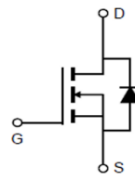


Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

Applications

- Solar Inverters
- Switch Mode Power Supplies
- UPS
- Battery Chargers



Product Summary

V_{DS}	650V
$R_{DS(on)_{typ}}$	500mΩ
I_D	4.9A

Package Marking and Ordering Information

Part #	Marking	Package
T1M500065N	1M500065N	DFN5*6

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	650	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_D	4.9 3.5	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	18	A
Gate-Source voltage	V_{GS}	-4/+18	V
Gate-Source voltage (Absolute maximum values)	V_{GSmax}	-8/+22	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	21	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$

- Example of acceptable V_{GS} waveform



Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	7.0	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at $T_J = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	650	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	2	2.8	4	V	$V_{DS}=V_{GS}, I_D=0.43mA$
Zero gate voltage drain current	I_{DSS}	-	1	10	μA	$V_{DS}=650V, V_{GS}=0V$ $T_C=25^\circ C$
		-	5	-		$T_C=175^\circ C$
Gate-source leakage current	I_{GSS}	-		100	nA	$V_{GS}=18V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	460	610	mΩ	$V_{GS}=18V, I_D=2A,$ $T_J=25^\circ C$
			540			$T_J=175^\circ C$
Drain-source on-state resistance	$R_{DS(on)}$	-	580	-	mΩ	$V_{GS}=15V, I_D=2A, T_J=25^\circ C$
Transconductance	g_{fs}	-	1.3	-	S	$V_{DS}=20V, I_D=2A$

Dynamic Characteristic

Input Capacitance	C _{iss}	-	176	-	pF	V _{DS} = 400V V _{GS} = 0V T _J = 25°C V _{AC} = 25mV f = 1MHz
Output Capacitance	C _{oss}	-	17	-		
Reverse Transfer Capacitance	C _{rss}	-	2	-		
Gate Total Charge	Q _G	-	8.3	-	nC	V _{DS} = 400V V _{GS} = -4/18V I _D = 1.6A
Gate-Source charge	Q _{gs}	-	2.6	-		
Gate-Drain charge	Q _{gd}	-	2.6	-		
Turn-On Switching Energy	E _{ON}	-	31.5	-	μJ	V _{DD} = 400V V _{GS} = -4/+18V I _D = 1.6A R _G = 5Ω
Turn-Off Switching Energy	E _{OFF}	-	0.53	-		
Turn-on delay time	t _{d(on)}	-	40	-	ns	
Rise time	t _r	-	33.5	-		
Turn-off delay time	t _{d(off)}	-	49	-		
Fall time	t _f	-	54	-		
Gate resistance	R _G	-	3.3	-	Ω	V _{AC} = 25mV, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V _{SD}		3		V	V _{GS} = 0V,I _{SD} =1A, T _J =25°C
			2.7			V _{GS} = 0V,I _{SD} =1A, T _J =175°C
Body Diode Reverse Recovery Time	t _{rr}	-	52	-	ns	V _R = 400V, V _{GS} = 0V I _D = 1.6A di/dt = 800A/μS T _J = 175°C
Body Diode Reverse Recovery Charge	Q _{rr}	-	21.8	-	nC	

Typical Performance Characteristics

Fig 1. Output Characteristic ($T_J = -55^{\circ}\text{C}$)

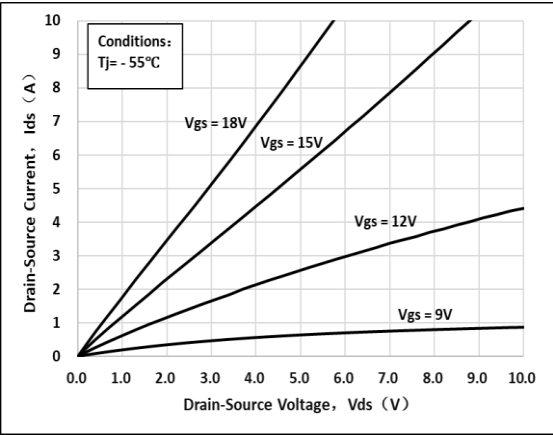


Fig 2. Output Characteristic ($T_J = 25^{\circ}\text{C}$)

