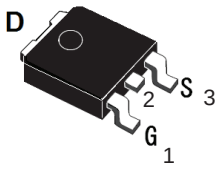
N-Channel Trench Power MOSFET

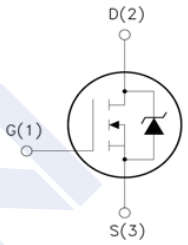
NDT40N06

■ Features

- $V_{DS\ (V)}$ = 60V
- I_D = 45A
- $R_{DS(ON)}$ < 15mΩ @ V_{GS} = 10V

TO-252





1. Gate (G)
2. Drain (D)
3. Source (S)

■ Absolute Maximum Ratings (T_A = 25℃, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±25	
Continuous Drain Current	T_C = 25℃	I_D	45	A
	T_C = 100℃		31	
Pulsed Drain Current (Note 1)		I_{DM}	180	
Avalanche Energy, Single Pulsed (Note 2)		E_{AS}	196	mJ
Power Dissipation (T_C = 25℃)		P_D	68	W
Thermal Resistance.Junction- to-Case		R_{thJC}	2.2	℃/W
Junction Temperature		T_J	175	℃
Storage Temperature Range		T_{stg}	-55 to 175	

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.E_{AS} condition:T_J=25℃,V_{DD}=30V,V_G=10V, R_G=25Ω

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■ Electrical Characteristics (T_A = 25℃, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V, Tc=25℃			1	μA
		V_{DS}=60V, V_{GS}=0V, Tc=100℃			5	
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	1.1		2.1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A			15	mΩ
		V_{GS}=4.5V, I_D=20A			19	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=15A	18			S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		1659		pF
Output Capacitance	C_{oss}			180		
Reverse Transfer Capacitance	C_{rss}			128		
Total Gate Charge	Q_g	V_{DS}=30V, I_D=15A, VGS=10V		50		nC
Gate Source Charge	Q_{gs}			12		
Gate Drain Charge	Q_{gd}			23		
Turn-On DelayTime	$t_{d(on)}$	V_{DS}=30V,R_L=2.5Ω V_{GS}=10V,R_G=3Ω		15		ns
Turn-On Rise Time	t_r			25		
Turn-Off DelayTime	$t_{d(off)}$			53		
Turn-Off Fall Time	t_f			23		
Maximum Body-Diode Continuous Current	I_S			45		A
Source Current Pulsed	I_{SM}			180		
Diode Forward Voltage (Note 1)	V_{SD}	T_J=25℃,I_{SD}=1A,V_{GS}=0V			0.99	V
Reverse Recovery Time (Note 1)	trr	T_J=25℃,I_F=15A di/dt=100A/μs		24		nS
Reverse Recovery Charge (Note 1)	Qrr			30		nC
Forward Turn-on Time	ton	Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D)				

Notes 1.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, Starting T_J=25℃

■ Marking

Marking	40N06 KC***

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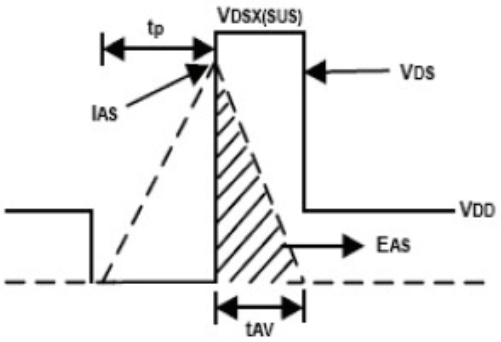
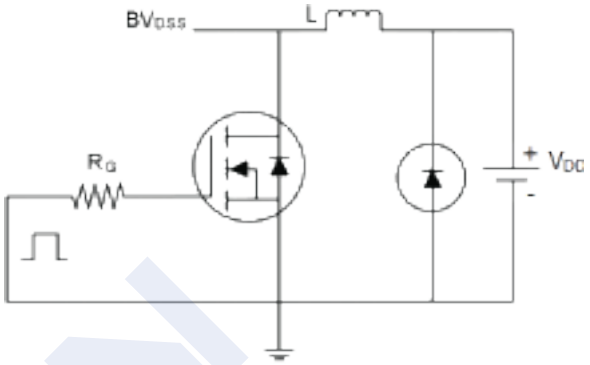
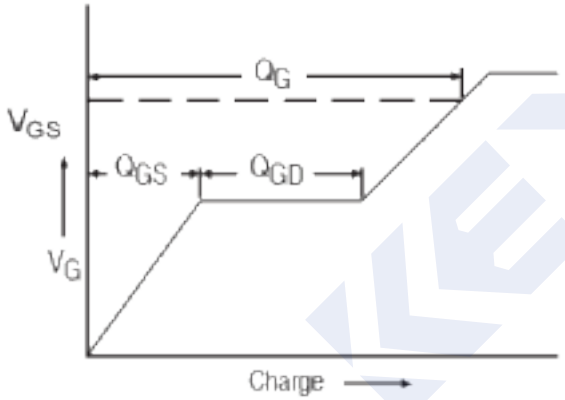
■ Test Circuit

