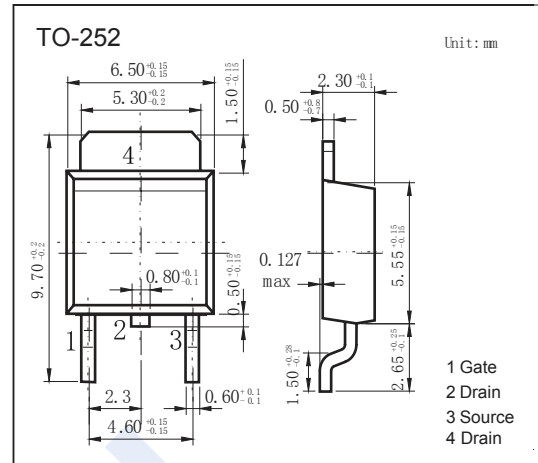
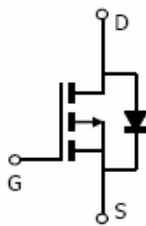


P-Channel MOSFET

NDT40P04

■ Features

- $V_{DS(V)} = -40V$
- $I_D = -40\text{ A}$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 14\text{ m}\Omega$ ($V_{GS} = -10V$)
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}



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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	-40	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current T _C =25°C	I _D	-40	A
		-25	
Pulsed Drain Current	I _{DM}	-50	
Power Dissipation	P _D	80	W
Derating factor		0.53	W/°C
Single Pulse Avalanche Energy (Note.1)	E _{AS}	544	mJ
Thermal Resistance.Junction- to-Case	R _{thJC}	1.88	°C/W
Junction Temperature	T _J	175	°C
Junction Storage Temperature Range	T _{stg}	-55 to 175	

Note.1:EAS condition: $T_j=25^{\circ}\text{C}$, $V_{DD}=-20\text{V}$, $V_G=-10\text{V}$, $L=1\text{mH}$, $R_g=25\Omega$, $I_{AS}=33\text{A}$.

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■ 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	-40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V			-1	μA
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	-1.5		-3	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-12A			14	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-12A	34			S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-20V, f=1MHz		2960		pF
Output Capacitance	C _{oss}			370		
Reverse Transfer Capacitance	C _{rss}			310		
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-20V, I _D =-12A		12		nC
Gate Source Charge	Q _{gs}			14		
Gate Drain Charge	Q _{gd}			15		
Turn-On DelayTime	t _{d(on)}	V _{DD} =-20V, I _D =-20A V _{GS} =-10V, R _G =3Ω		10		ns
Turn-On Rise Time	t _r			18		
Turn-Off DelayTime	t _{d(off)}			38		
Turn-Off Fall Time	t _f			24		
Body Diode Reverse Recovery Time	t _{rr}	I _F =-20A, dI/dt=100A/μs, T _J =25°C		40		nC
Body Diode Reverse Recovery Charge	Q _{rr}			42		
Maximum Body-Diode Continuous Current	I _S				-40	A
Diode Forward Voltage	V _{SD}	I _S =-20A, V _{GS} =0V			-1.2	V

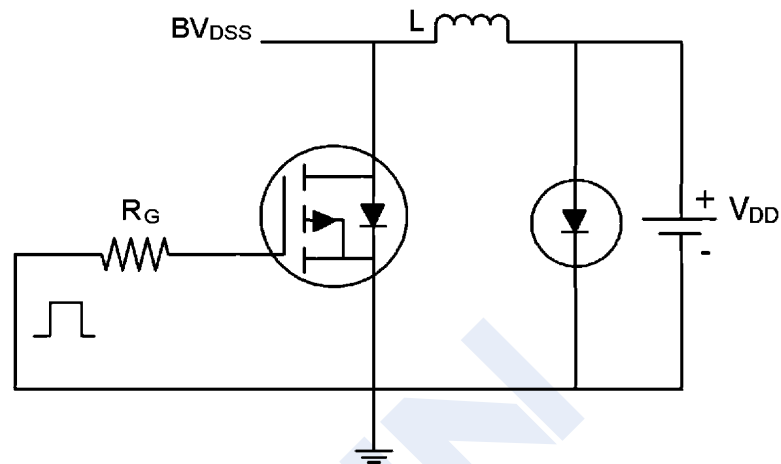
Note : Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

