TM05N50BD

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

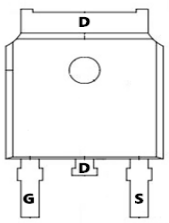
- Load switch
- PWM

General Features

V_{DS} =500V I_D =4.6A

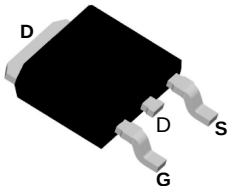
$R_{DS(ON)}$=2.4 Ω(typ.)@V_{GS}=10V

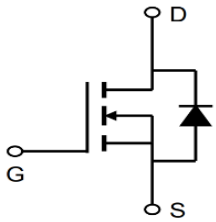
100% UIS Tested
100% R_g Tested



Marking: 05N50B

D:TO-252-3L





Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	500	V
ID	Continuous Drain Current	4.6	A
IDM	Pulsed Drain Current (note1)	17	A
VGS	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	57	mJ
IAR	Avalanche Current (note1)	2.9	A
E_{AR}	Repetitive Avalanche Energy note1)	6.4	mJ
P_D	Power Dissipation (T_C = 25ºC)	32.9	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	6.25	ºC/W
RthJA	Thermal Resistance, Junction-to-Ambient	62.5	ºC/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	500	550	--	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}= 650V, V_{GS}= 0V, T_J=25ºC	--	--	1	μA
IGSS	Gate-Source Leakage	V_{GS} = ±30V	--	--	±100	nA
VGS(th)	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	3.0	4.0	V
RDS(on)	Drain-Source On-Resistance (Note3)	V_{GS} = 10V, I_D = 3.5A	--	2.4	3.0	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	310	--	pF
C_{oss}	Output Capacitance		--	39	--	
C_{rss}	Reverse Transfer Capacitance		--	6	--	
Q_g	Total Gate Charge	V_{DD}=400V, I_D = 3A, V_{GS} = 10V	--	8	--	nC
Q_{gs}	Gate-Source Charge		--	1.2	--	
Q_{gd}	Gate-Drain Charge		--	5	--	
td(on)	Turn-on Delay Time	V_{DD}=250V, I_D = 3A, R_G = 25Ω	--	7.8	--	ns
t_r	Turn-on Rise Time		--	33	--	
td(off)	Turn-off Delay Time		--	23	--	
t_f	Turn-off Fall Time		--	59	--	
IS	Continuous Body Diode Current	T_C = 25 ºC	--	--	4.6	A
ISM	Pulsed Diode Forward Current		--	--	2.9	A
V_{SD}	Body Diode Voltage	T_J = 25ºC, I_{SD} = 3A, V_{GS} = 0V	--	--	1.4	V
trr	Reverse Recovery Time	V_{GS} = 0V,I_S = 3A, di_F/dt =100A /μs	--	80	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.8	--	μC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The EAS data shows Max. rating . IAS = 2.4A, VDD = 50V, RG = 25 Ω, Starting TJ = 25 ºC

3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

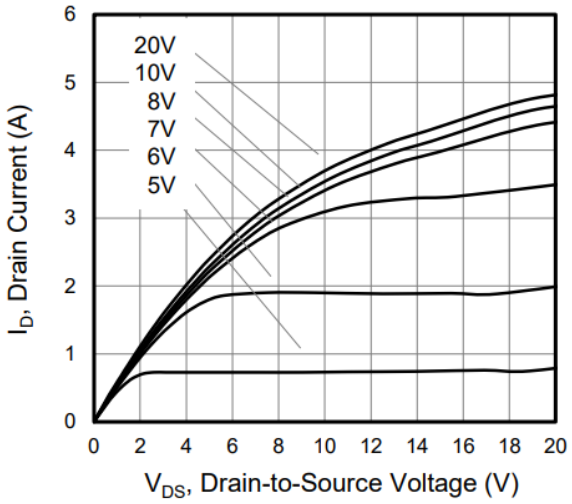


Figure 1. Output Characteristics (T J = 25ºC)

