Alitek

AT25503

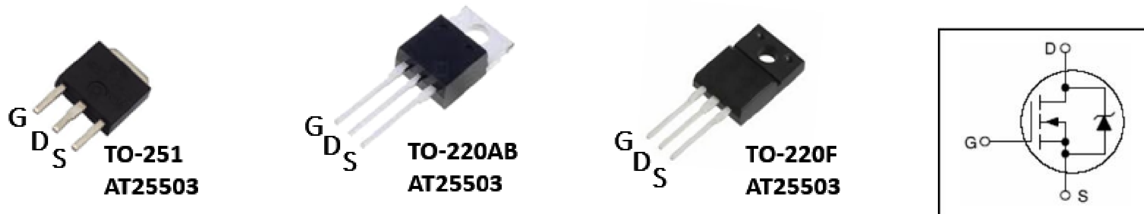
N-Channel Enhancement Mode Field Effect Transistor

Features

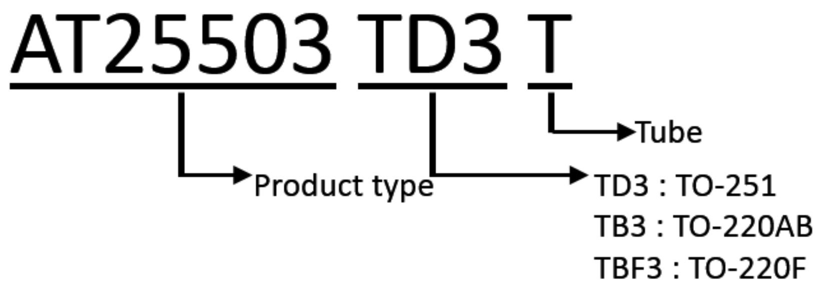
$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
500V	2.9Ω	3A

Application

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- UPS



Order information:



ABSOLUTE MAXIMUN RATINGS

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNITS
Drain-Source Voltage	V_{DS}	500	V
Drain Current –continuous @25°C	I_D	3	A
Drain Current –continuous @100°C	I_D	2.5	A
Pulsed Drain Current[1]	I_{DM}	1.8	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche[2]	E_{AS}	60	mJ
Pulsed Avalanche Rating[2]	I_{AS}	3.5	A
Operating Junction & Storage Temperature	T_j, T_{stg}	-55 to 150	°C
Lead Temperature ($^1/_{16}$" from case for 10sec.)	T_L	300	°C

Note:

1. Pulse width limited by maximum junction temperature.
2. V_{DD} = 50V, V_{DS} = 500V, R_G = 25 Ω, T_J: 25°C

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	500			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	3.0		4.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±30V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500V, V_{GS} = 0V			1	μA
		V_{DS} = 500V, V_{GS} = 0V, Tj=150°C			10	μA
On-State Drain Current	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 1.5A		2.9	3.5	Ω
Forward Transconductance	G_{FS}	V_{DS} = 40V, I_D = 1.5A		3.2		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		215		pF
Output Capacitance	C_{oss}			40		pF
Reverse Transfer Capacitance	C_{rss}			13		pF
Total Gate Charge	Q_g	V_{DD} = 500V, I_D = 3A, V_{GS} = 10V		7.2		nC
Gate-Source Charge	Q_{gs}			3.0		nC
Gate-Drain Charge	Q_{gd}			3.3		nC
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				3	A
Forward Voltage	V_{SD}	I_F = I_S, V_{GS} = 0V			1.5	V
Reverse Recovery Time	t_{rr}	I_s = 3A, dI_F/dt = 100A / μS		165		nS
Reverse Recovery Charge	Q_{rr}	V_{GS} = 0V		830		nC
THERMAL DATA						
Thermal Resistance Junction to Case	$R_{θJC}$	AT25503 (TO-251)			3.5	°C/W
		AT25503 (TO-220AB)			3.0	°C/W
		AT25503 (TO-220F)			5.5	°C/W
Thermal Resistance Junction to Ambient	$R_{θJA}$	AT25503 (TO-251)			100	°C/W
		AT25503 (TO-220AB)			62.5	°C/W
		AT25503 (TO-220F)			62.5	°C/W

