

Features

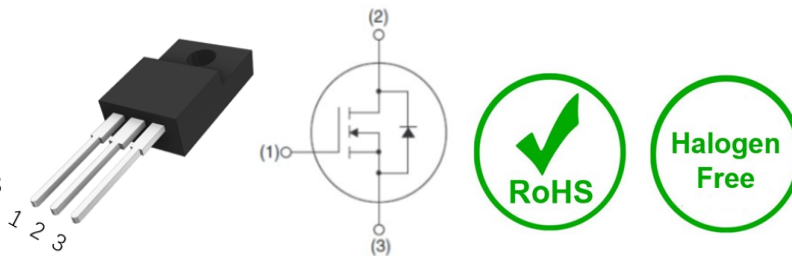
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

Product Summary

V_{DS}	1200V
$R_{DS(on)_{typ}}$	320mΩ
I_D	7A

Applications

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



Package Marking and Ordering Information

Part #	Marking	Package
T1M320120F	1M320120F	TO-220F

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current $T_C = 25^\circ\text{C}$, $V_{GS} = 18\text{V}$ $T_C = 100^\circ\text{C}$, $V_{GS} = 18\text{V}$	I_D	7 5	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	16	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}	50	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}	3.0	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at $T_j = 25\text{ °C}$, unless otherwise specified)

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

Static Characteristic

Drain-source breakdown voltage	V_{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	$V_{DS}=1200V, V_{GS}=0V$ $T_C=25\text{ °C}$
		-	5	-		$T_C=175\text{ °C}$
Gate-source leakage current	I_{GSS}	-		100	nA	$V_{GS}=18V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	320	480	mΩ	$V_{GS}=18V, I_D=3.6A,$ $T_j=25\text{ °C}$
		-	480	-		$T_j=175\text{ °C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	410	530	mΩ	$V_{GS}=15V, I_D=3.6A,$ $T_j=25\text{ °C}$
		-	520	-		$T_j=175\text{ °C}$

Dynamic Characteristic

Input Capacitance	C _{iss}	-	324	-	pF	V _{DS} = 1000V V _{GS} = 0V T _J = 25°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	-	μJ	V _{DD} =800V, V _{GS} =-4/18V R _G =5Ω, I _D =3.6A Inductive Load, T _J =25°C
Turn-Off Switching Energy	E _{OFF}	-	140	-		
Turn-on delay time	t _{d(on)}	-	10.9	-	ns	
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	$V_R = 800V, V_{GS} = 0V$ $I_D = 3.6A$ $di/dt = 800A/\mu S$ $T_J = 25^{\circ}C$
Body Diode Reverse Recovery Charge	Q_{rr}	-	23.5	-	nC	

Typical Performance Characteristics

Fig 1. Output Characteristic (T_J=-55°C)

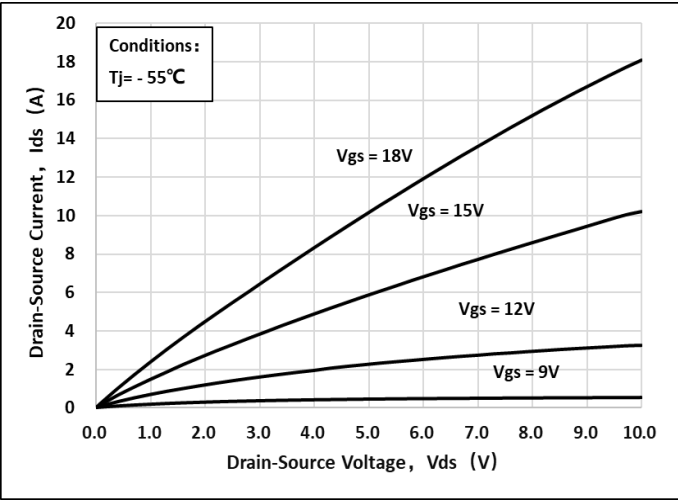


Fig 2. Output Characteristic (T_J=25°C)

