

Features

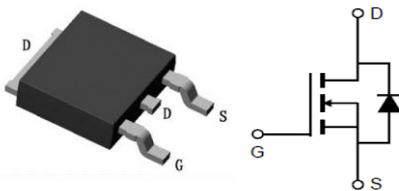
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness

Product Summary

V_{DS}	1200V
$R_{DS(on)}_{typ}$	320mΩ
I_D	7.6A

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC-DC Converters
- Battery Chargers



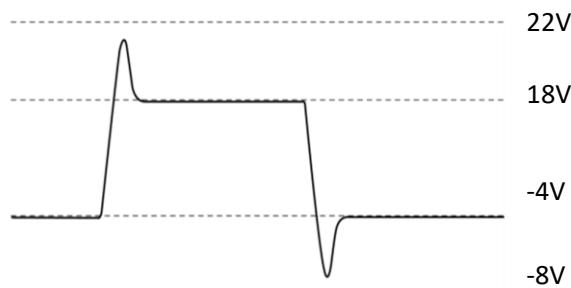
Package Marking and Ordering Information

Part #	Marking	Package
T1M320120E	1M320120E	TO-252

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current $T_C = 25^\circ C, V_{GS} = 18V$ $T_C = 100^\circ C, V_{GS} = 18V$	I_D	7.6 5.5	A
Pulsed drain current ($T_C = 25^\circ C, t_p$ limited by T_{jmax})	I_D pulse	20	A
Gate-Source voltage	V_{GS}	-4/+18	V
Gate-Source voltage (Absolute maximum values)	V_{GSmax}	-8/+22	V
Power dissipation ($T_C = 25^\circ C$)	P_{tot}	60	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}	2.50	°C/W

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}	1200	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	2	3.1	4	V	$V_{DS}=V_{GS}, I_D=1mA$
Zero gate voltage drain current	I_{DSS}	-	1	20	μA	$V_{DS}=1200V, V_{GS}=0V$ $T_C=25^\circ C$ $T_C=175^\circ C$
Gate-source leakage current	I_{GSS}	-		100	nA	$V_{GS}=18V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	320	450	$m\Omega$	$V_{GS}=18V, I_D=3.6A,$ $T_J=25^\circ C$ $T_J=175^\circ C$
Transconductance	g_{fs}	-	3	-	S	$V_{DS}=20V, I_D=3.6A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	324	-	pF	$V_{DS} = 1000V$ $V_{GS} = 0V$ $T_J = 25^\circ C$ $V_{AC} = 25mV$ $f = 1MHz$
Output Capacitance	C_{oss}	-	24	-		
Reverse Transfer Capacitance	C_{rss}	-	4	-		
Gate Total Charge	Q_G	-	23.5	-	nC	$V_{DS} = 800V$ $V_{GS} = 0/18V$ $I_D = 3.6A$ $I_G = 10mA$
Gate-Source charge	Q_{gs}	-	3.2	-		
Gate-Drain charge	Q_{gd}	-	14	-		
Turn-On Switching Energy	E_{ON}	-	9	-		
Turn-Off Switching Energy	E_{OFF}	-	140	-		
Turn-on delay time	$t_{d(on)}$	-	10.9	-	ns	$V_{DD}=800V,$ $V_{GS}=-4/18V$ $R_G=5\Omega,$ $I_D=3.6A$ Inductive Load, $T_J=25^\circ C$
Rise time	t_r	-	16.2	-		
Turn-off delay time	$t_{d(off)}$	-	11.2	-		
Fall time	t_f	-	30.4	-		
Gate resistance	R_G	-	5.9	-	Ω	$V_{AC} = 25mV, f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}		3.6		V	$V_{GS} = 0V, I_{SD} = 4A, T_J = 25^{\circ}C$
			3.2			$V_{GS} = 0V, I_{SD} = 4A, T_J = 175^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	12.3	-	ns	$V_R = 800V, V_{GS} = 0V$ $I_D = 3.6A$
Body Diode Reverse Recovery Charge	Q_{rr}	-	23.5	-	nC	$di/dt = 800A/\mu S$ $T_J = 25^{\circ}C$