Typical Characteristics

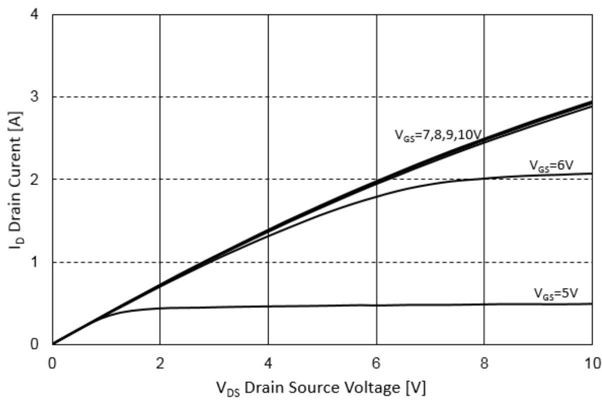


Figure 1. On-Region Characteristics

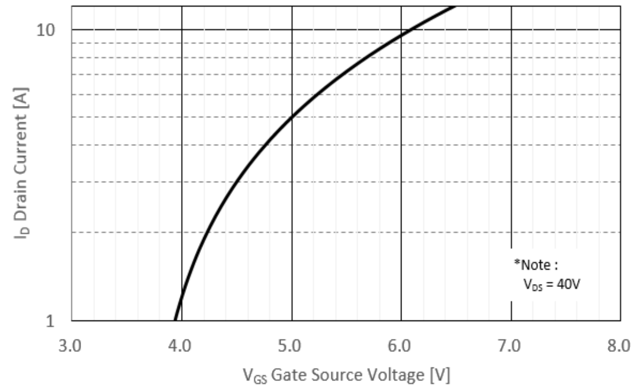


Figure 2. G_{FS} Characteristics

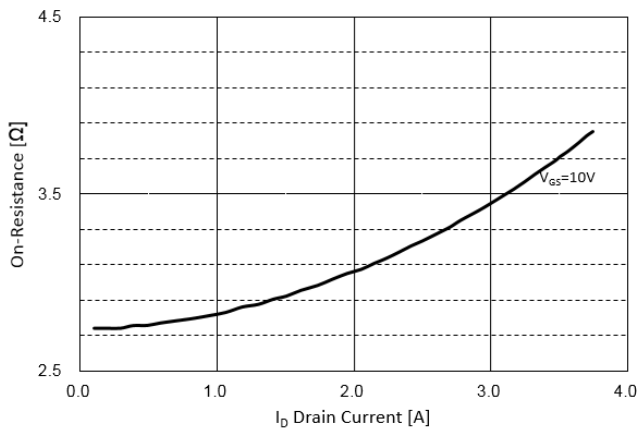


Figure 3. On-Resistance Variation vs Drain Current

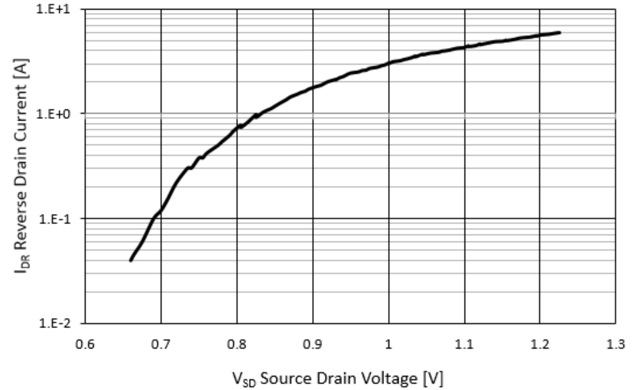
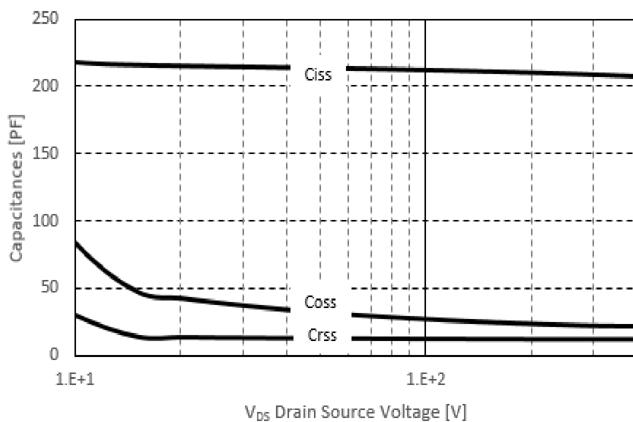


