## FEATURES

- $V_{DS (V)}$ = 60V

- I_D = 35A (V_{GS}=10V)

- $R_{DS(ON)} <$ 25mΩ (V_{GS} =10V)

- $R_{DS(ON)} <$ 30mΩ (V_{GS} = 4.5V)

PRODUCT SUMMARY

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
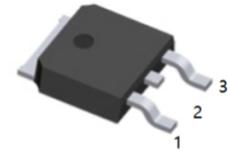
1.G   2.D   3.S
TO-252(DPAK) top view
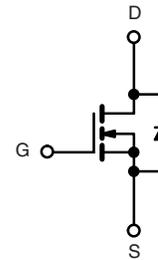
N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_C = 25 °C, unless otherwise noted

Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (T_J = 175 °C)[b]	T_C = 25 °C	I_D	35	A
	T_C = 100 °C		28	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)		I_S	23	
Avalanche Current		I_{AS}	20	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E_{AS}	20	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	100	W
	T_A = 25 °C		3[a]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	18	22	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	3.2	4	

Notes:
a. Surface Mounted on 1" x 1" FR4 board, t ≤ 10 sec.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted

| Parameter	Symbol	Test Conditions	Min	Typ[a]	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 175 °C			250	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	50			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A		25	31	mΩ
		V_{GS} = 4.5 V, I_D = 10 A		30	45	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 15 A		20		S
Dynamic[a]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		670		pF
Output Capacitance	C_{oss}			140		
Reverse Transfer Capacitance	C_{rss}			60		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 23 A		11	17	nC
Gate-Source Charge[c]	Q_{gs}			3		
Gate-Drain Charge[c]	Q_{gd}			3		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 1.3 Ω $I_D \cong$ 23 A, V_{GEN} = 10 V, R_g = 2.5 Ω		8	15	ns
Rise Time[c]	t_r			15	25	
Turn-Off Delay Time[c]	$t_{d(off)}$			30	45	
Fall Time[c]	t_f			25	40	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)						
Pulsed Current	I_{SM}				50	A
Diode Forward Voltage	V_{SD}	I_F = 15 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 15 A, di/dt = 100 A/µs		30	60	ns

Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
c. Independent of operating temperature.

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TYPICAL CHARACTERISTICS 25 °C unless noted
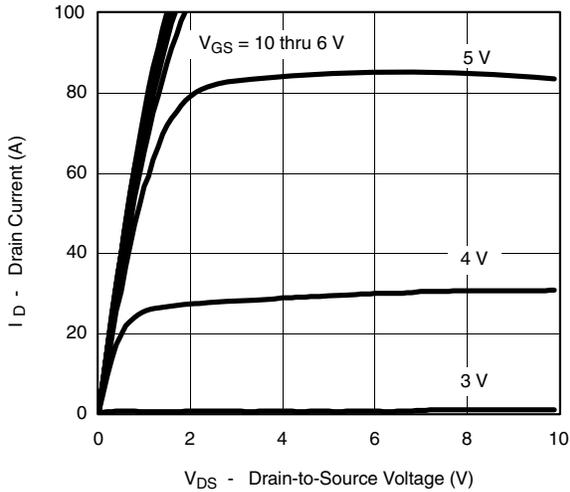
Output Characteristics

V_{GS} = 10 thru 6 V, 5 V, 4 V, 3 V

I_D - Drain Current (A) vs. V_{DS} - Drain-to-Source Voltage (V)
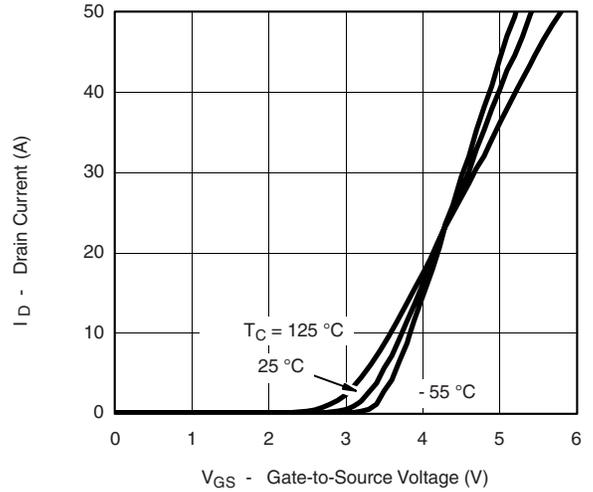
Transfer Characteristics

