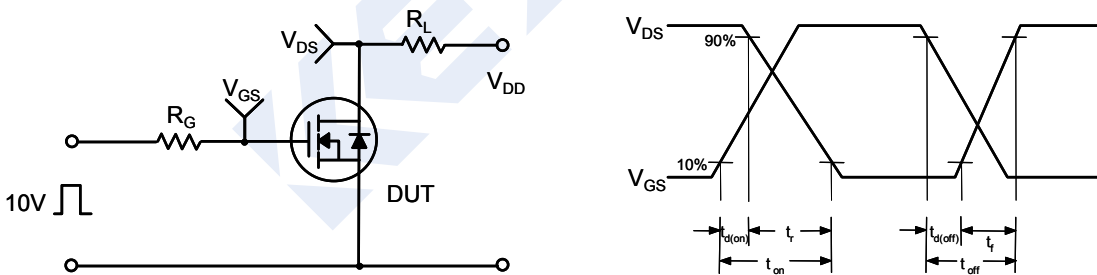**Figure 11. Transient Thermal Response Curve**

N-Channel MOSFET
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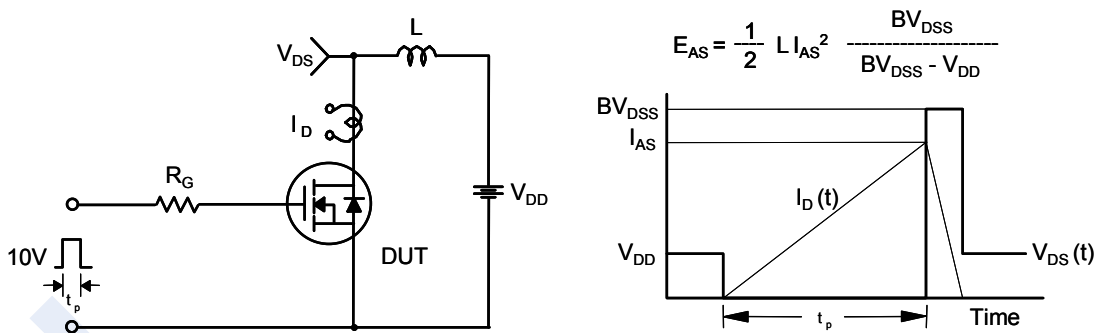■ Typical Characterisitics

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching Test Circuit & Waveforms

$$E_{AS} = \frac{1}{2} L I_{AS}^2 \ \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

N-Channel MOSFET
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■ Typical Characterisitics

Peak Diode Recovery dv/dt Test Circuit & Waveforms

$$D = \frac{\text{Gate Pulse Width}}{\text{Gate Pulse Period}}$$

V_{GS} (Driver)   10V

I_{SD} (DUT)

I_{FM} , Body Diode Forward Current

di/dt

I_{RM}

Body Diode Reverse Current

V_{DS} (DUT)

Body Diode Recovery dv/dt

V_{SD} V_{DD}

Body Diode
Forward Voltage Drop