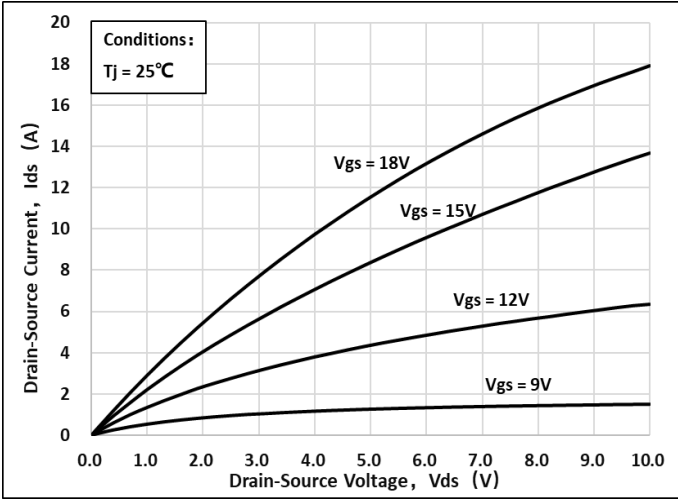


Fig 3. Output Characteristic (T_J=175°C)

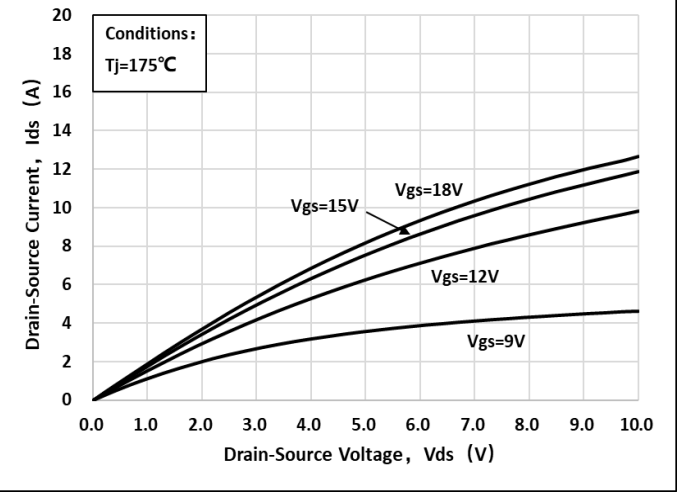


Fig 4: Rdson Vs Ids Characteristic

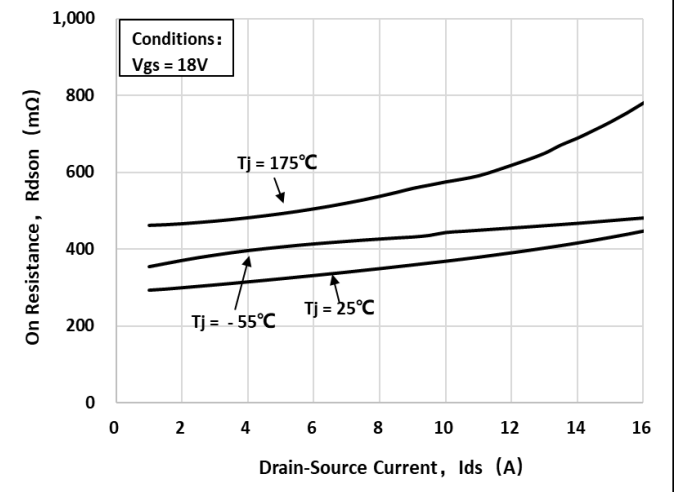


Fig 5: Rds(on) vs. Temperature

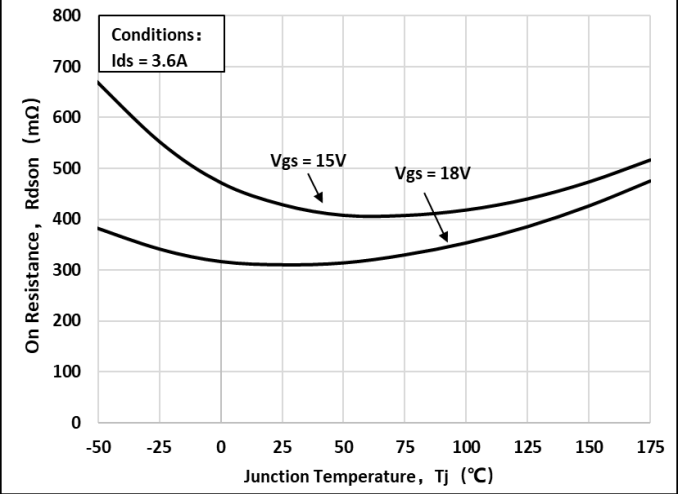