T_C = 125 °C, 25 °C, - 55 °C

I_D - Drain Current (A) vs. V_{GS} - Gate-to-Source Voltage (V)

Transconductance

T_C = - 55 °C, 25 °C, 125 °C

g_{fs} - Transconductance (S) vs. I_D - Drain Current (A)
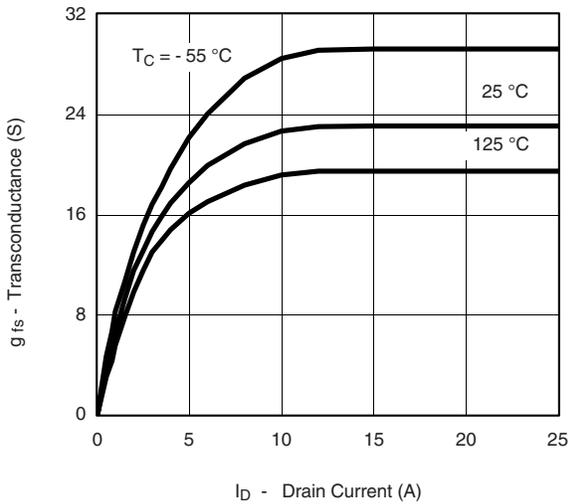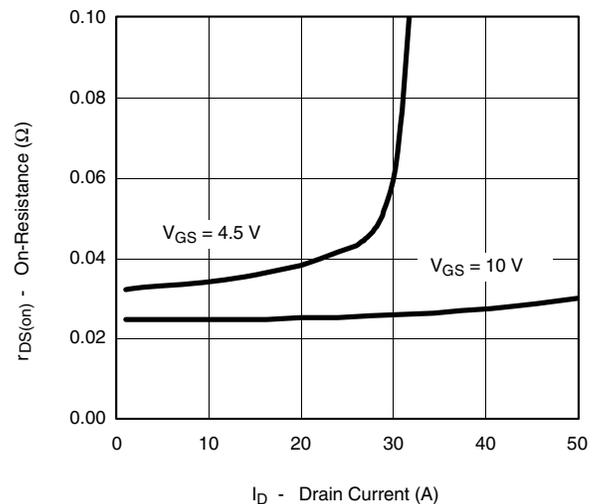
On-Resistance vs. Drain Current
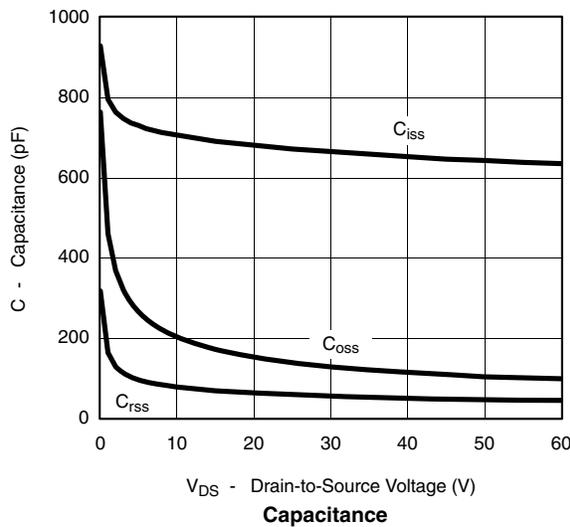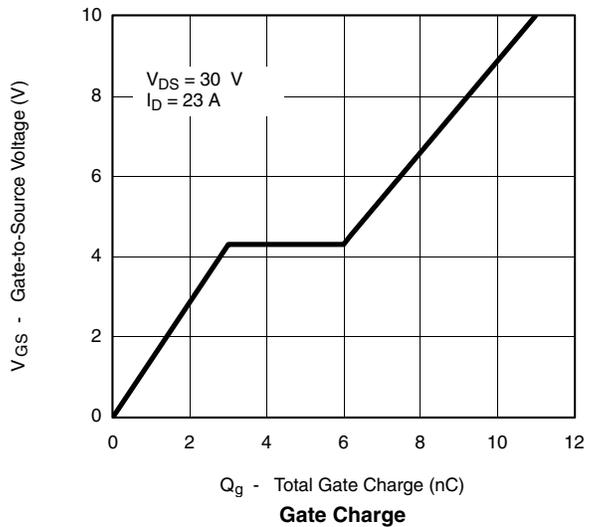
V_{GS} = 4.5 V, V_{GS} = 10 V

