



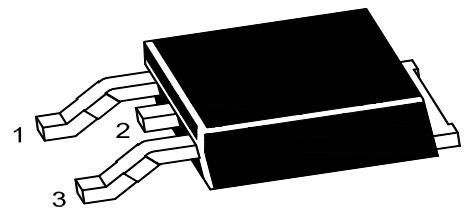
TN90N20TE

N-Channel Enhancement Mode Power MOSFET

## Features

- High density cell design for ultra low  $R_{DS(on)}$
- Excellent package for good heat dissipation
- $V_{DS} = 20V, I_D = 90A$
- $R_{DS(on)} < 4.0m\Omega$  @  $V_{GS} = 10V$

TO-252

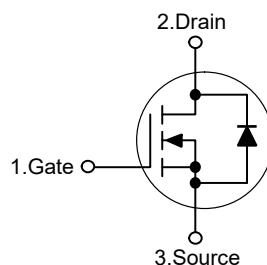


1. Gate 2. Drain 3. Source

## Applications

- Power switching application
- Hard switched and high frequency circuits

## Schematic Diagram



## Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	90	A
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	360	A
Single pulse avalanche energy <sup>Note4</sup>	$E_{AS}$	250	mJ
Maximum Power Dissipation	$P_D$	90	W
Junction Temperature	$T_J$	175	°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C

## Thermal Characteristics

Maximum Junction-to-Case <sup>Note2</sup>	$R_{eJC}$	1.67	°C/W
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**Electrical Characteristics**

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	--	--	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	--	--	±0.1	μA
Gate Threshold Voltage <sup>Note3</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.65	1.5	V
Drain-Source On-Resistance <sup>Note3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =45A	--	2.6	4.0	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	--	2.8	4.0	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =10A	--	--	5.5	mΩ
Forward Transconductance <sup>Note3</sup>	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =45A	22	--	--	S
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	--	2800	--	pF
Output Capacitance	C <sub>oss</sub>		--	510	--	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		--	265	--	pF
<b>Switching Characteristics</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =45A, V <sub>GS</sub> =5V, R <sub>G</sub> =1.8Ω	--	9	--	nS
Turn-on Rise Time	t <sub>r</sub>		--	24	--	nS
Turn-off Delay Time	t <sub>d(off)</sub>		--	37	--	nS
Turn-off Fall Time	t <sub>f</sub>		--	23	--	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =45A, V <sub>GS</sub> =10V	--	32	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	9	--	nC
Gate-Drain Charge	Q <sub>gd</sub>		--	11	--	nC
<b>Source-Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>Note3</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =90A	--	--	1.5	V
Diode Forward Current <sup>Note2</sup>	I <sub>S</sub>		--	--	90	A