Fig 6: Transfer Characteristic

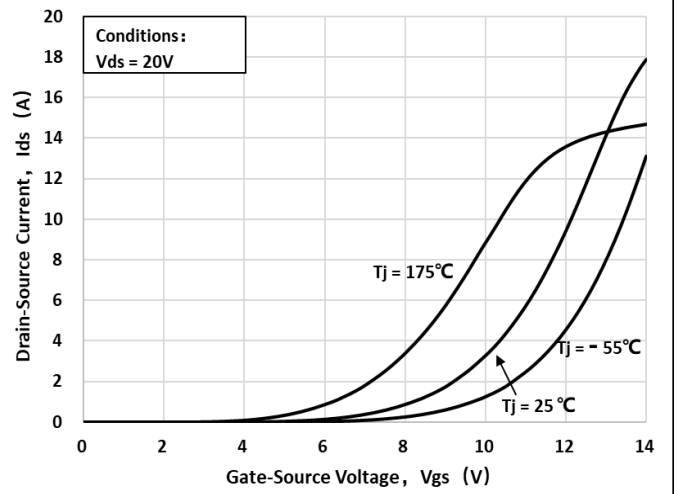


Fig 7: Body-diode Characteristic (T_J=-55°C)

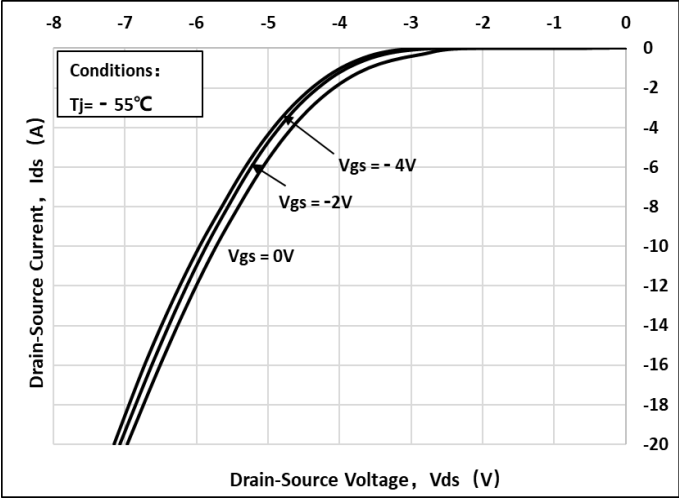


Fig 8: Body-diode Characteristic (T_J=25°C)

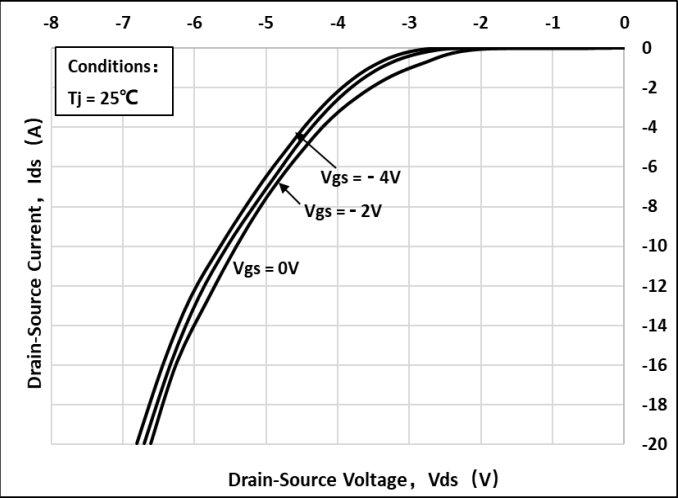


Fig 9: Body-diode Characteristic (T_J=175°C)