P-Channel MOSFET

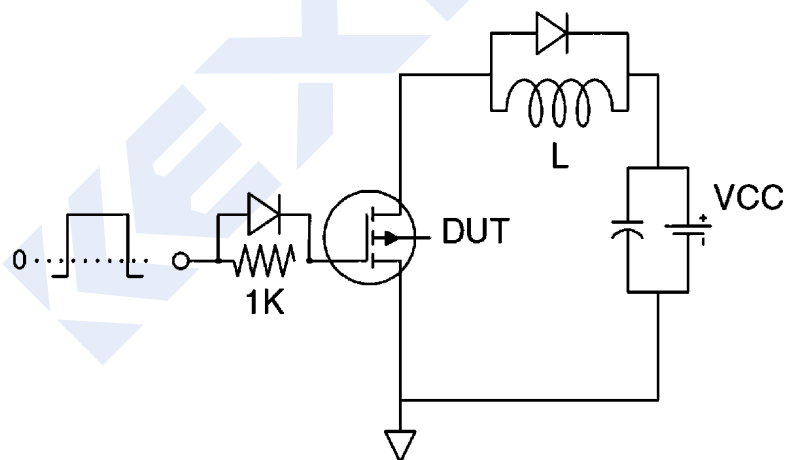
NDT40P04

■ Test Circuit

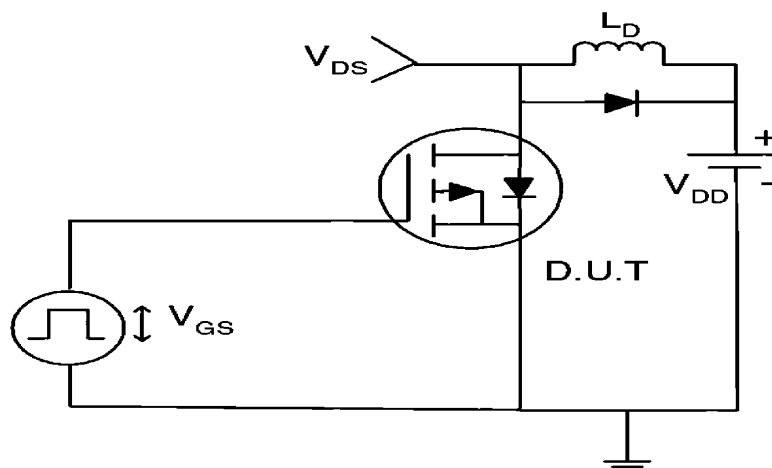
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



