

Features

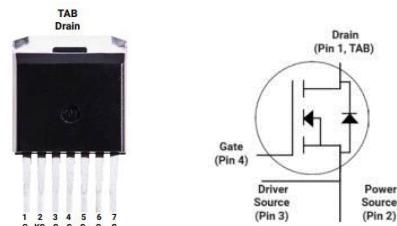
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness

Product Summary

V_{DS}	1700V
$R_{DS(on)}_{typ}$	1000mΩ
I_D	6.7A

Applications

- Solar Inverters
- Switch Mode Power Supplies
- Auxiliary power supplies
- Smart meters


Package Marking and Ordering Information

Part #	Marking	Package	
T1M1K170J	1M1K170J	TO-263-7	

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1700	V
Continuous drain current $T_C = 25^\circ\text{C}$	I_D	6.7	A
$T_C = 100^\circ\text{C}$		5	
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	I_D pulse	16.7	A
Avalanche energy, single pulse ($L=10\text{mH}$)	E_{AS}	90	mJ
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}	86	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

- Example of acceptable V_{GS} waveform



Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	1.7	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at $T_j = 25$ °C, unless otherwise specified)

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

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	1700	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	1.8	3	4.5	V	$V_{DS}=V_{GS}, I_D=380\mu A$
Zero gate voltage drain current	I_{DSS}	-	1	10	μA	$V_{DS}=1700V, V_{GS}=0V$
		-	5	-		$T_C=25^\circ C$ $T_C=175^\circ C$
Gate-source leakage current	I_{GSS}	-		100	nA	$V_{GS}=20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	700	910	$m\Omega$	$V_{GS}=18V, I_D=1A,$ $T_j=25^\circ C$ $T_j=175^\circ C$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	285	-	pF	$V_{DS} = 1000V$ $V_{GS} = 0V$ $T_j = 25^\circ C$ $V_{AC} = 25mV$ $f = 1MHz$
Output Capacitance	C_{oss}	-	15.3	-		
Reverse Transfer Capacitance	C_{rss}	-	2.2	-		
Gate Total Charge	Q_G	-	16.5	-	nC	$V_{DS} = 1000V$ $V_{GS} = -5/18V$ $I_D = 1A$
Gate-Source charge	Q_{gs}	-	2.7	-		
Gate-Drain charge	Q_{gd}	-	12.5	-		
Turn-On Switching Energy	E_{ON}	-	73.9	-	μJ	$V_{DD} = 1000V$ $V_{GS} = -3.5/+18V$ $I_D = 2A$ $R_G = 10\Omega$ $L = 1880\mu H$
Turn-Off Switching Energy	E_{OFF}	-	20.4	-		
Turn-on delay time	$t_{d(on)}$	-	6.2	-		
Rise time	t_r	-	13.7	-	ns	
Turn-off delay time	$t_{d(off)}$	-	9.4	-		
Fall time	t_f	-	45.4	-		
Gate resistance	R_G	-	18.0	-	Ω	$V_{AC} = 25mV, f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}		4		V	$V_{GS}=0V, I_{SD}=1A, T_j=25^\circ C$
			3.8			$V_{GS}=0V, I_{SD}=1A, T_j=175^\circ C$
Body Diode Reverse Recovery Time	t_{rr}	-	33.5	-	ns	$V_R = 1000V, V_{GS} = -3.5V/+18V$
Body Diode Reverse Recovery Charge	Q_{rr}	-	56.1	-	nC	$I_D = 2A, R_g=30\Omega, di/dt = 1000A/\mu S, L=1880\mu H$