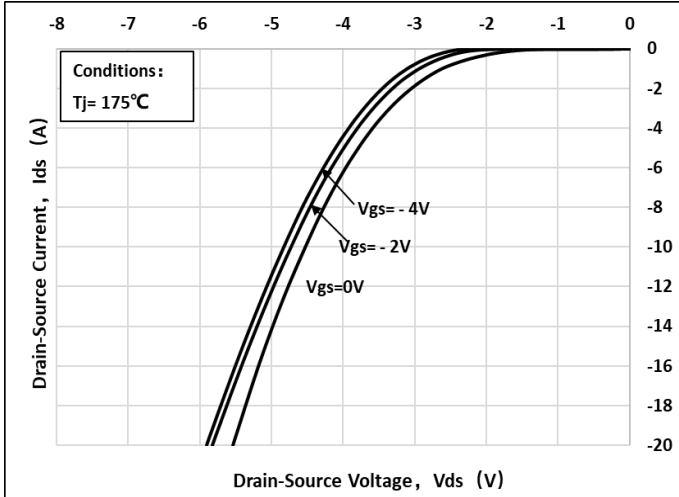


Fig 10: V_{TH} Vs T_J Temperature Characteristic

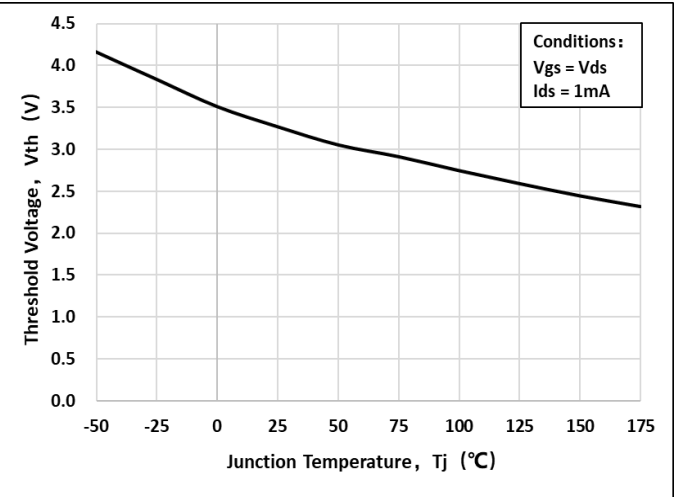


Fig 11: Gate Charge Characteristics

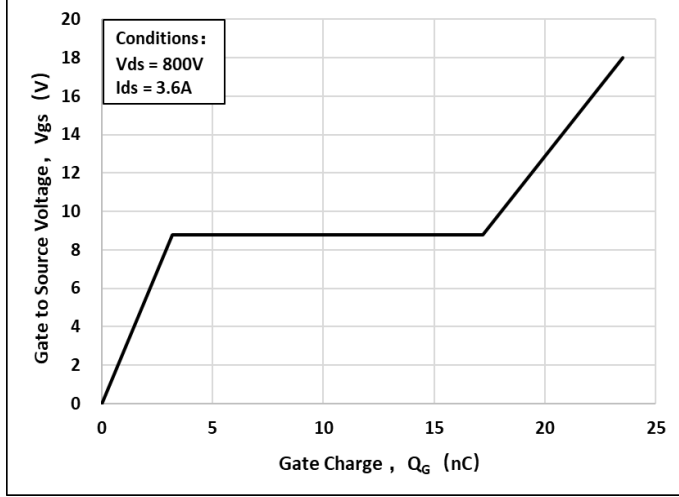


Fig 12: 3rd Quadrant Characteristic(T_J=-55°C)

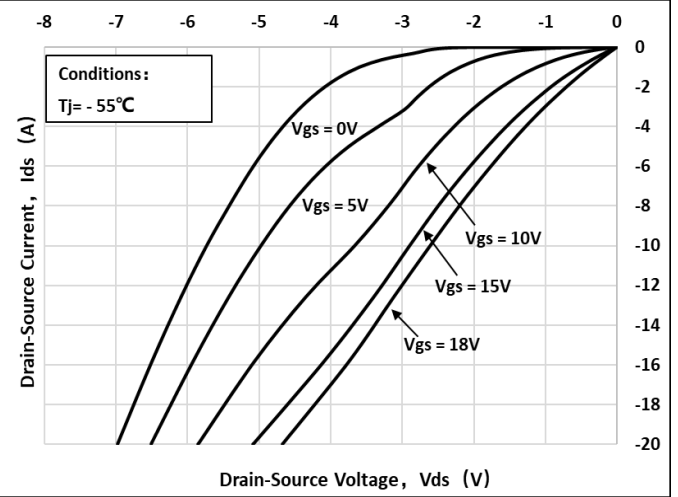


Fig 13: 3rd Quadrant Characteristic(T_J=25°C)