P-Channel MOSFET

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Typical Characteristics

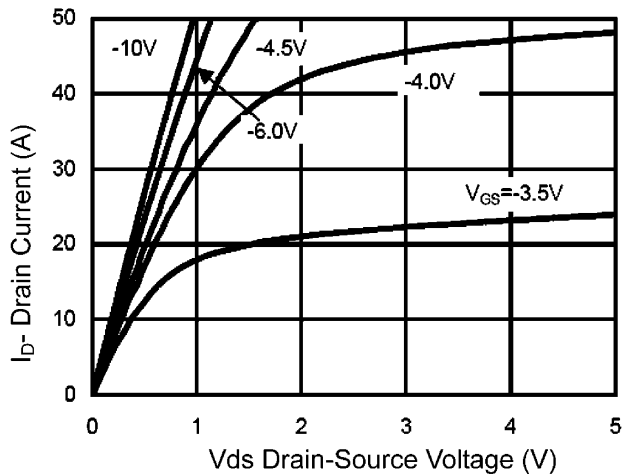


Figure 1 Output Characteristics

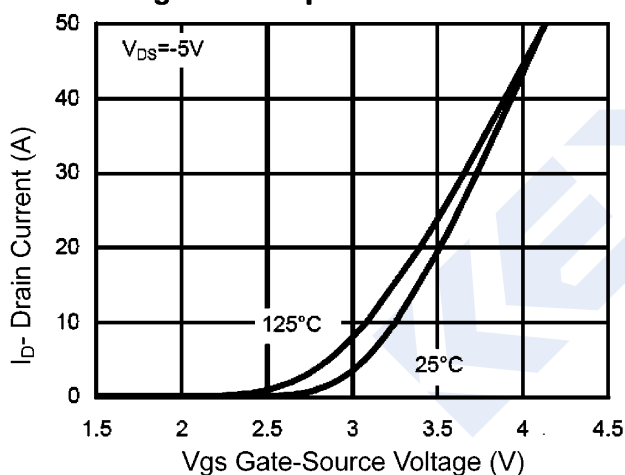


Figure 2 Transfer Characteristics

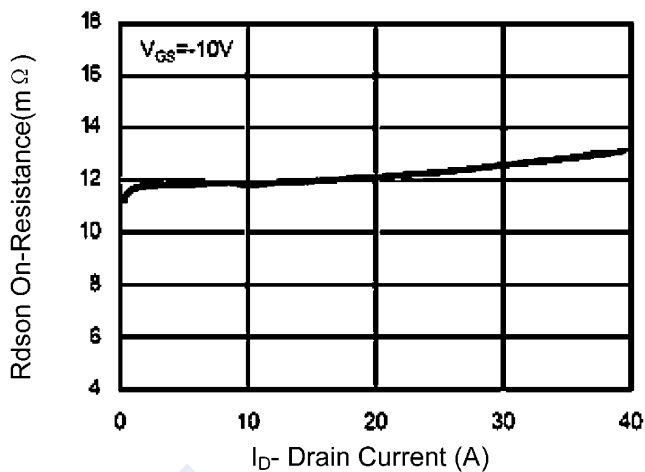


Figure 3 $R_{DS(on)}$ - Drain Current

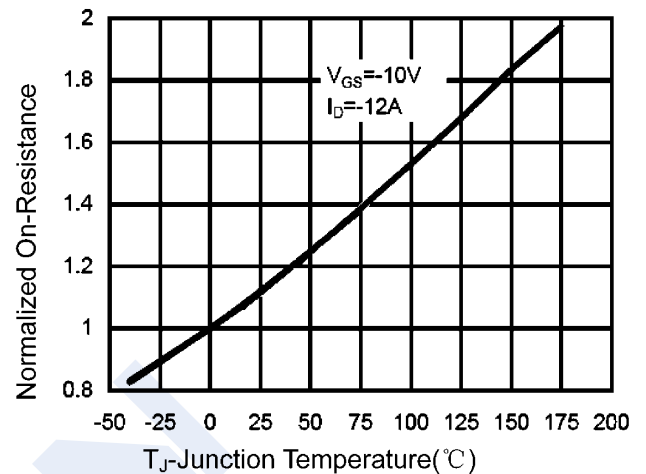