Typical Performance Characteristics

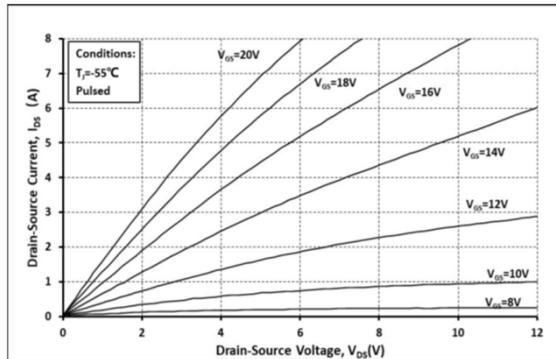
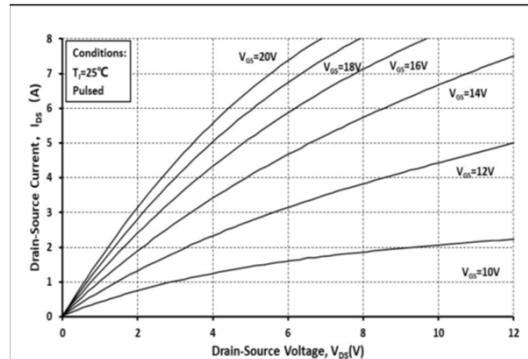
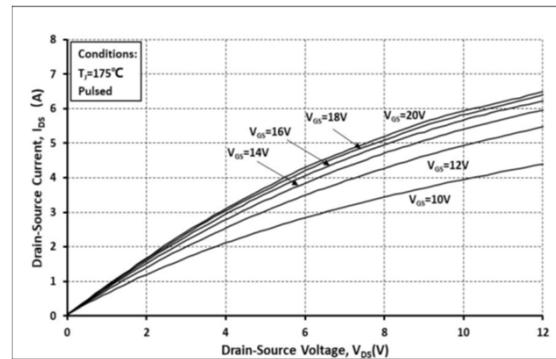
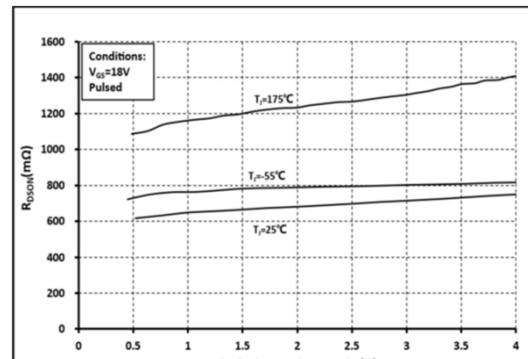
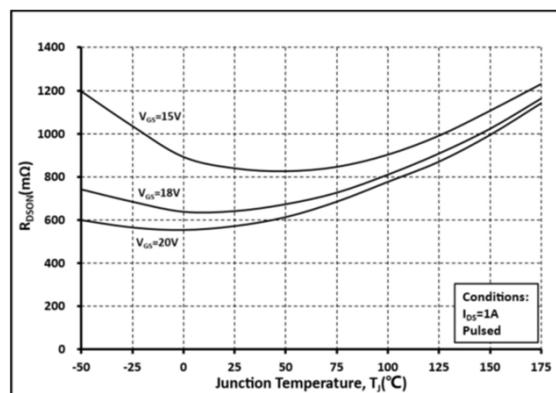
Fig 1. Output Characteristic ($T_J=-55^\circ\text{C}$)Fig 2. Output Characteristic ($T_J=25^\circ\text{C}$)Fig 3. Output Characteristic ($T_J=175^\circ\text{C}$)Fig 4: $R_{DS(on)}$ Vs I_{DS} CharacteristicFig 5: $R_{DS(on)}$ vs. Temperature