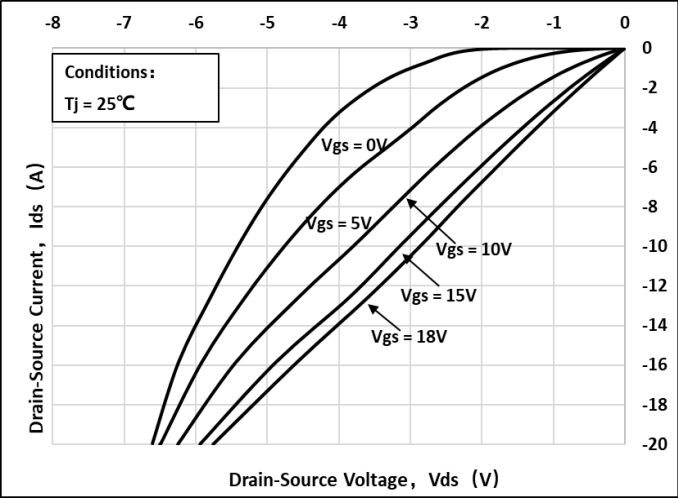


Fig 14: 3rd Quadrant Characteristic(T_J=175°C)

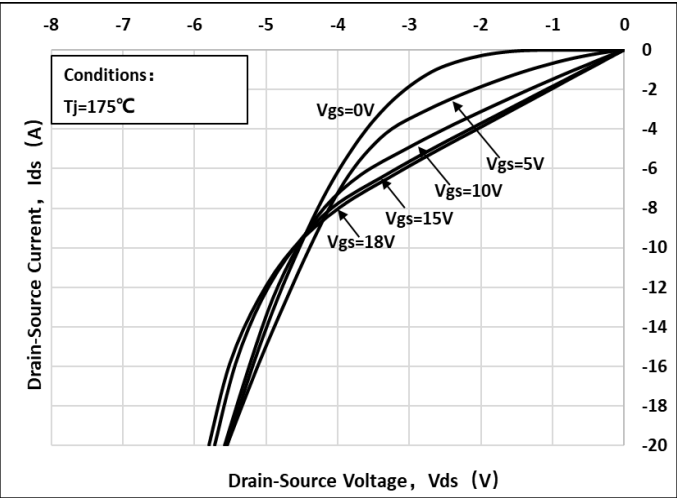


Fig 15: Capacitance Characteristic

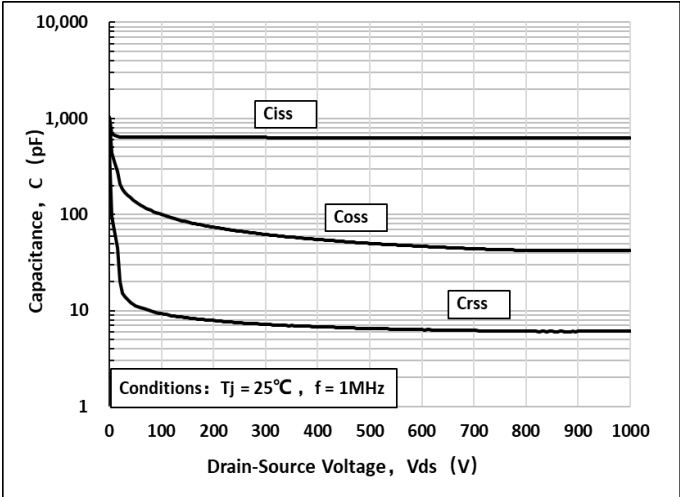


Fig 16: Safe Operating Area

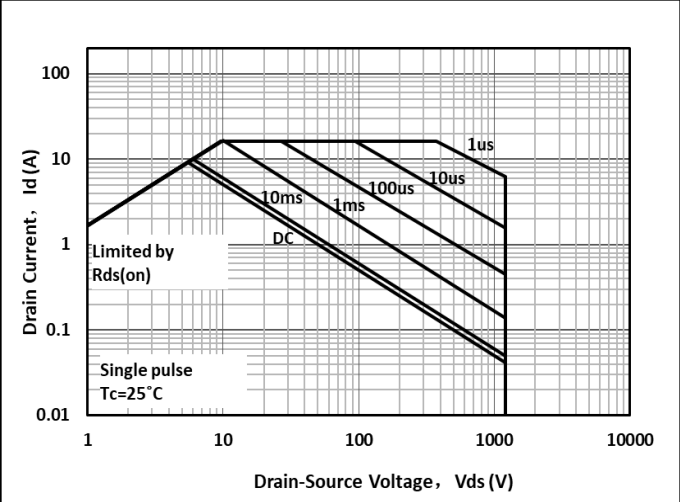
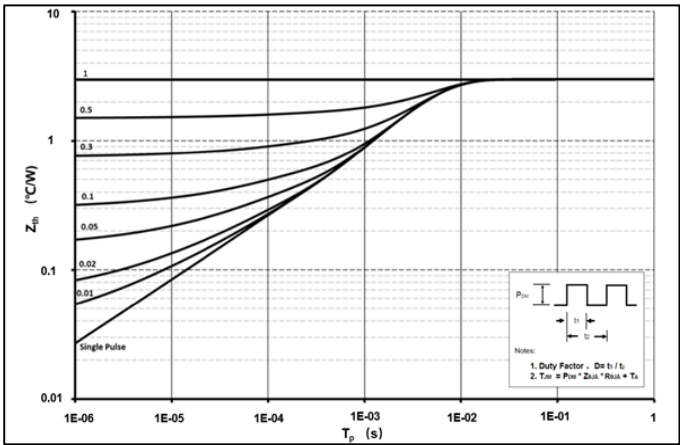