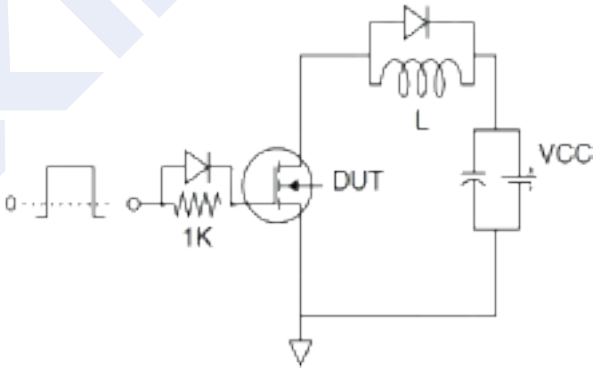
1） E_{AS} Test Circuits



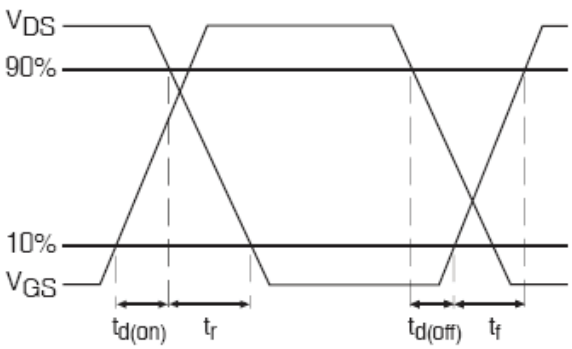


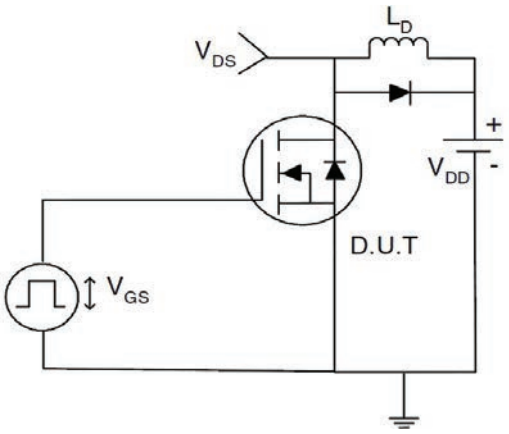
2）Gate Charge Test Circuit:





3）Switch Time Test Circuit:





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■ Typical Electrical And Thermal Characteristics (Curves)

