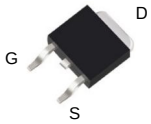
Description

The TX40N02D uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge . The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications



TO252-2L

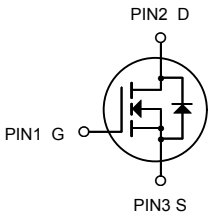
General Features

V_{DS} = 20V,I_D =40A
$R_{DS(ON)}$ < 9 mΩ@ V_{GS}=4.5V

High power and current handing capability

Lead free product is acquired

Surface mount package



N-Channel MOSFET

Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	20	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 4.5V	40	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 4.5V	25	A
I_D@T_A=25℃	Drain Current, V_{GS} @ 4.5V[3]	38	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 4.5V[3]	28	A
IDM	Pulsed Drain Current[1]	80	A
P_D@T_C=25℃	Total Power Dissipation	15.6	W
P_D@T_A=25℃	Total Power Dissipation[3]	5	W
E_{AS}	Single Pulse Avalanche Energy[4]	150	mJ
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
Rthj-c	Maximum Thermal Resistance, Junction-case	8	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	25	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	20	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V, I_D=20A	-	7.5	9	mΩ
		V_{GS}=2.5V, I_D=12A	-	9.1	12	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	0.5	-	0.9	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=20A	-	50	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V, V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge	I_D=20A	-	16	25.6	nC
Q_{gs}	Gate-Source Charge	V_{DS}=10V	-	3	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	4.5	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=10V	-	10	-	ns
t_r	Rise Time	I_D=1A	-	13	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	28	-	ns
t_f	Fall Time	V_{GS}=5V	-	7	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1400	2240	pF
C_{oss}	Output Capacitance	V_{DS}=10V	-	170	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	135	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1	2	Ω
V_{SD}	Forward On Voltage[2]	I_S=20A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_S=12A, V_{GS}=0V, dI/dt=100A/μs	-	8.5	-	ns
Q_{rr}	Reverse Recovery Charge		-	2.5	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 in^2 copper pad of FR4 board, t ≤10sec ; 60 ℃/W at steady state.