Figure 4. Body diode Forward Voltage



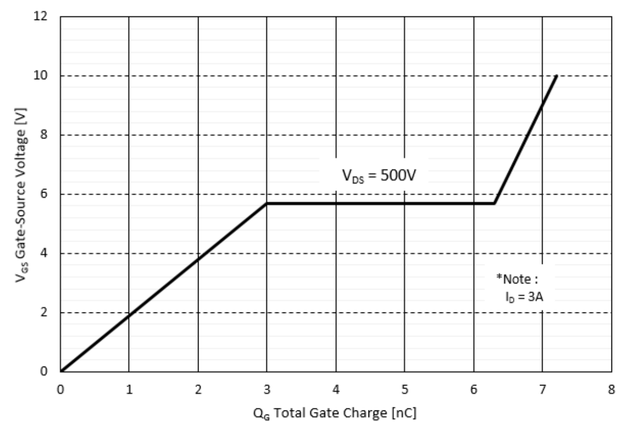
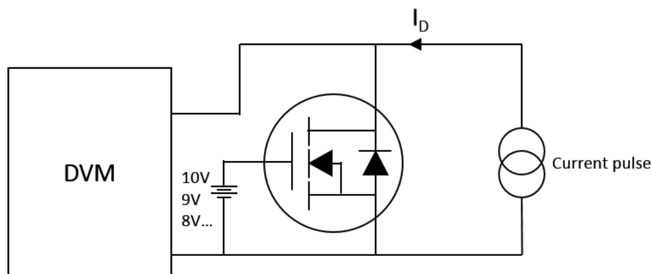


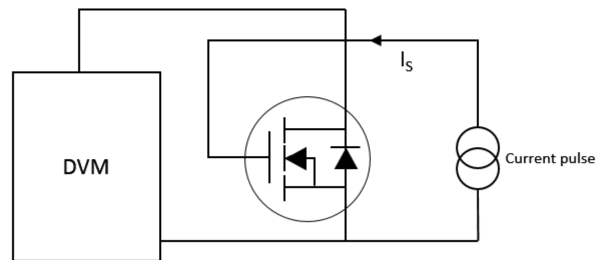
Figure 5. Capacitance Characteristics

Figure 6. Gate Charge Characteristics

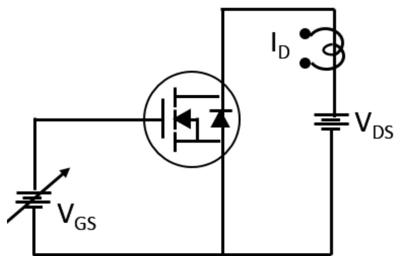
On-Region Characteristics Test Circuit



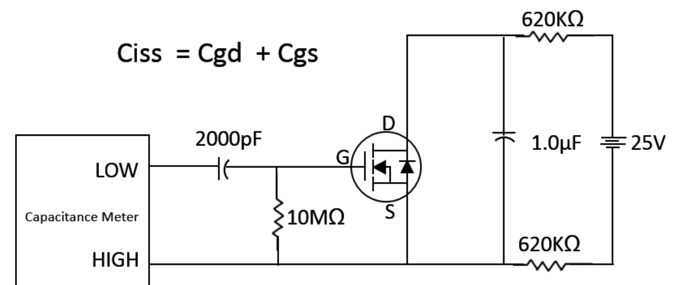
V_{SD} Characteristics Test Circuit



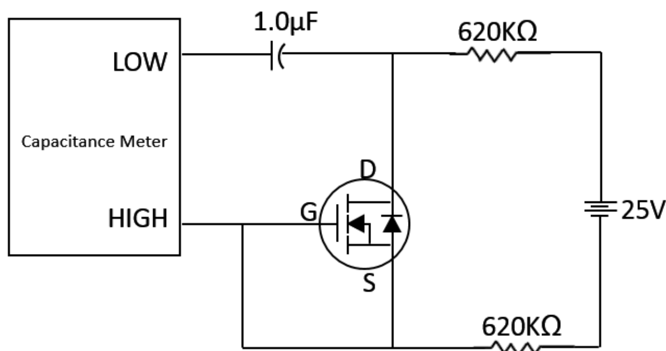
G_{FS} Characteristics Test Circuit



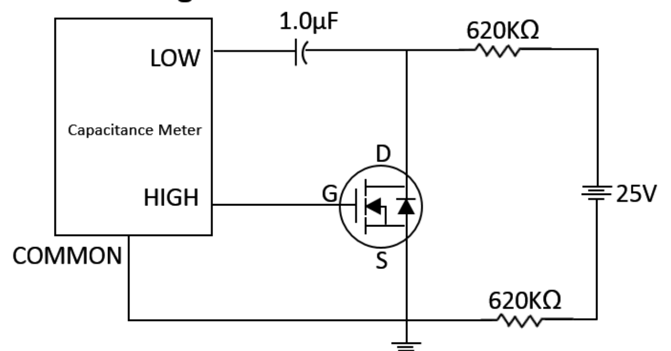
Input Capacitance Characteristics Test Circuit