Figure1. Output Characteristics

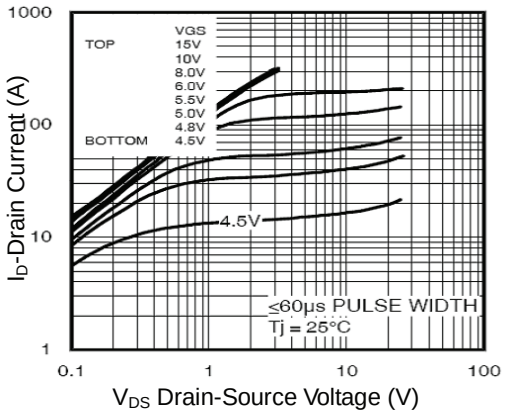

Figure2. Transfer Characteristics

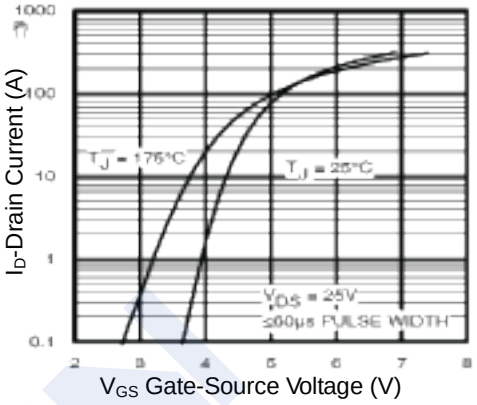

Figure3. BVDSS vs Junction Temperature

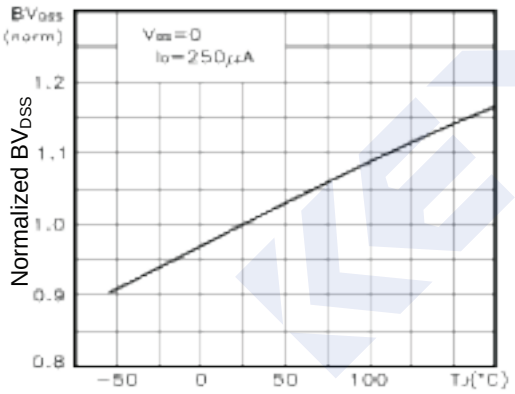

Figure4. ID vs Junction Temperature

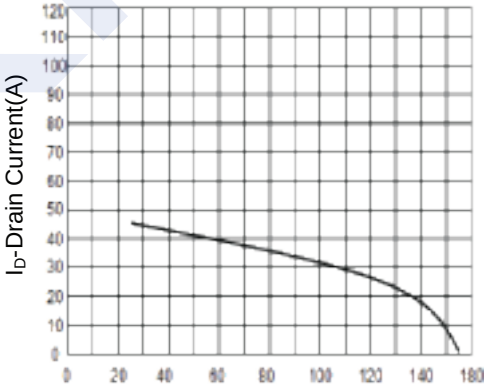

Figure5. VGS(th) vs Junction Temperature

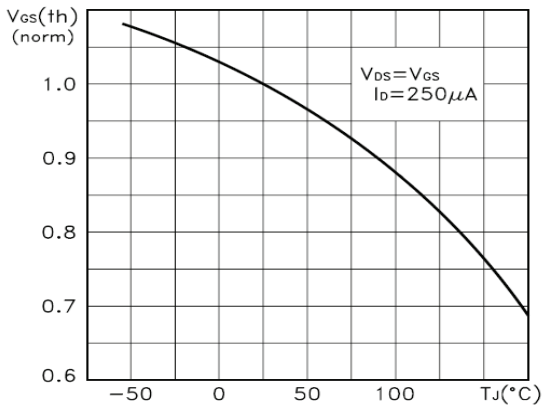

Figure6. Rdson Vs Junction Temperature