$r_{DS(on)}$ - On-Resistance (Ω) vs. I_D - Drain Current (A)

Capacitance

C_{iss}, C_{oss}, C_{rss}

C - Capacitance (pF) vs. V_{DS} - Drain-to-Source Voltage (V)

Gate Charge

V_{DS} = 30 V, I_D = 23 A

V_{GS} - Gate-to-Source Voltage (V) vs. Q_g - Total Gate Charge (nC)

TYPICAL CHARACTERISTICS 25 °C unless noted

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage
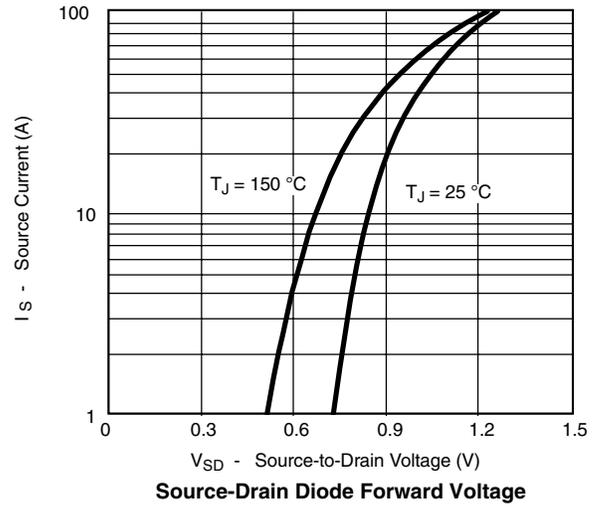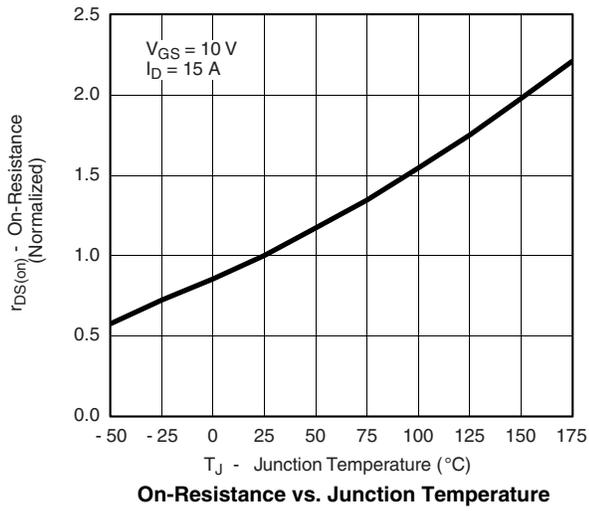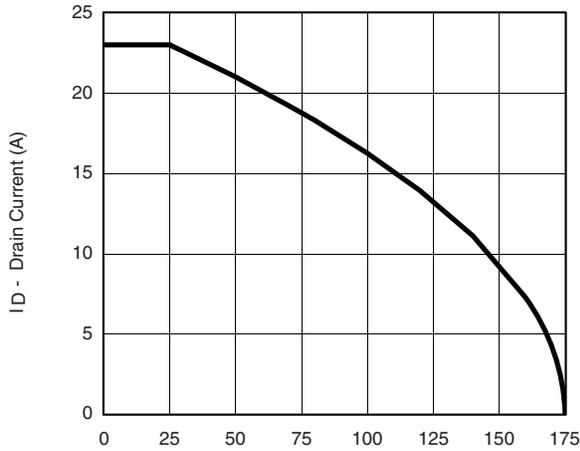
THERMAL RATINGS