Typical Performance Characteristics

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

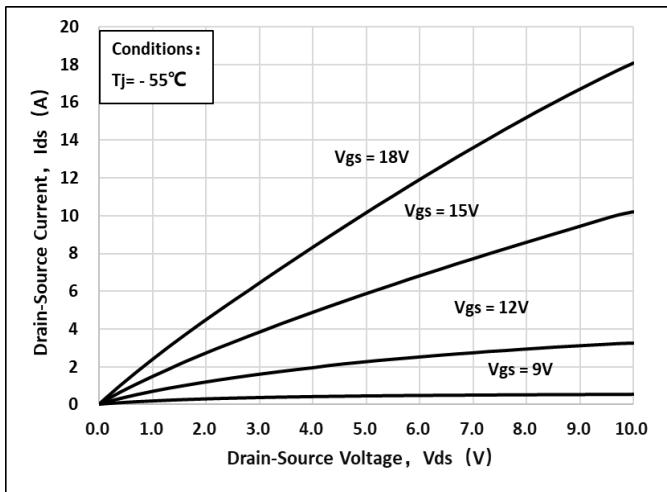


Fig 2. Output Characteristic ($T_j = 25^\circ\text{C}$)

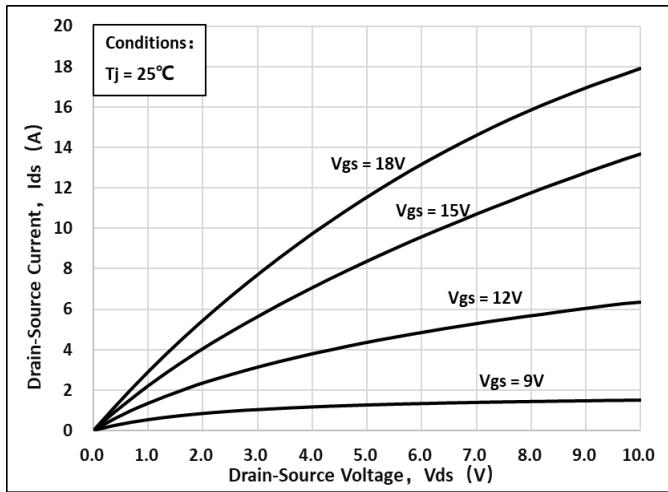


Fig 3. Output Characteristic ($T_j = 175^\circ\text{C}$)