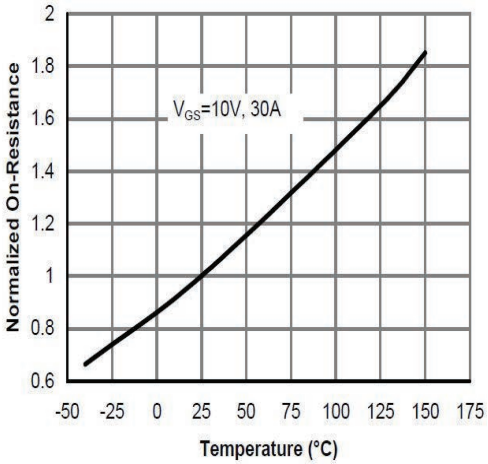

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Figure7. Gate Charge

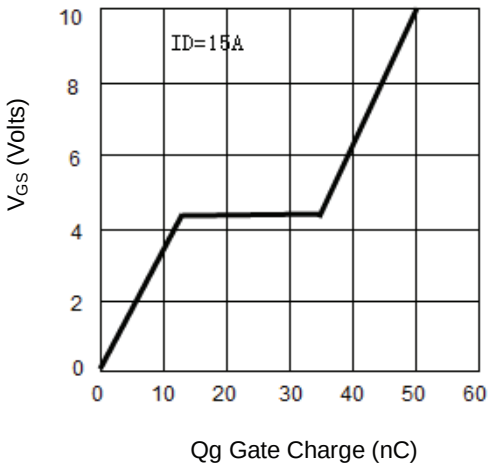


Figure8. Capacitance vs Vds

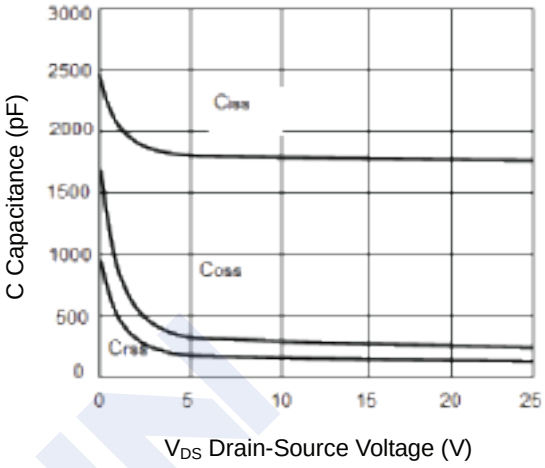


Figure9. Source- Drain Diode Forward

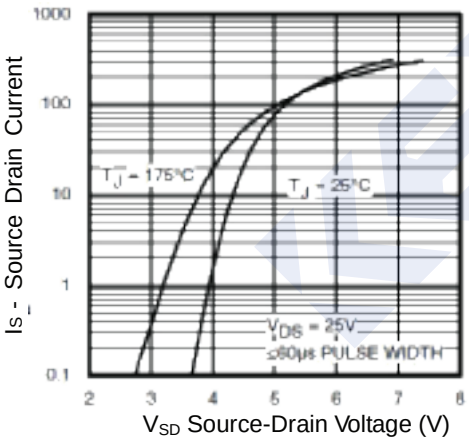


Figure10. Safe Operation Area

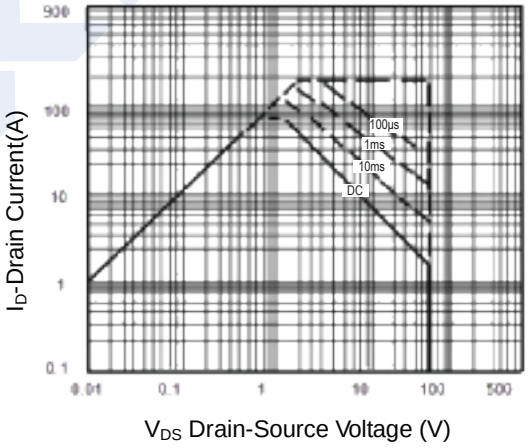
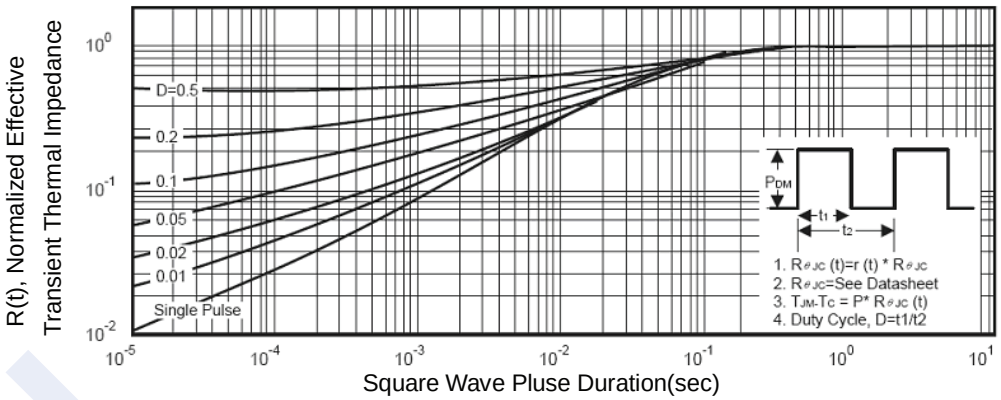