Fig 17: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

Figure B. Dynamic test circuit

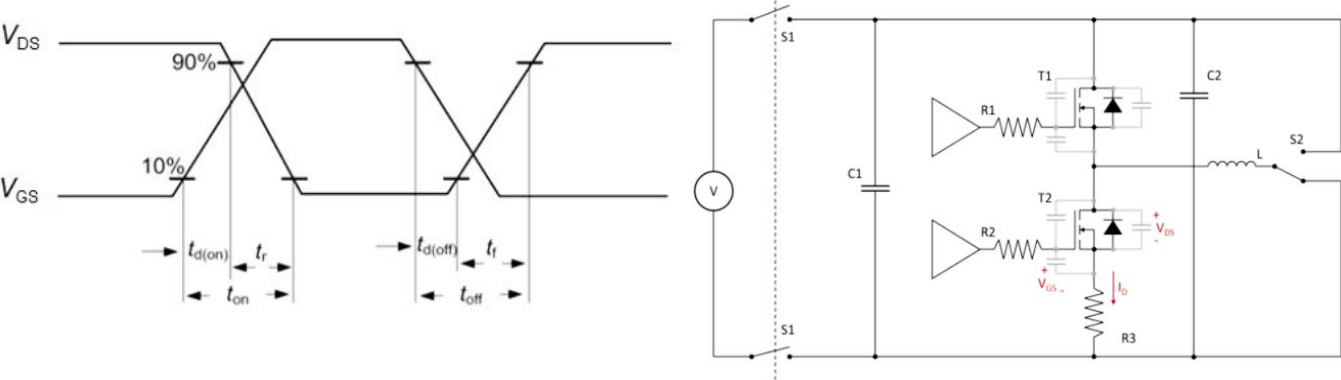


Figure C. Definition of body diodeswitching characteristics

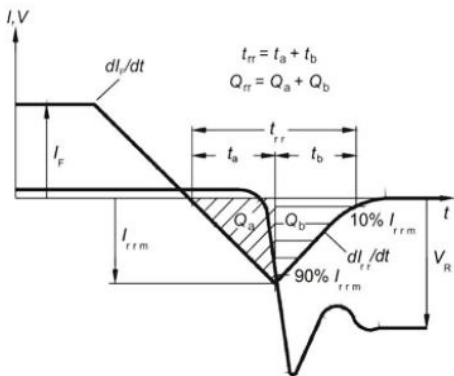