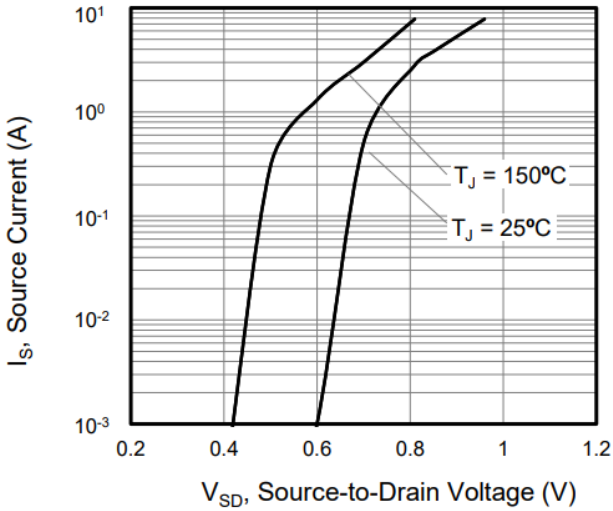


Figure 2. Body Diode Forward Voltage

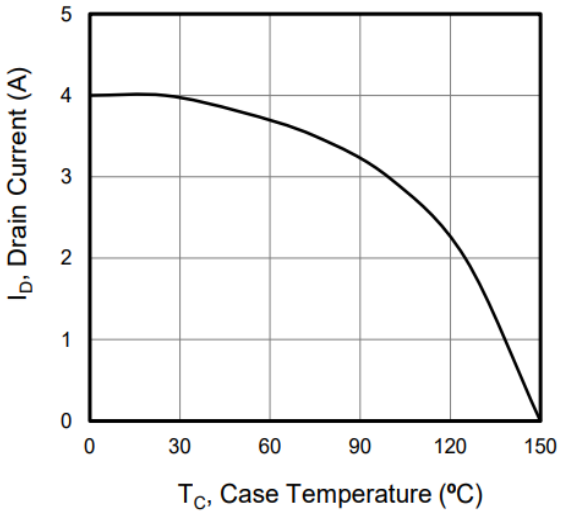


Figure 3. Drain Current vs. Temperature

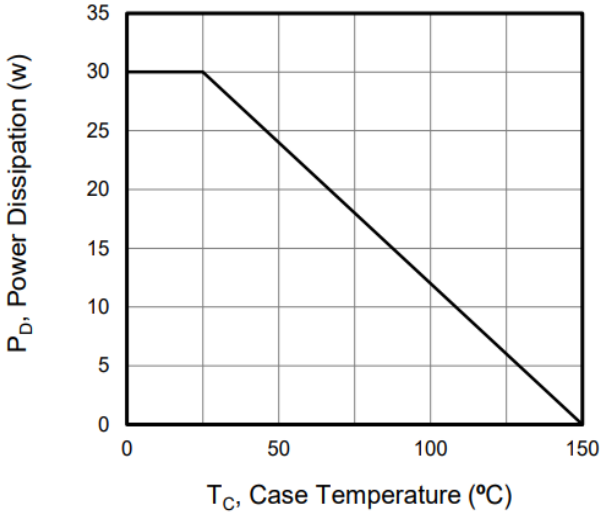


Figure 4. BV DSS Variation vs. Temperature

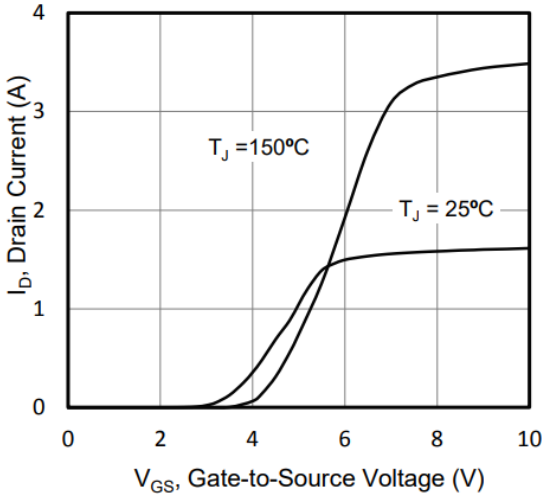


Figure 5. Transfer Characteristics

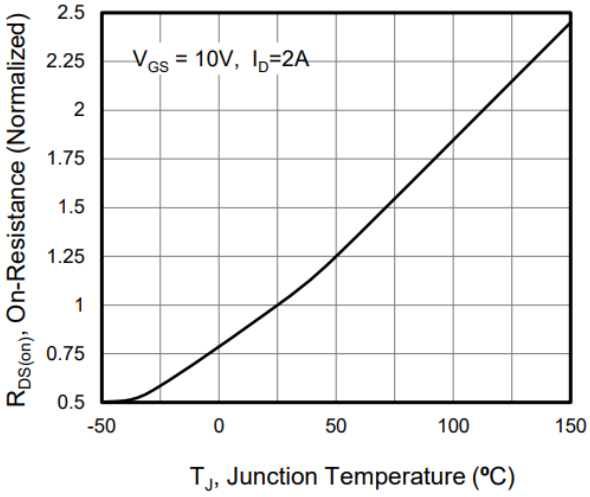


Figure 6. On-Resistance vs. Temperature