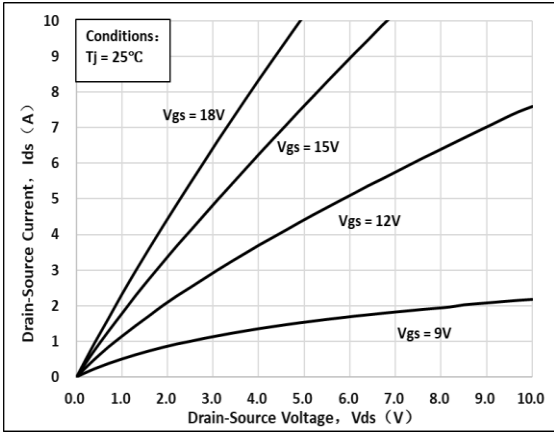


Fig 3. Output Characteristic ($T_J = 175^{\circ}\text{C}$)

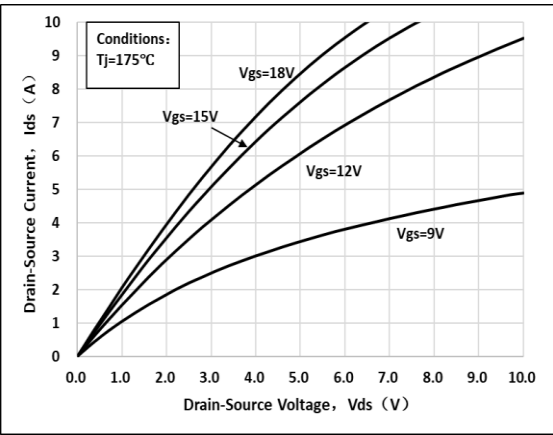


Fig 4: $R_{ds(on)}$ Vs I_{ds} Characteristic

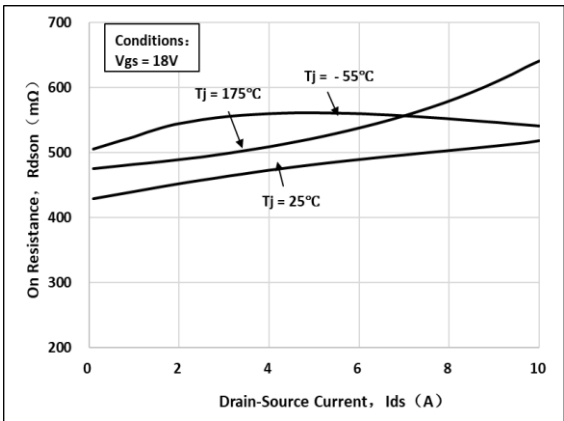


Fig 5: $R_{ds(on)}$ vs. Temperature

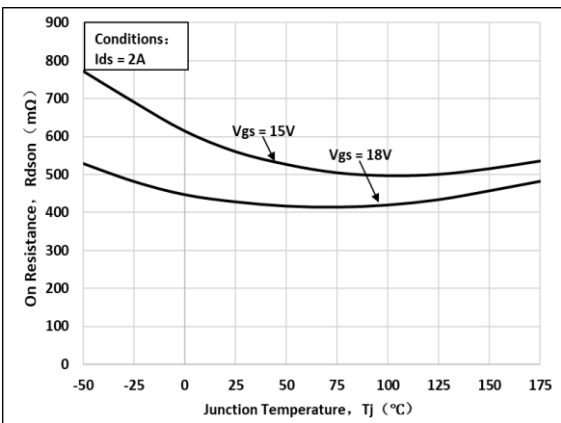


Fig 5: Transfer Characteristic

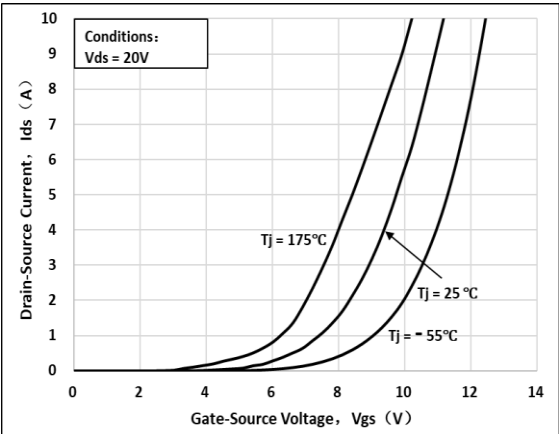


Fig 7: Body-diode Characteristic (T_J=-55°C)