Fig 6: Transfer Characteristic

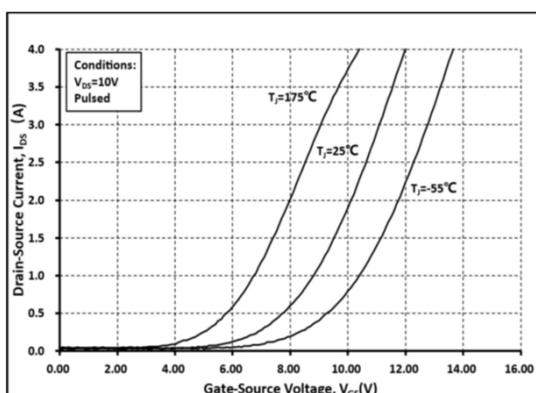


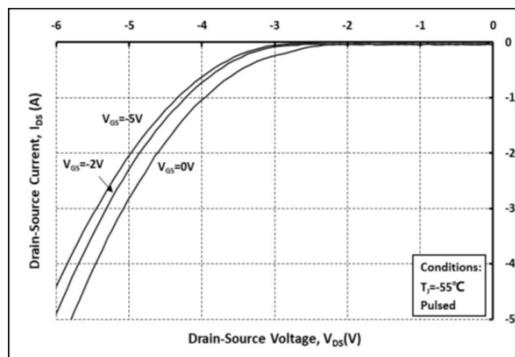
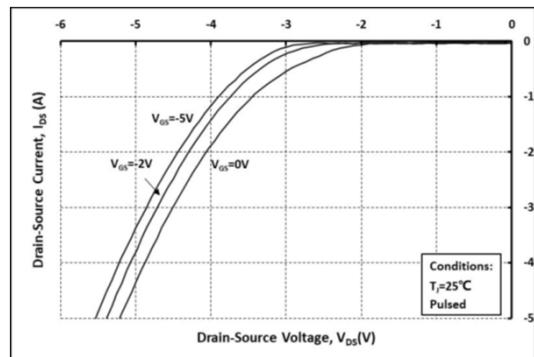
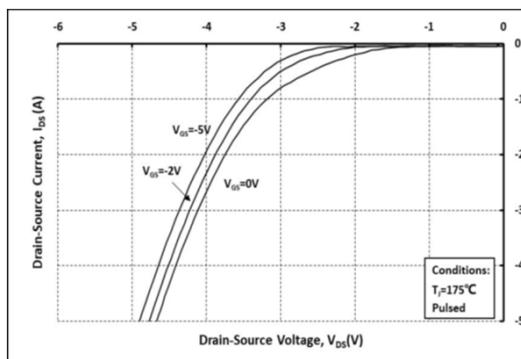
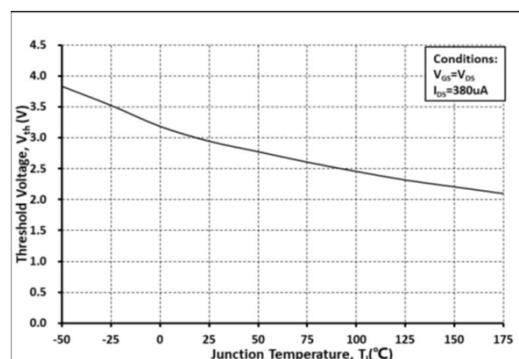
Fig 7: Body-diode Characteristic ($T_J = -55^\circ\text{C}$)Fig 8: Body-diode Characteristic ($T_J = 25^\circ\text{C}$)Fig 9: Body-diode Characteristic ($T_J = 175^\circ\text{C}$)Fig 10: V_{TH} Vs T_J Temperature Characteristic

Fig 11: Gate Charge Characteristics

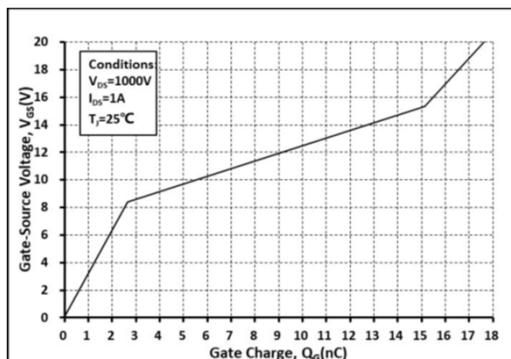
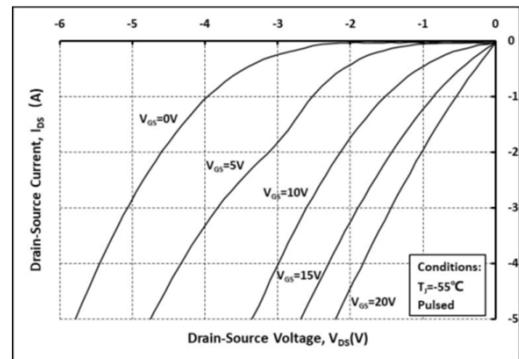
Fig 12: 3rd Quadrant Characteristic ($T_J = -55^\circ\text{C}$)

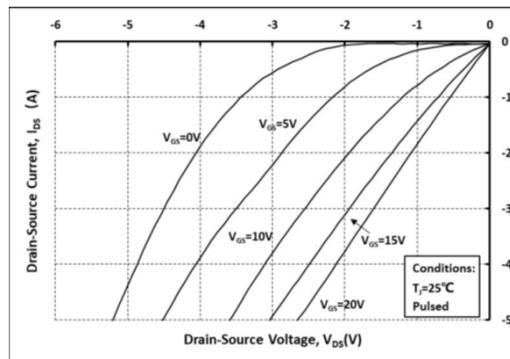
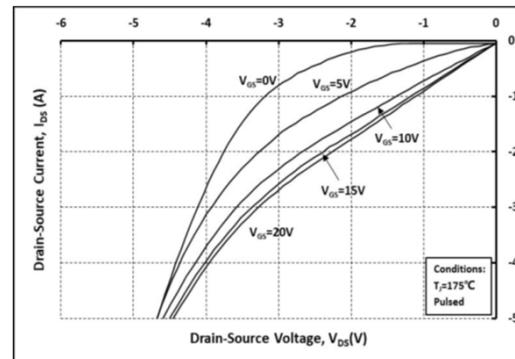
Fig 13: 3rd Quadrant Characteristic($T_J=25^\circ\text{C}$)Fig 14: 3rd Quadrant Characteristic($T_J=175^\circ\text{C}$)