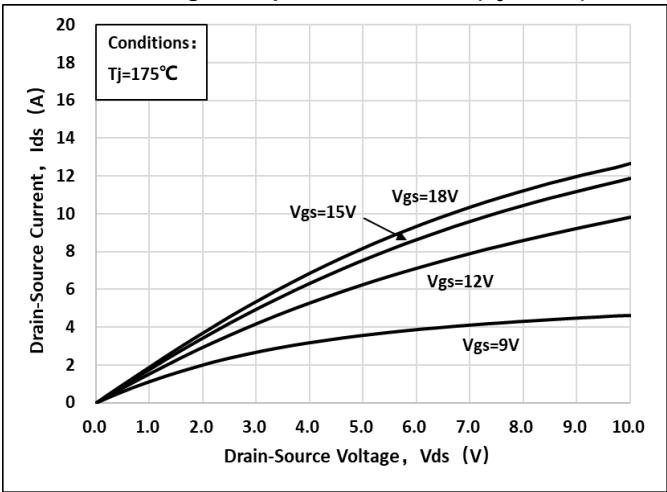


Fig 4: R_{dson} Vs Ids Characteristic

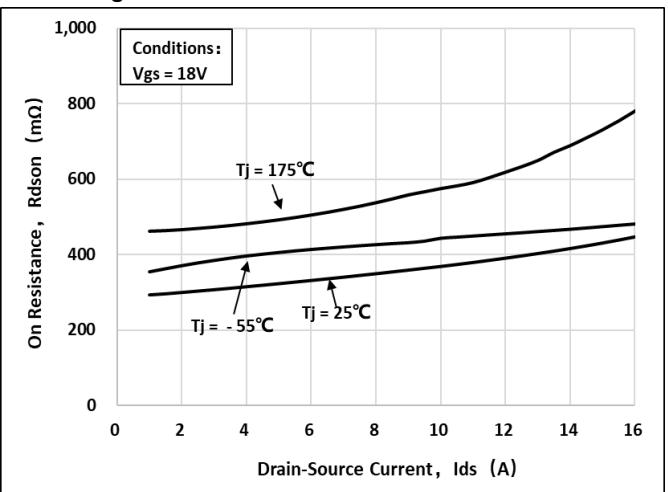


Fig 5: $R_{d(on)}$ vs. Temperature

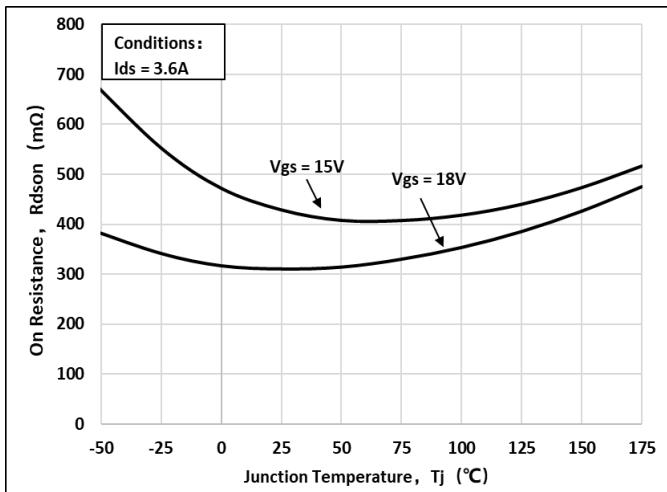


Fig 6: Transfer Characteristic

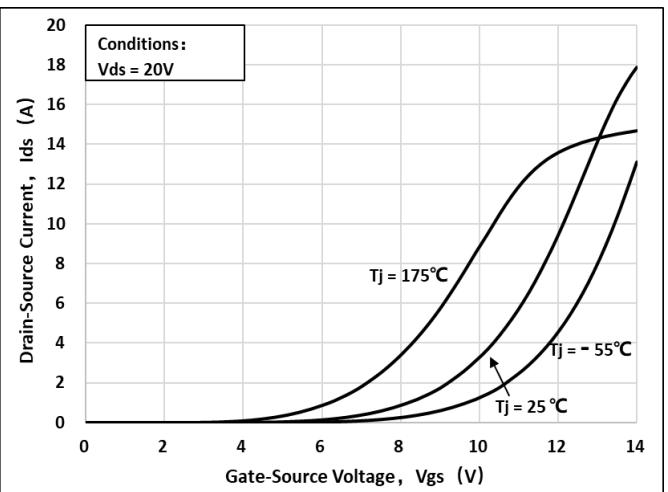


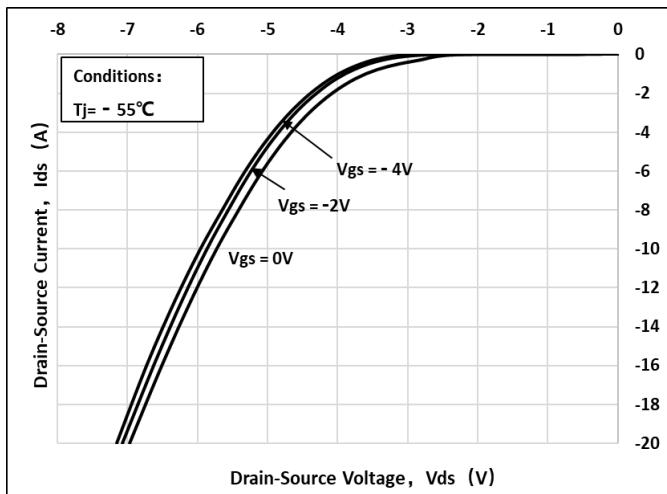