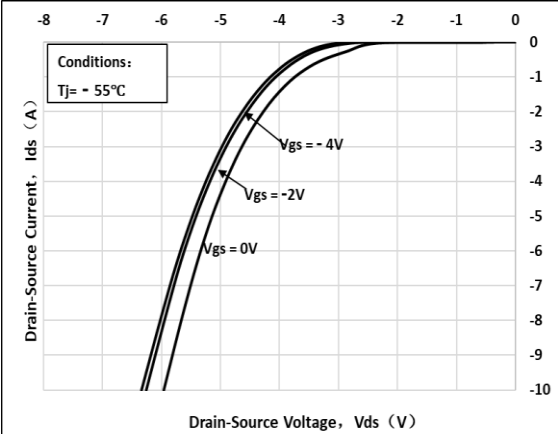


Fig 8: Body-diode Characteristic (T_J=25°C)

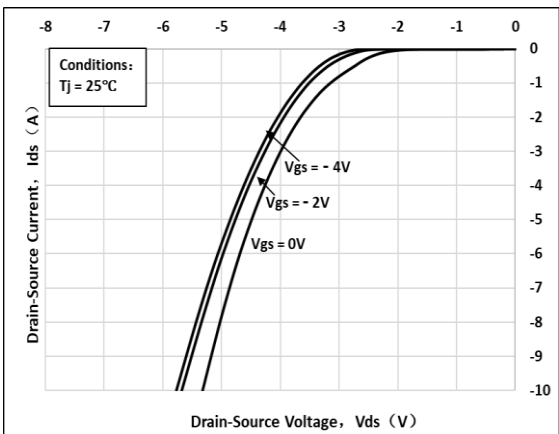


Fig 9: Body-diode Characteristic (T_J=175°C)

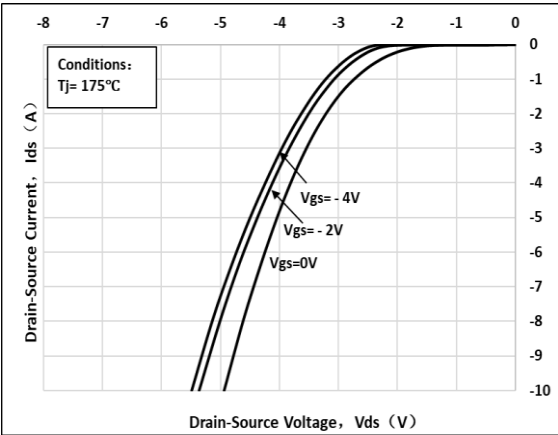


Fig 10: V_{th} Vs T_J Temperature Characteristic

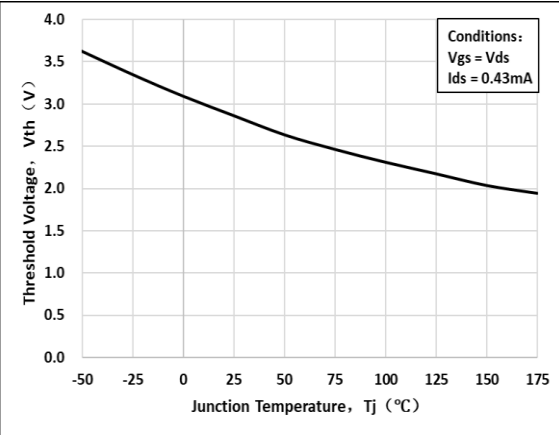


Fig 11: 3rd Quadrant Characteristic(T_J=-55°C)

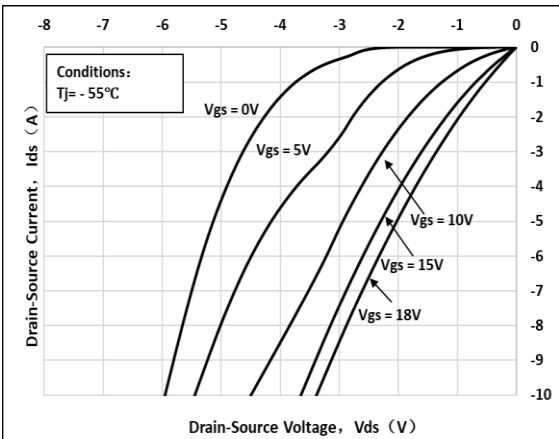


Fig 12: 3rd Quadrant Characteristic(T_J=25°C)

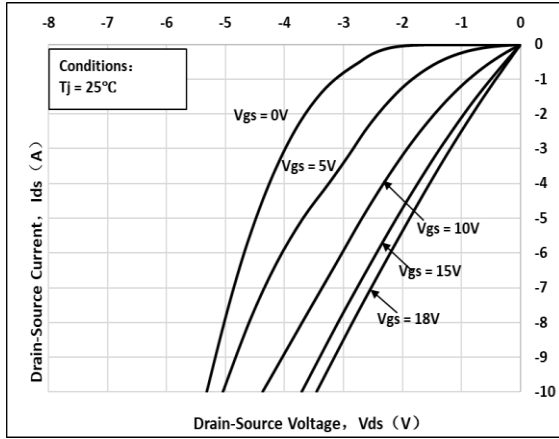


Fig 13: 3rd Quadrant Characteristic(TJ=175°C)