Output Capacitance Characteristics Test Circuit

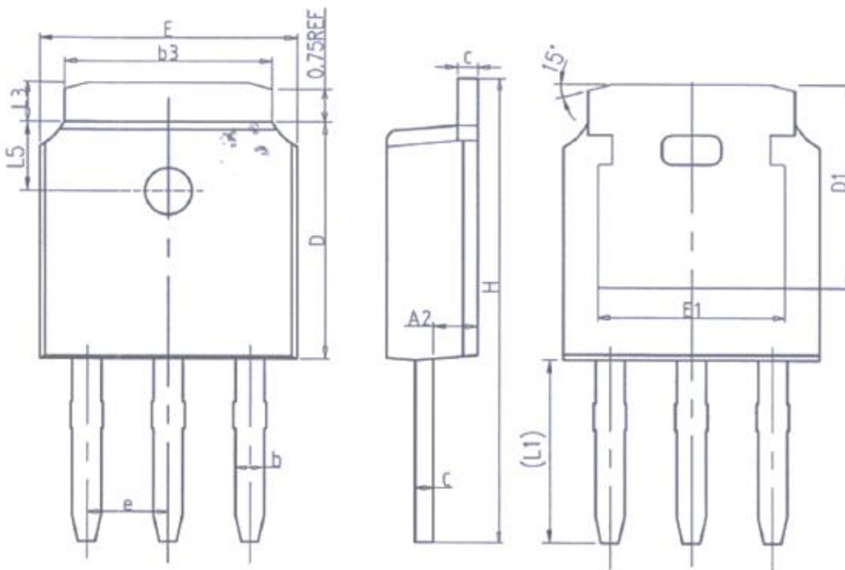


Reverse Capacitance Characteristics Test Circuit



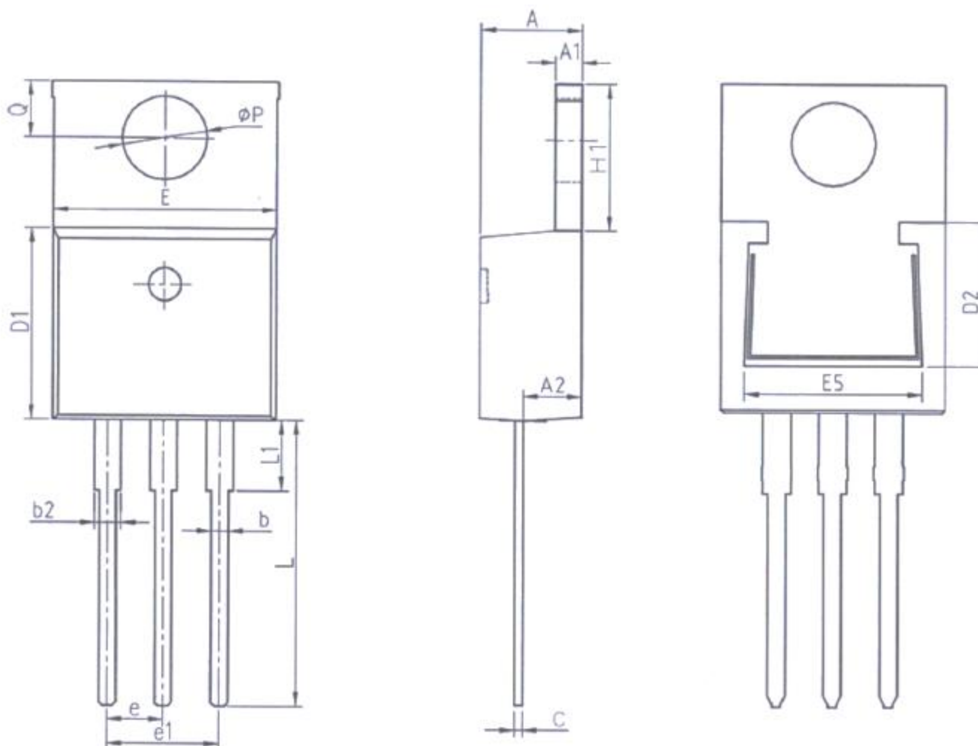
Mechanical Dimensions

TO-251



SYMBOL	MM		
	MIN	NOM	MAX
A	2. 20	2. 30	2. 40
A2	0. 97	1. 07	1. 17
b	0. 68	0. 78	0. 90
b3	5. 20	5. 33	5. 50
c	0. 43	0. 53	0. 63
D	5. 98	6. 10	6. 22
D1	5. 30REF		
E	6. 40	6. 60	6. 80
E1	4. 63	–	–
e	2. 286BSC		
H	10. 00	11. 22	11. 44
L1	3. 90	4. 10	4. 30
L3	0. 88	1. 02	1. 28
L5	1. 65	1. 80	1. 95

TO-220AB

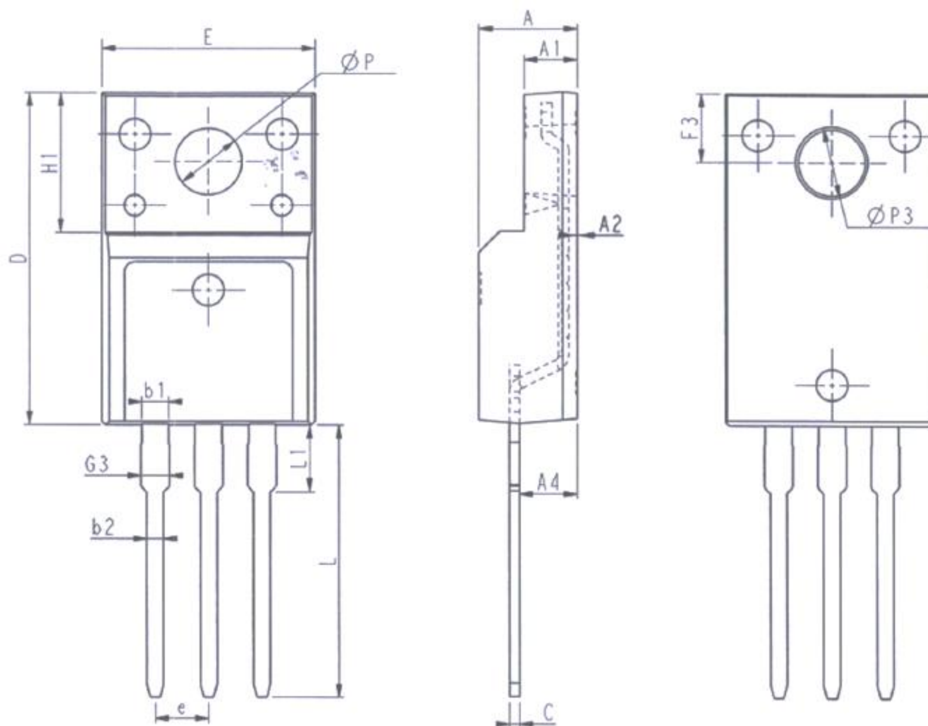


SYMBOL	MM		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
b	0.75	0.81	0.96
b2	1.22	1.27	1.47
c	0.30	0.38	0.48
D1	8.50	8.70	8.90
D2	5.20	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.10	6.30	6.50
L	13.10	13.40	13.70
L1	-	3.75	4.10
ΦP	3.70	3.84	3.99
Q	2.54	2.74	2.94

N-Channel Enhancement Mode Field Effect Transistor

Mechanical Dimensions

TO-220F



SYMBOL	MM		
	MIN	NOM	MAX
E	9. 96	10. 16	10. 36
A	4. 50	4. 70	4. 90
A1	2. 34	2. 54	2. 74
A2	0. 30	0. 45	0. 60
A4	2. 56	2. 76	2. 96
c	0. 40	0. 50	0. 65
D	15. 57	15. 87	16. 17
H1	6. 70REF		
e	2. 54BSC		
L	12. 68	12. 98	13. 28
L1	2. 93	3. 03	3. 13
ΦP	3. 03	3. 18	3. 38
ΦP3	3. 15	3. 45	3. 65
F3	3. 15	3. 30	3. 45
G3	1. 25	1. 35	1. 55
b1	1. 18	1. 28	1. 43
b2	0. 70	0. 80	0. 95