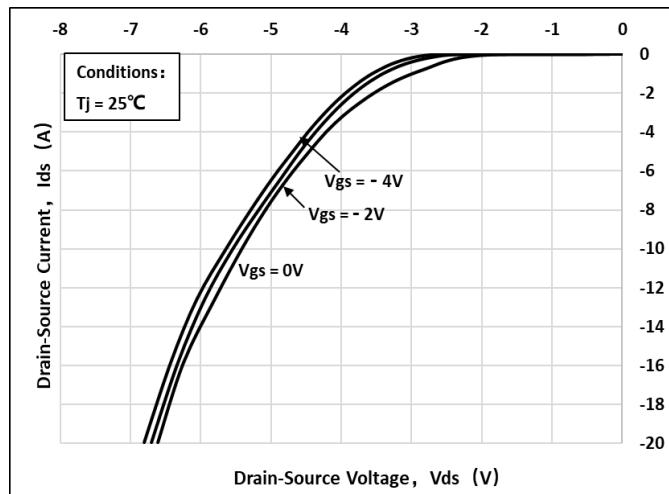
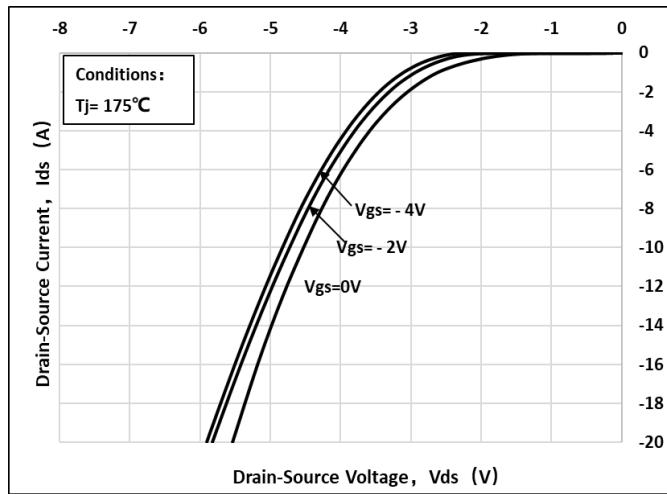
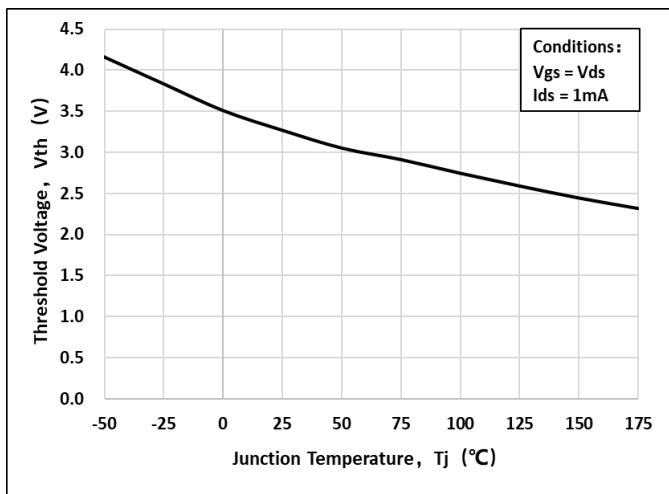
Fig 7: Body-diode Characteristic ($T_J = -55^\circ\text{C}$)Fig 8: Body-diode Characteristic ($T_J = 25^\circ\text{C}$)Fig 9: Body-diode Characteristic ($T_J = 175^\circ\text{C}$)Fig 10: V_{th} Vs T_J Temperature Characteristic