Figure11. Normalized Maximum Transient Thermal Impedance



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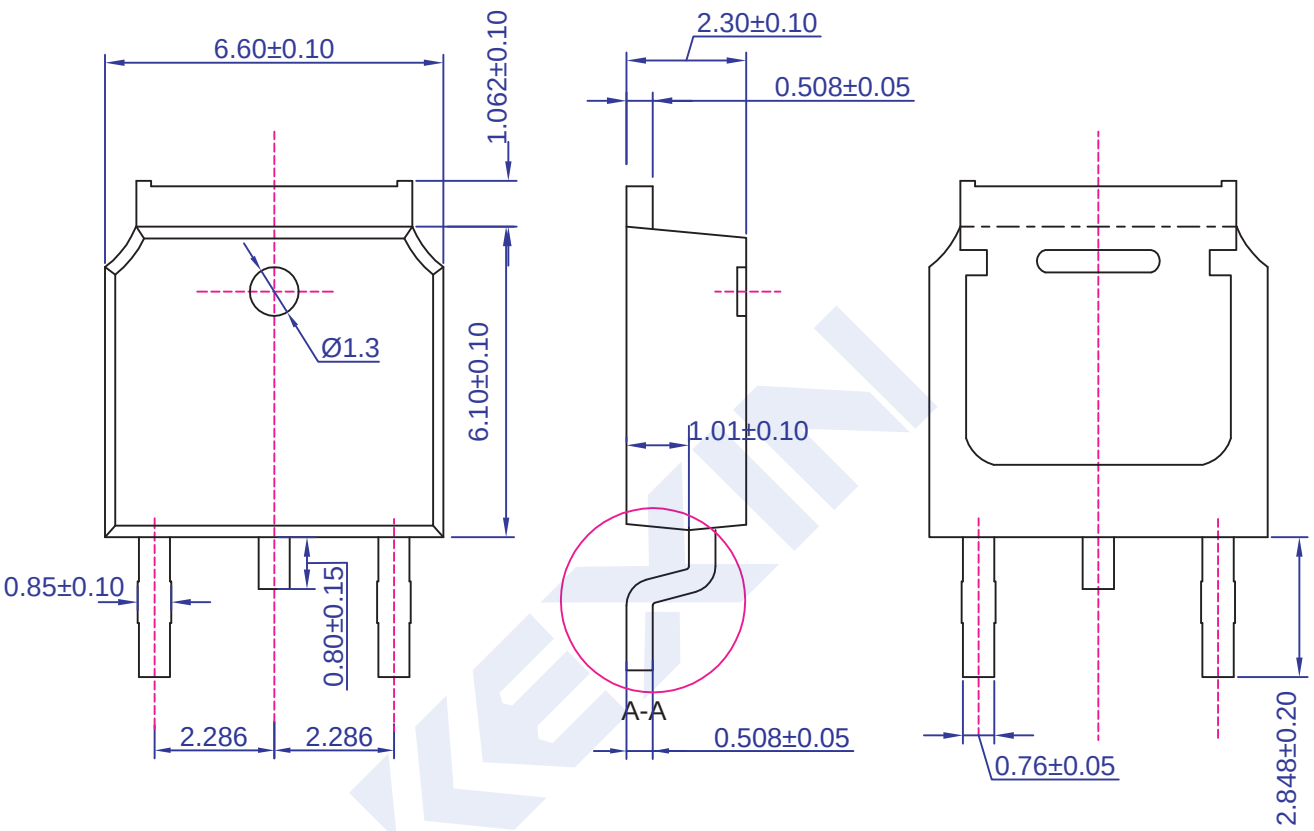
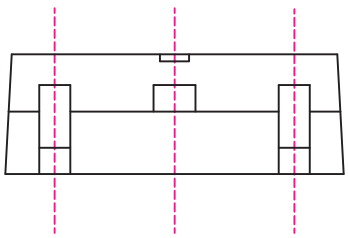
■ Package Dimension

Units: mm

TO-252





A-A