4.Starting T_j=25°C , V_{DD}=20V , L=0.1mH , R_G=25Ω, V_{GS}=10V

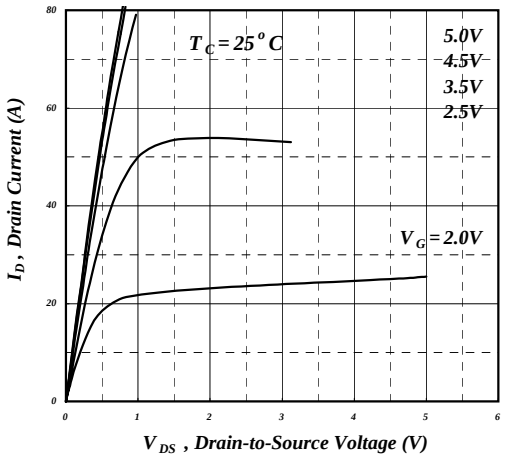


Fig 1. Typical Output Characteristics

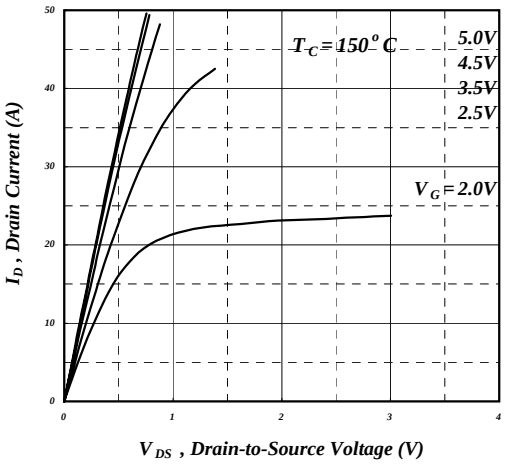


Fig 2. Typical Output Characteristics

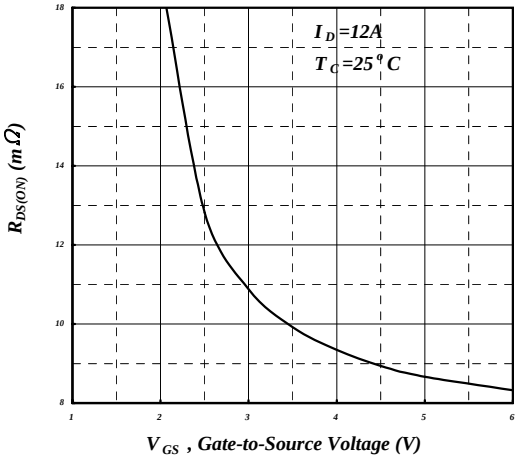


Fig 3. On-Resistance v.s. Gate Voltage

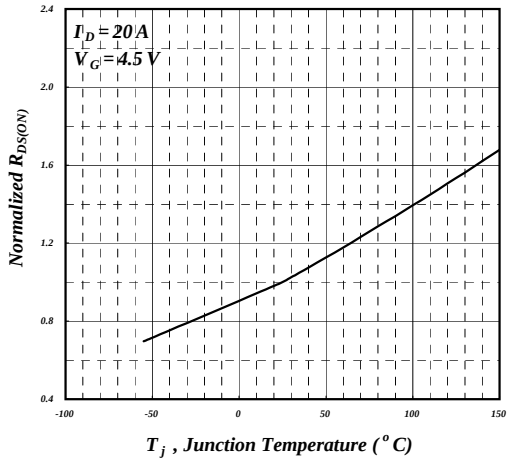


Fig 4. Normalized On-Resistance v.s. Junction Temperature

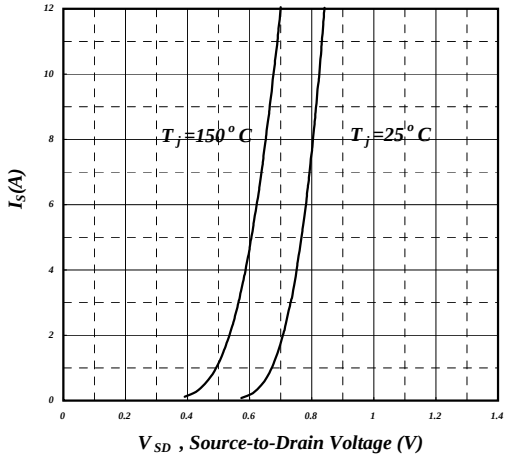


Fig 5. Forward Characteristic of Reverse Diode