Fig 11: Gate Charge Characteristics

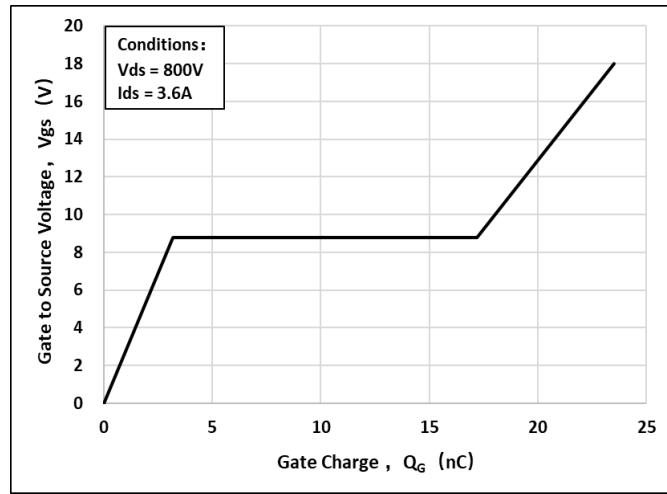
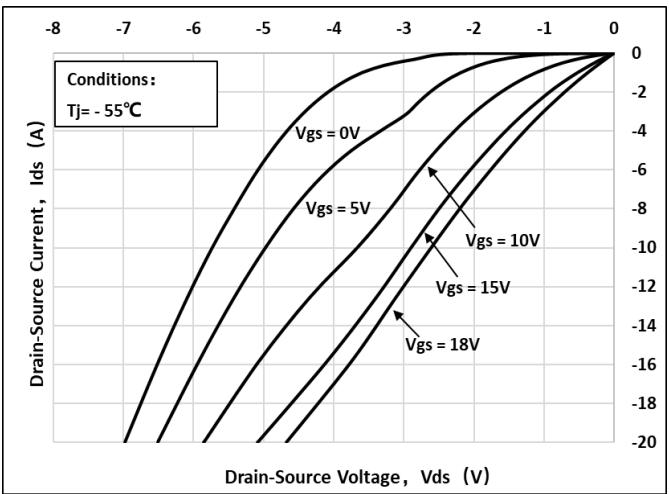
Fig 12: 3rd Quadrant Characteristic ($T_J = -55^\circ\text{C}$)

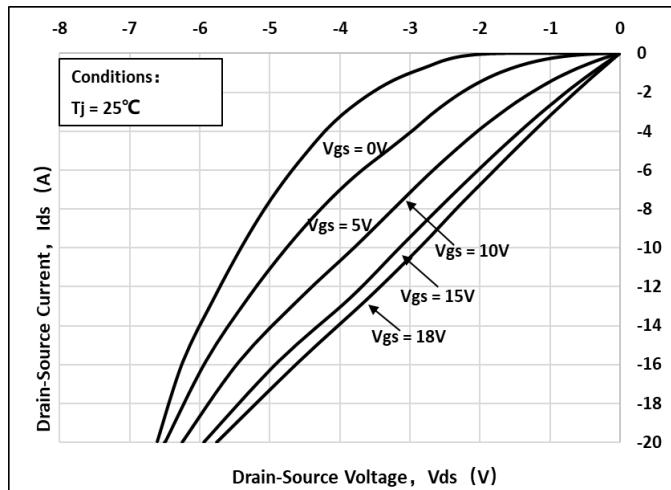
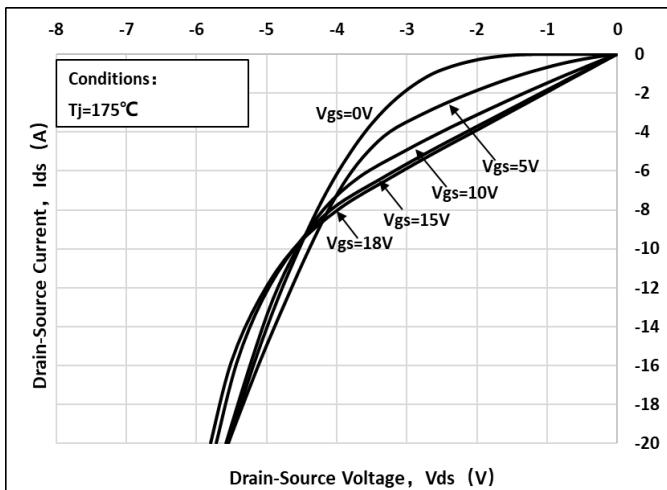
Fig 13: 3rd Quadrant Characteristic($T_J=25^\circ\text{C}$)Fig 14: 3rd Quadrant Characteristic($T_J=175^\circ\text{C}$)