Fig 15: Capacitance Characteristic

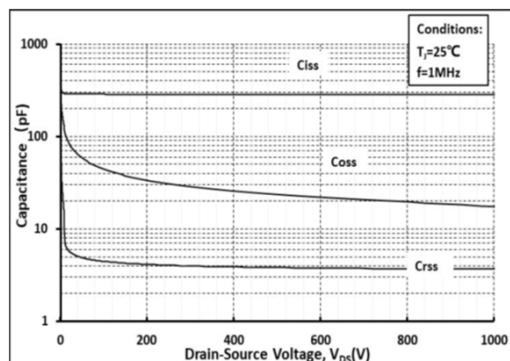


Fig 16: Safe Operating Area

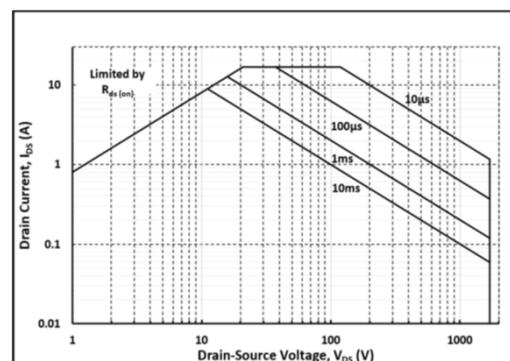
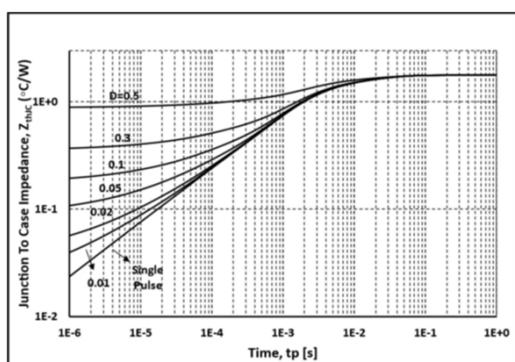


Fig 17: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

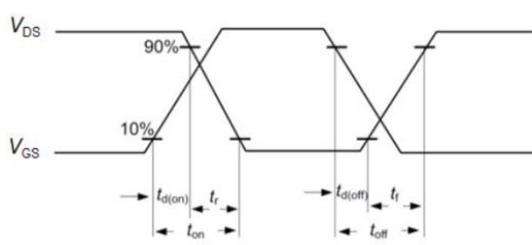


Figure B. Dynamic test circuit

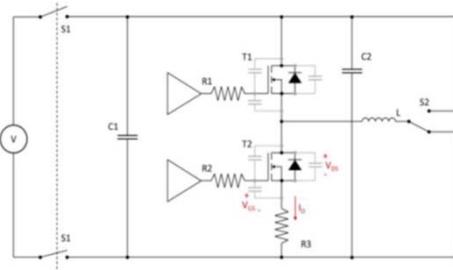


Figure C. Definition of body diodeswitching characteristics

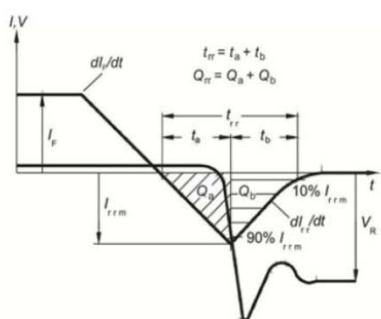
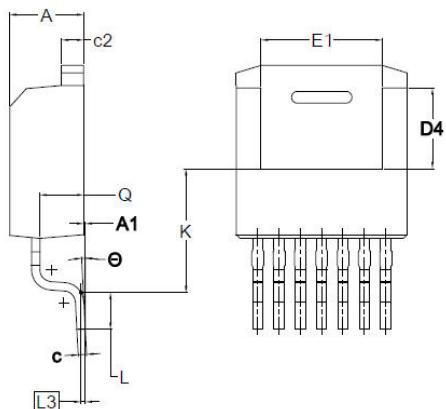
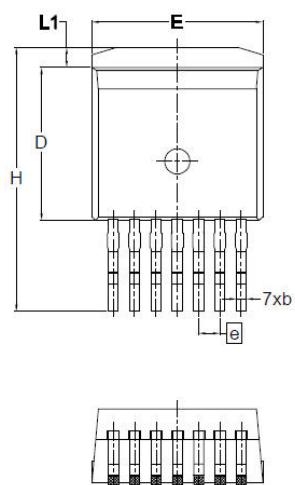


Figure C. Definition of diode switching characteristics

Package Outline:



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	4.30	4.40	4.50
A1	0.00	0.10	0.25
b	0.50	0.60	0.70
c	0.45	0.50	0.60
c2	1.20	1.30	1.40
D	8.93	9.08	9.23
D4	4.65	4.80	4.95
E	10.08	10.18	10.28
E1	6.82	7.22	7.62
e	1.27 BSC		
H	15.00	15.70	16.00
K	7.30		
L	1.90	2.20	2.50
L1	1.00	1.20	1.40
L3	0.25 BSC		
Q	2.45	2.60	2.75
Θ	0°	3°	7°

Contact Information

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For additional information, please contact your local Sales Representative.



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Product Specification Statement

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The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

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