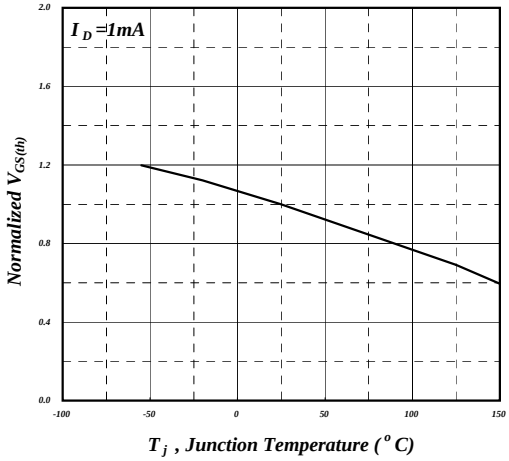


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

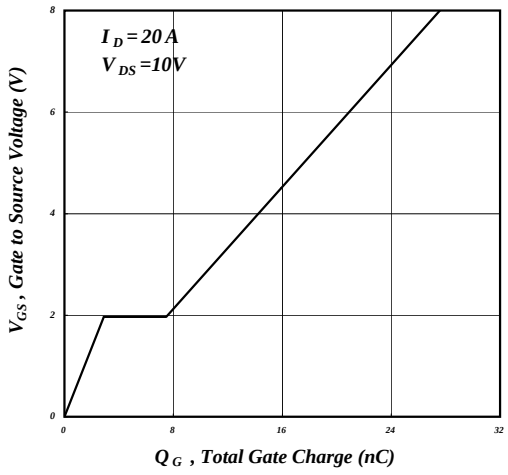


Fig 7. Gate Charge Characteristics

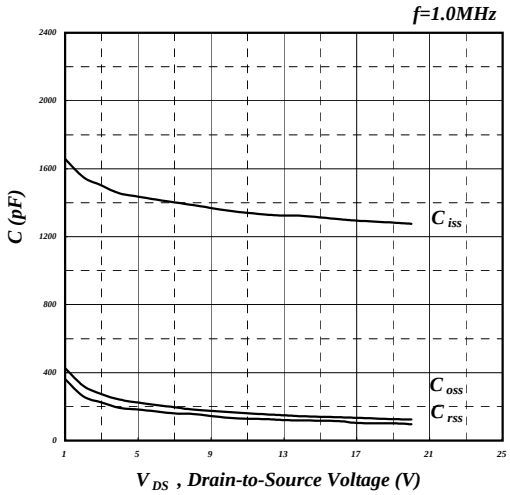


Fig 8. Typical Capacitance Characteristics

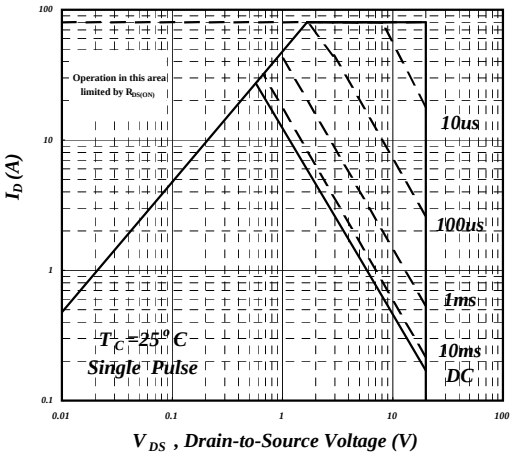


Fig 9. Maximum Safe Operating Area

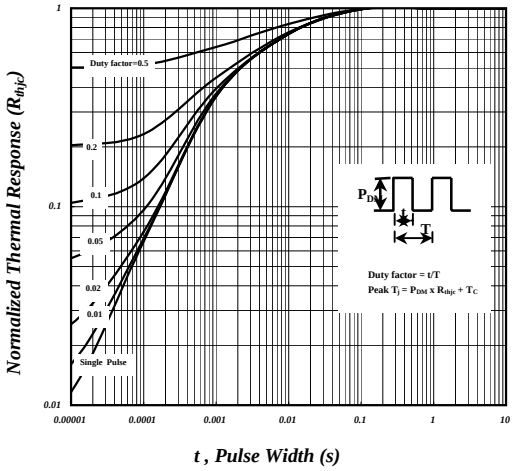


Fig 10. Effective Transient Thermal Impedance

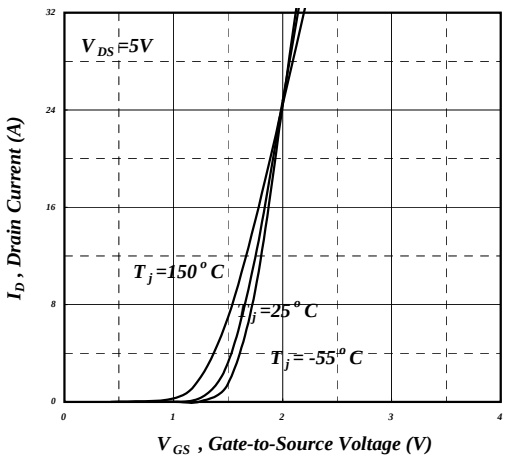


Fig 11. Transfer Characteristics