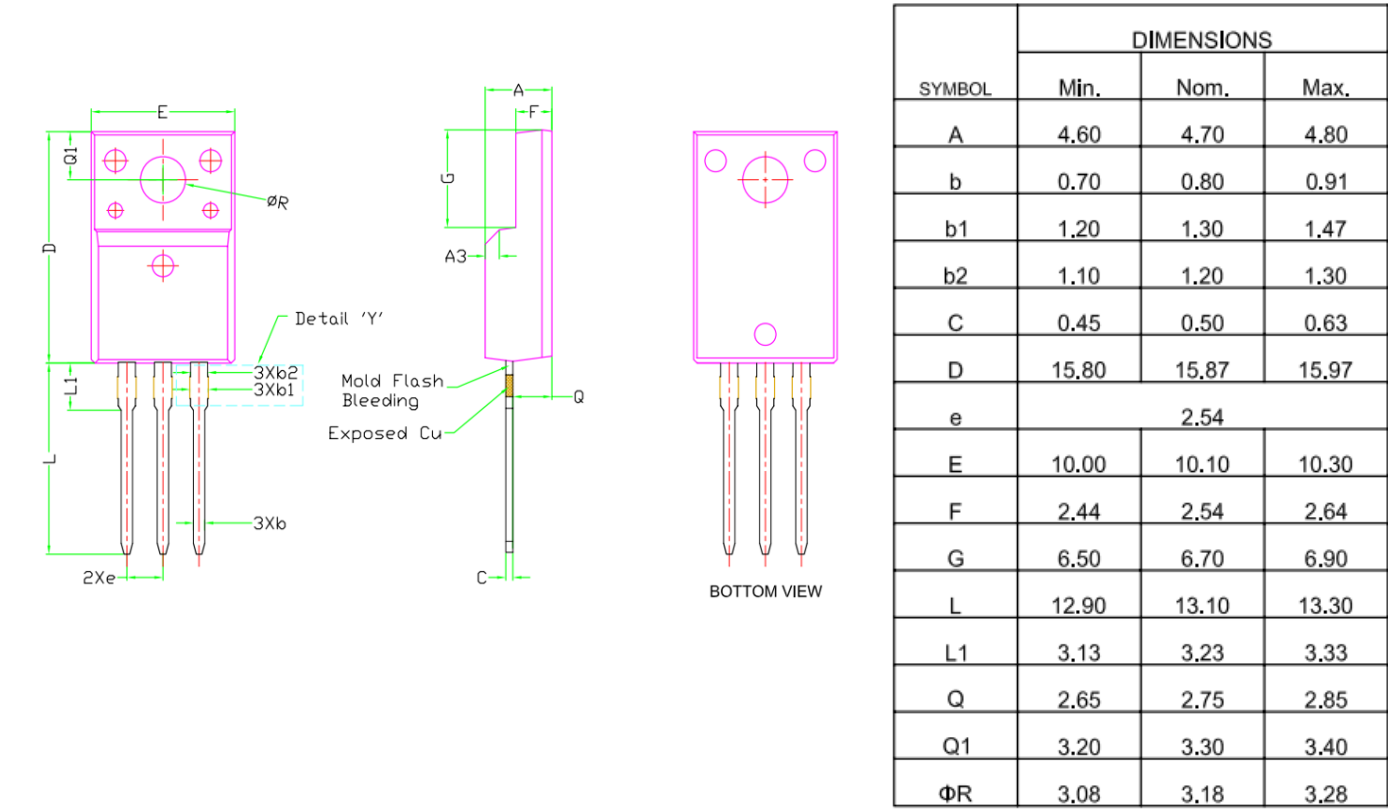


Figure C. Definition of diode switching characteristics

Package Outline:



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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