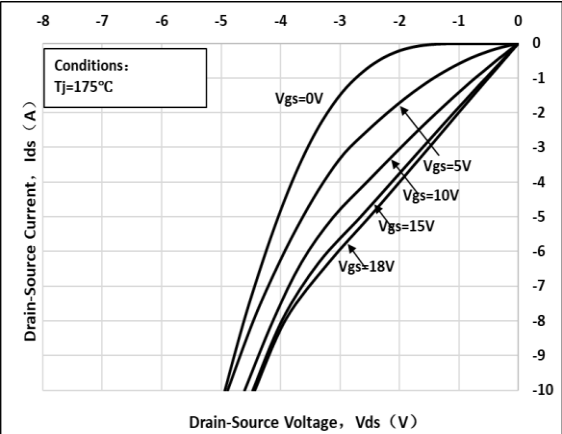


Fig 15:Continuous Drain Current vs.Case Temperature

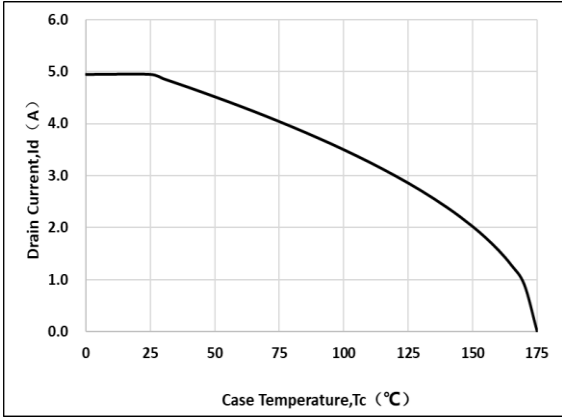


Fig 17: Capacitance Characteristics

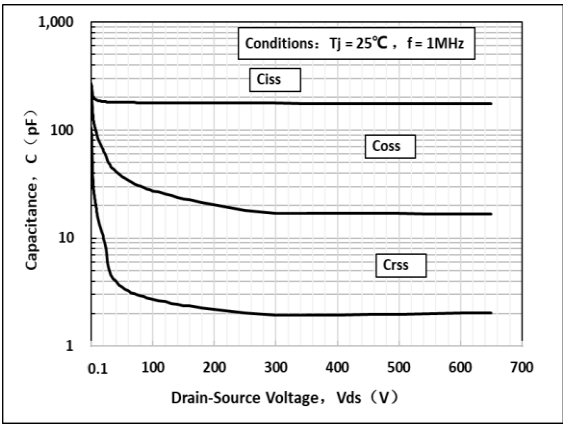


Fig 14: Gate Charge Characteristics

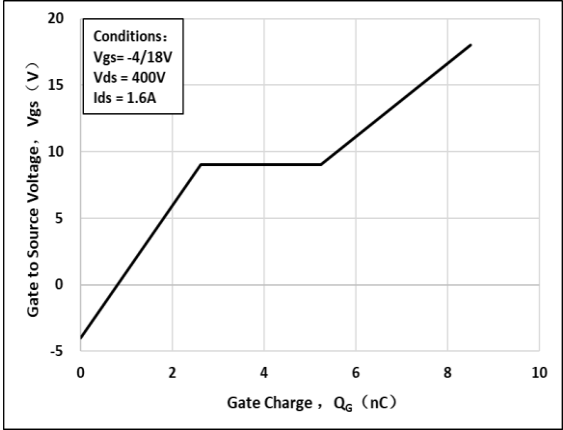


Fig 16: Safe Operating Area

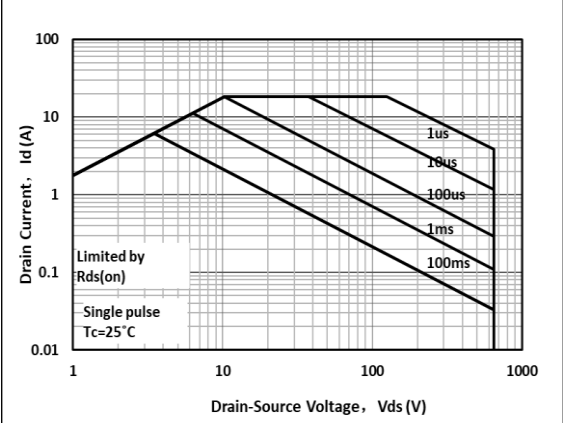
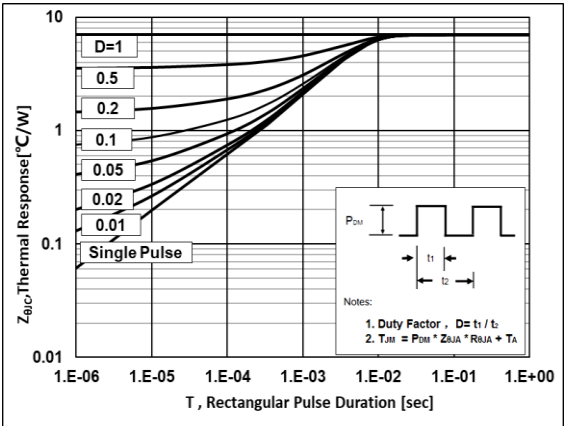


Fig 18: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

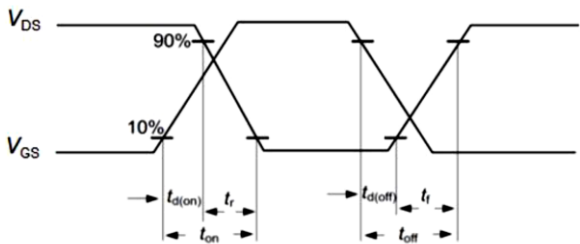


Figure B. Dynamic test circuit

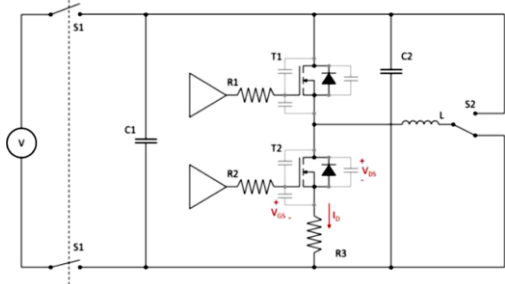