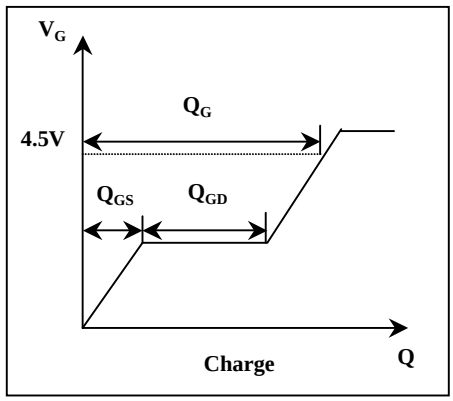


Fig 12. Gate Charge Waveform

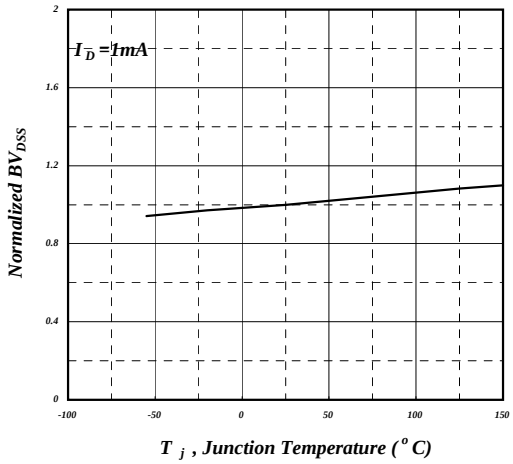


Fig 13. Normalized BV_{DSS} v.s. Junction Temperature

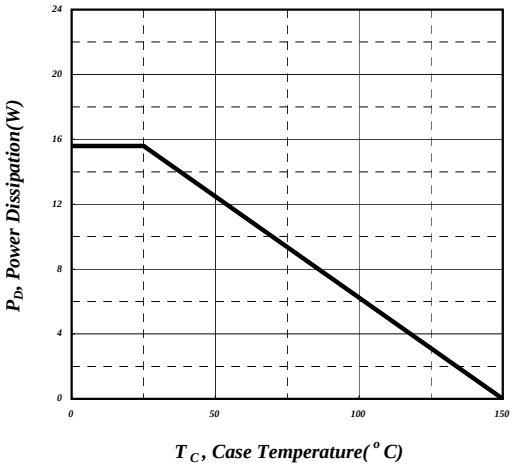


Fig 14. Total Power Dissipation

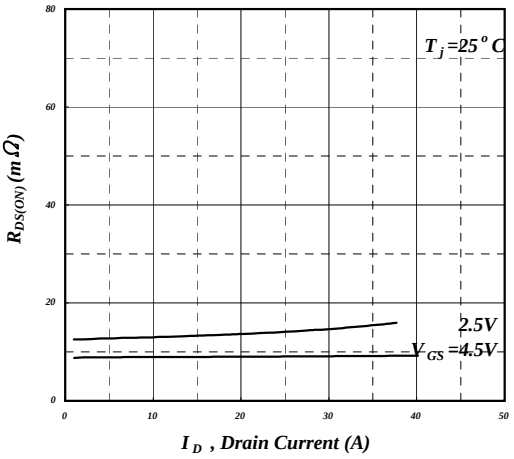
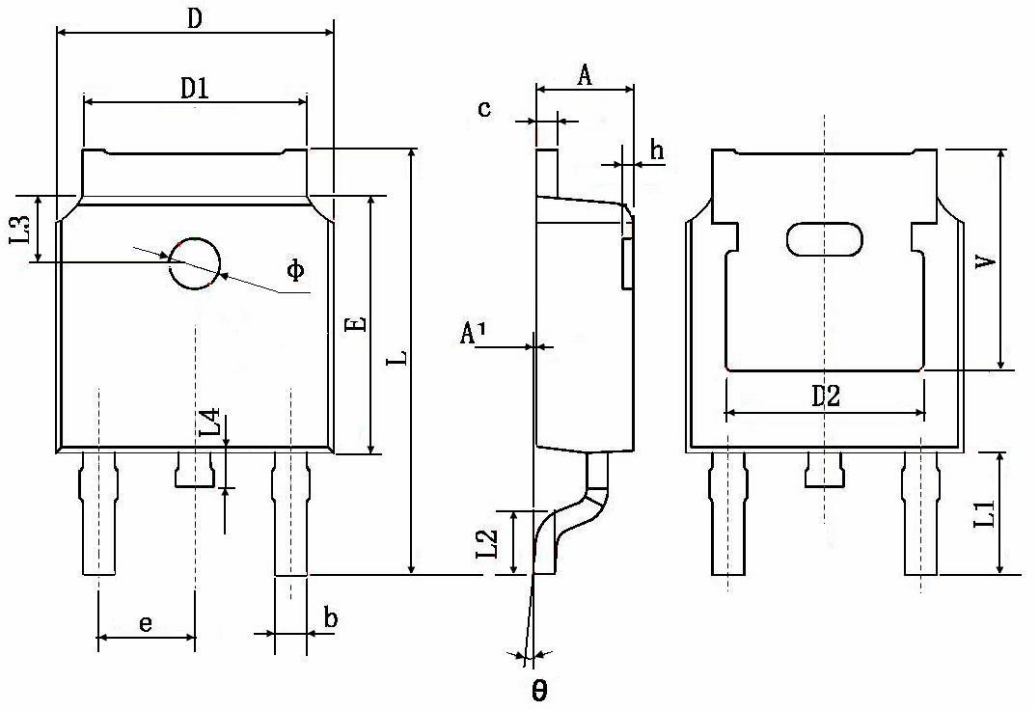


Fig 15. Typ. Drain-Source on State Resistance

TO252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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