Figure 4 $R_{DS(on)}$ -Junction Temperature

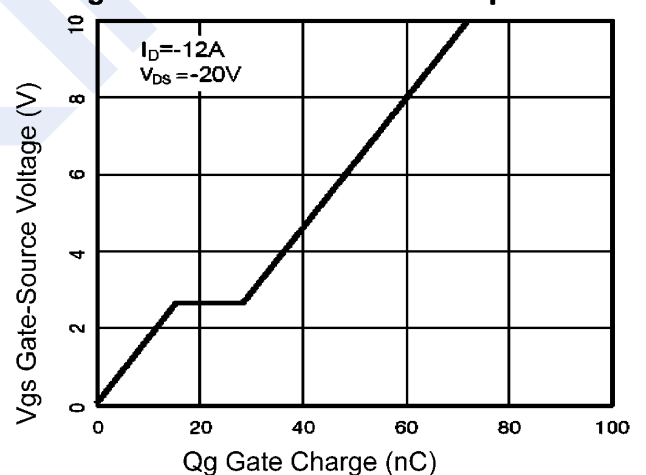


Figure 5 Gate Charge

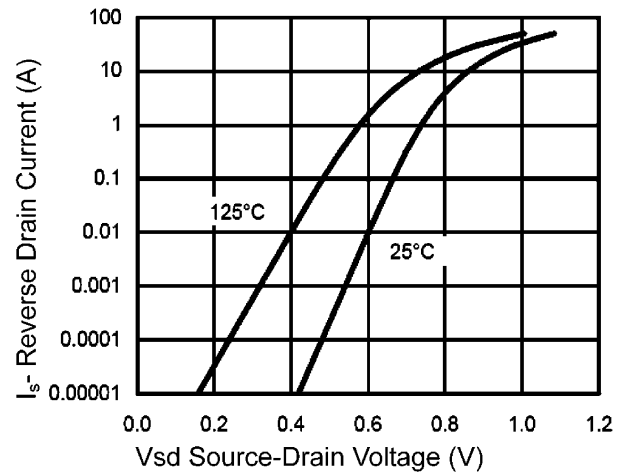


Figure 6 Source- Drain Diode Forward

P-Channel MOSFET

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■ Typical Characteristics

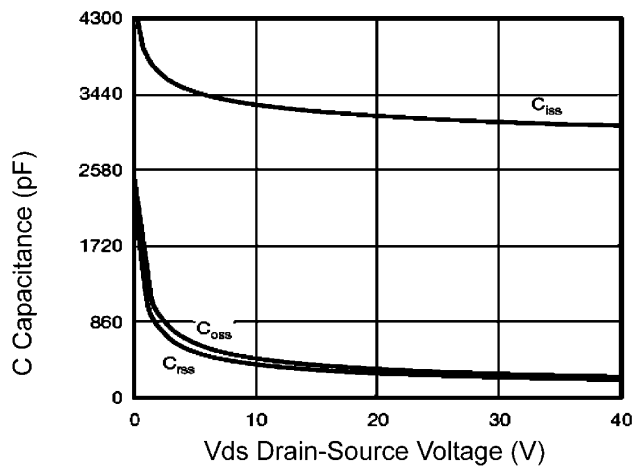


Figure 7 Capacitance vs Vds