Fig 15: Capacitance Characteristic

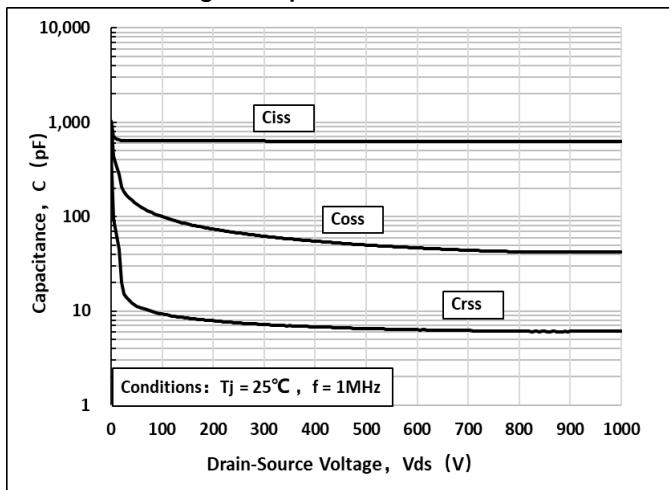


Fig 16: Safe Operating Area

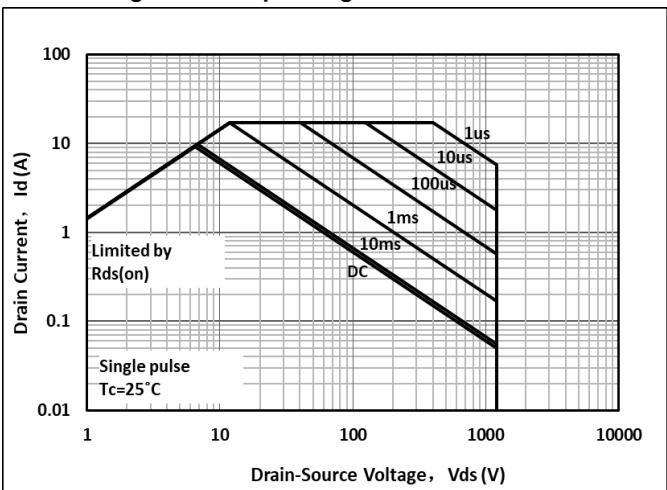
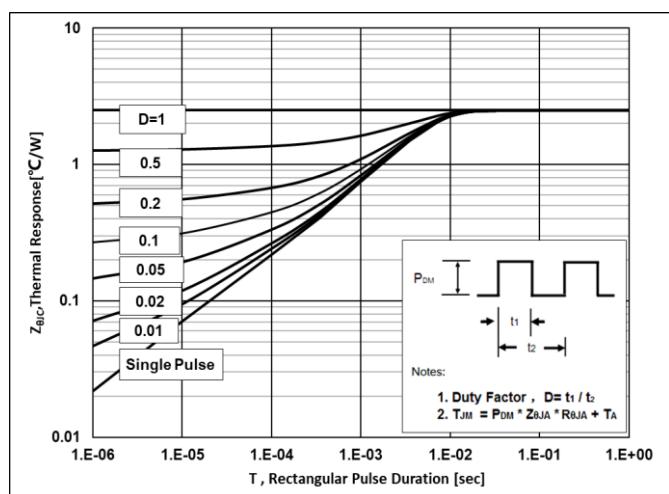