Figure C. Definition of body diodeswitching characteristics

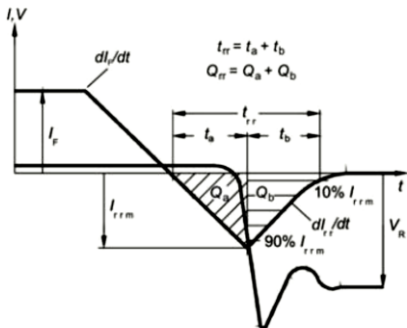
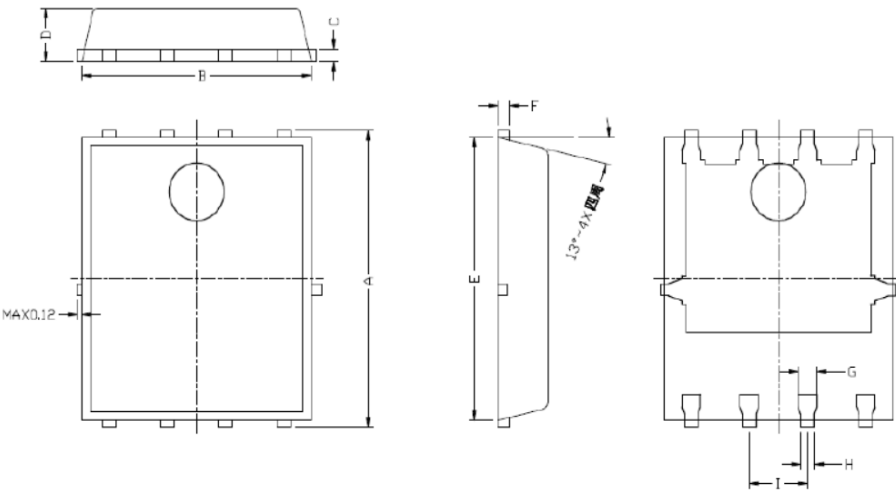


Figure C. Definition of diode switching characteristics

Package Outline:



项目	规范(mm)	
	MIN	MAX
A	6.05	6.25
B	4.975	5.025
C	0.246	0.262
D	1.075	1.125
E	5.835	5.885
F	0.246	0.262
G	0.3	0.5
H	0.2	0.4
I	1.26	1.28

Contact Information

TANI website: <http://www.tanisemi.com> Email: tani@tanisemi.com

For additional information, please contact your local Sales Representative.



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