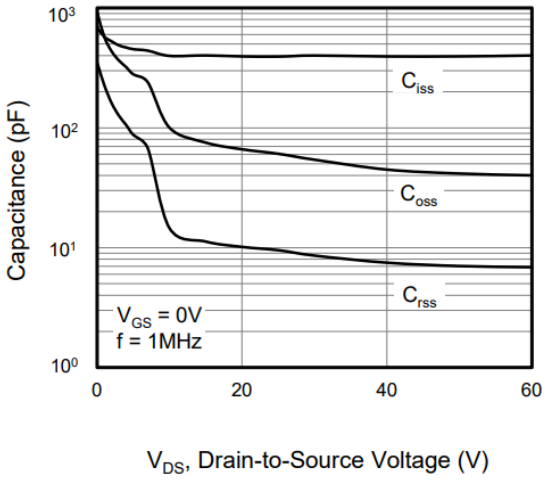


Figure 7. Capacitance

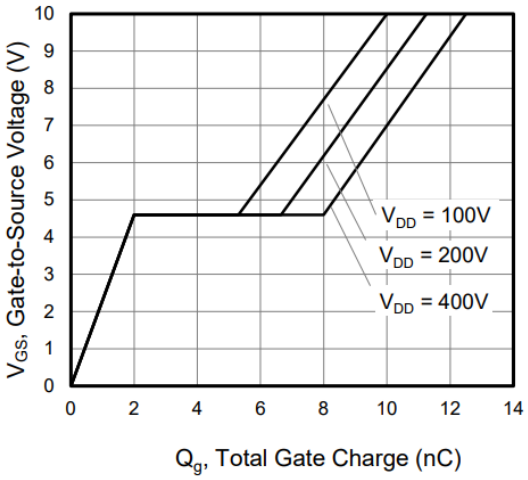


Figure 8. Gate Charge

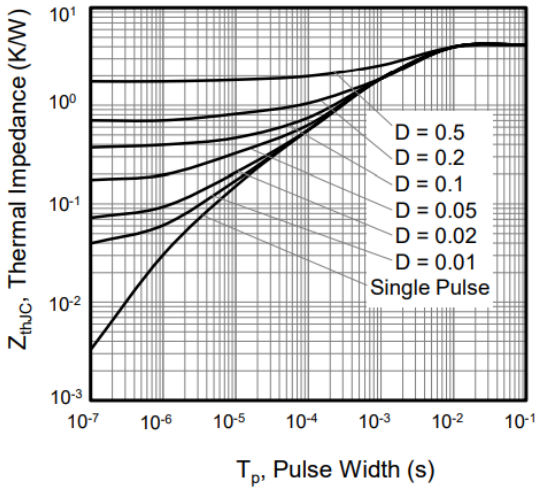
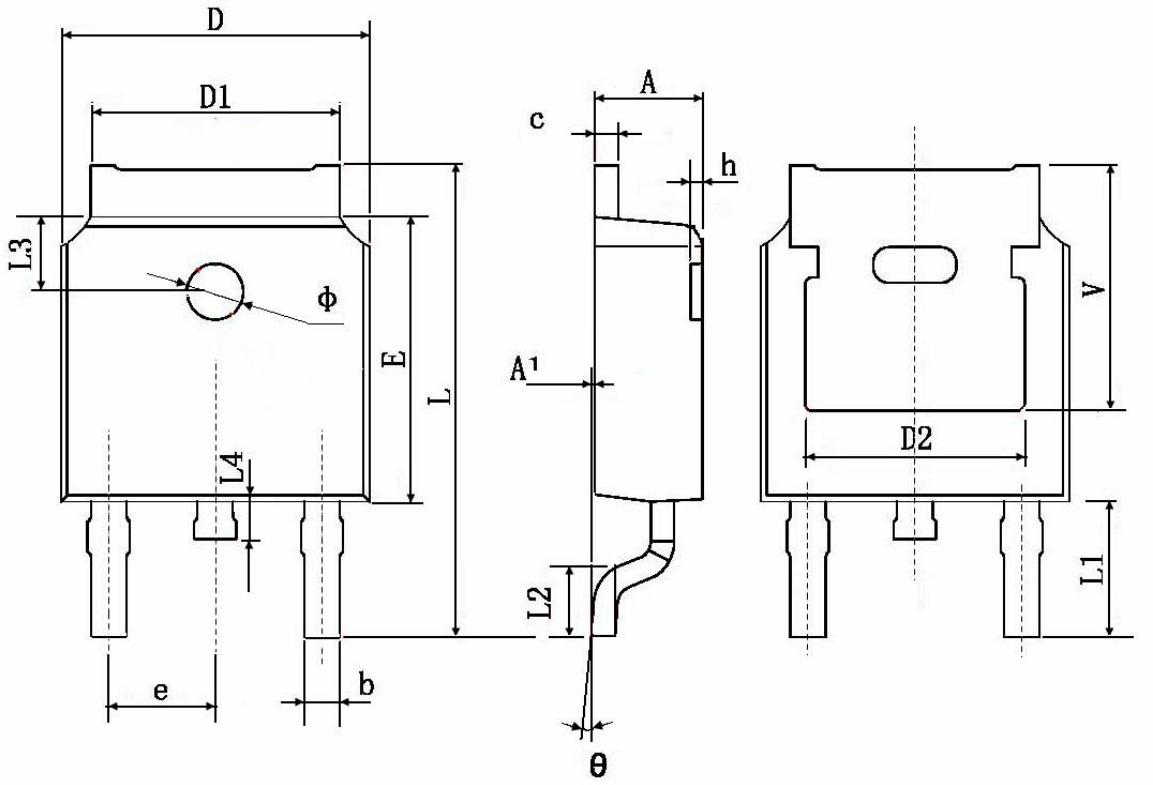


Figure 9. Transient Thermal Impedance

Package Information:TO-252-3L



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	4.830 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.	