Fig 17: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

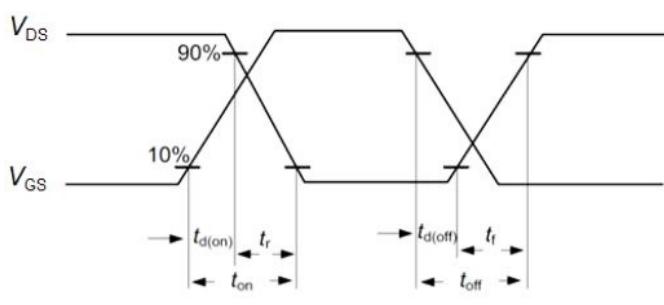


Figure B. Dynamic test circuit

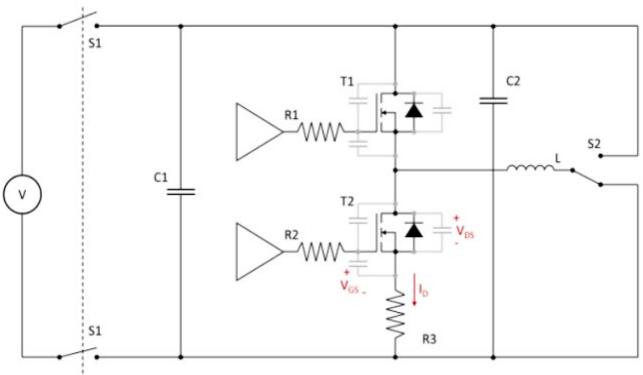


Figure C. Definition of body diodeswitching characteristics

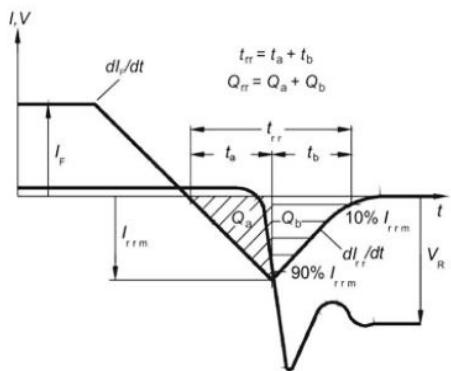
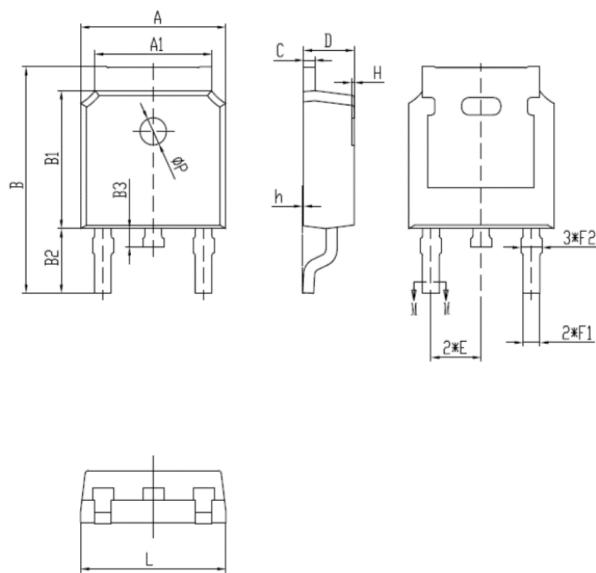


Figure C. Definition of diode switching characteristics

Package Outline:



项目	规范(mm)	
	MIN	MAX
A	6.50	6.70
A1	5.16	5.46
B	9.77	10.17
B1	6.00	6.20
B2	2.60	3.00
B3	0.70	0.90
C	0.45	0.61
D	2.20	2.40
E	2.186	2.386
F1	0.67	0.87
F2	0.76	0.96
H	0.00	0.30
h	0.00	0.127
L	6.50	6.70
Φ P	1.10	1.30



Contact Information

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For additional information, please contact your local Sales Representative.



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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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The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage.

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