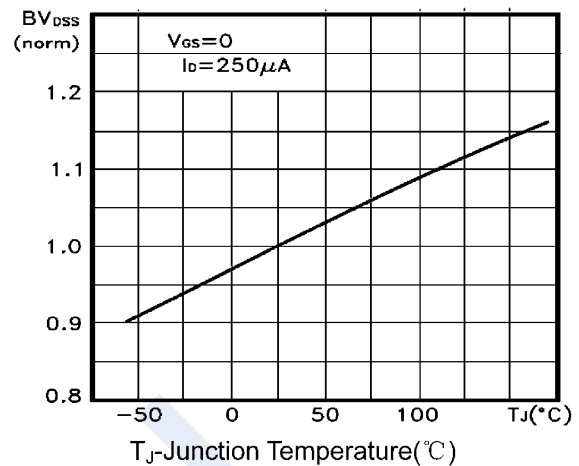


Figure 9 BV_{DSS} vs Junction Temperature

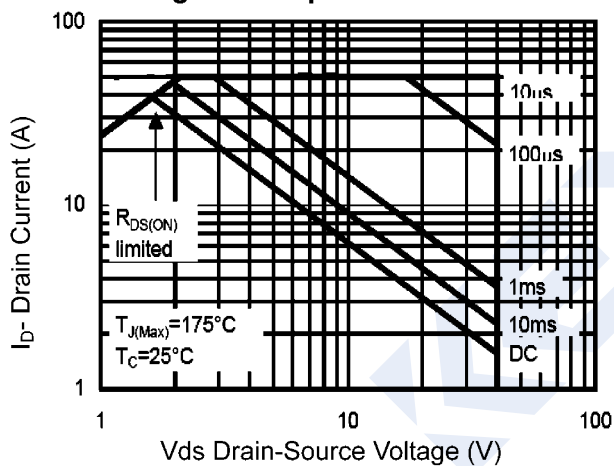


Figure 8 Safe Operation Area

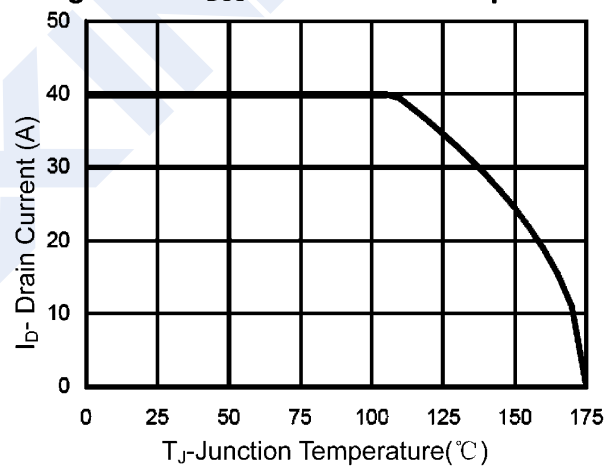


Figure 10 ID Current Derating vs Junction Temperature

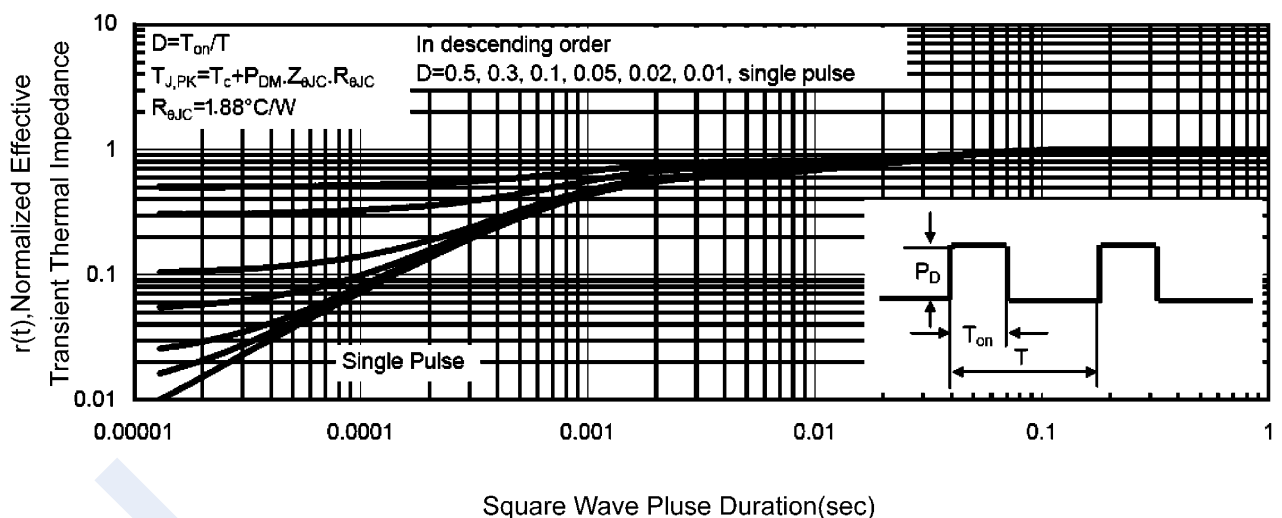


Figure 11 Normalized Maximum Transient Thermal Impedance