**Maximum Drain Current
vs. Ambient Temperature**
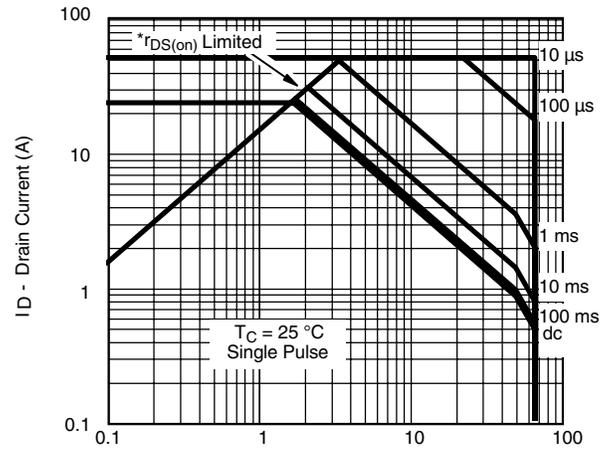

Safe Operating Area
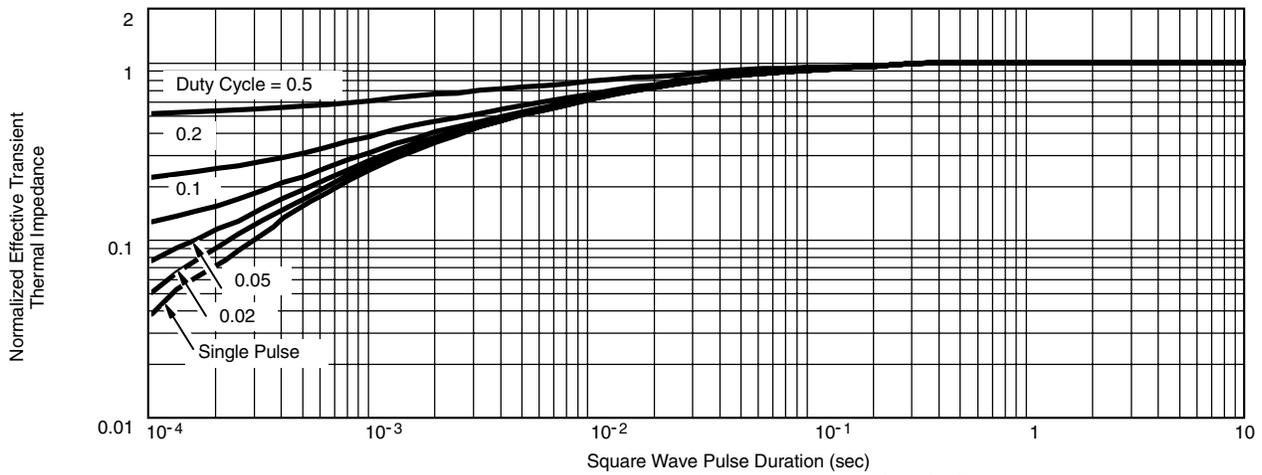
Normalized Thermal Transient Impedance, Junction-to-Case

Package Mechanical Data TO-252

DETAIL A
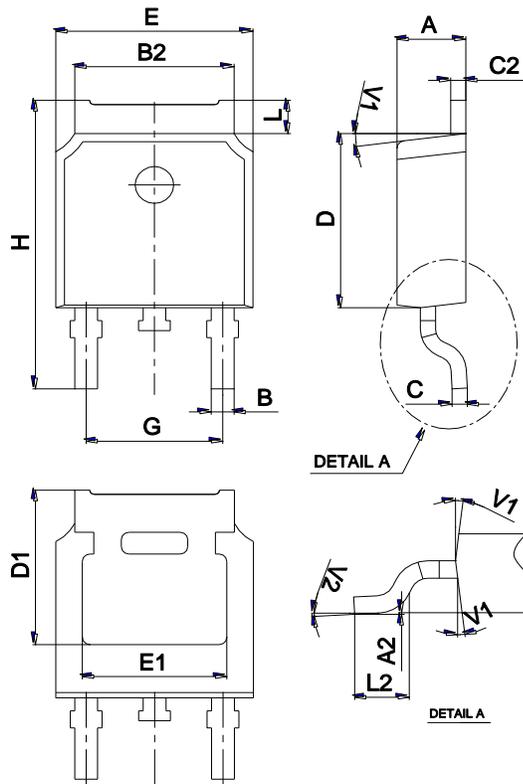
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking
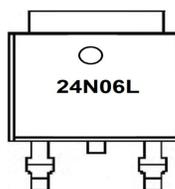
24N06L

Ordering information

Order code	Package	Baseqty	Deliverymode
NTD24N06LT4G	TO-252	2500	Tape and reel