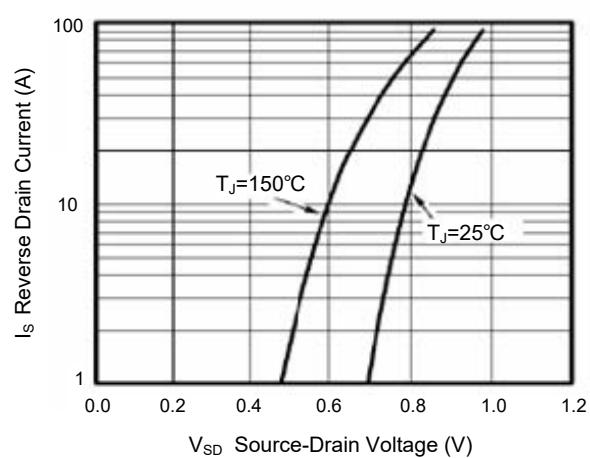
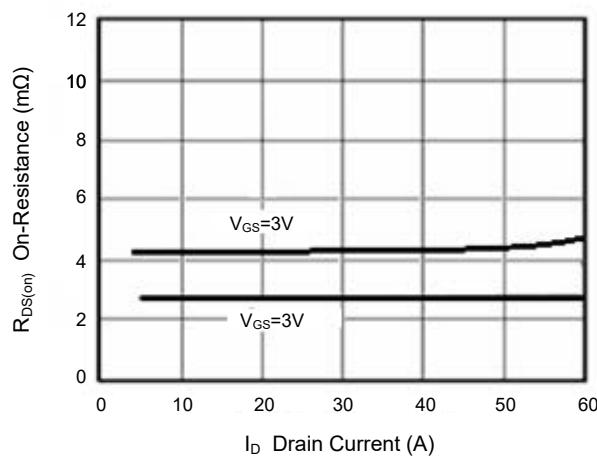
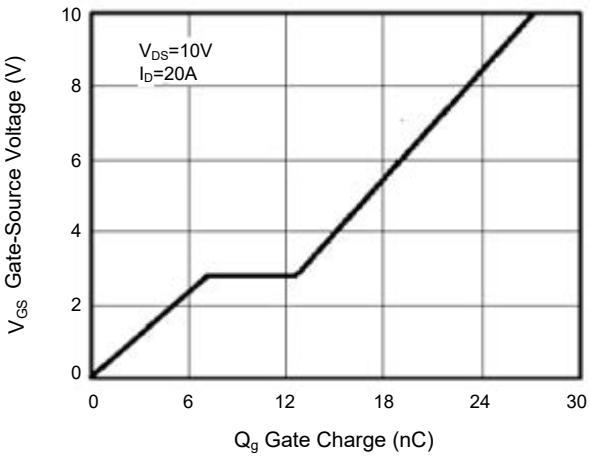
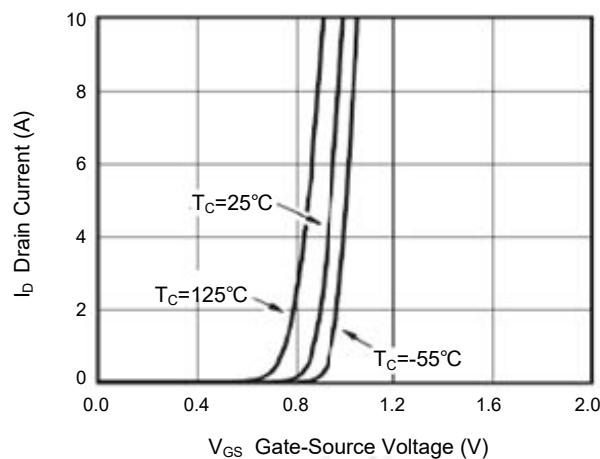
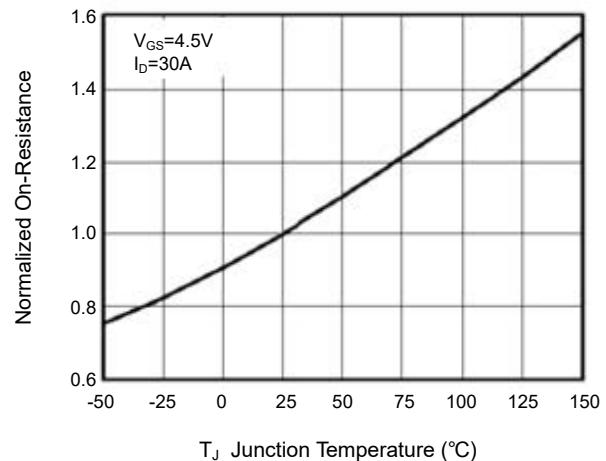
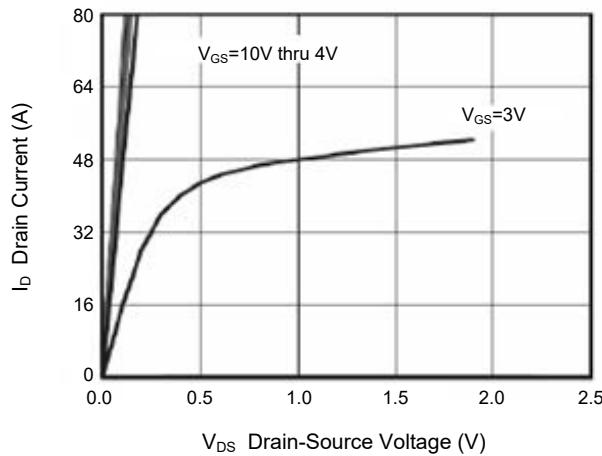
Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

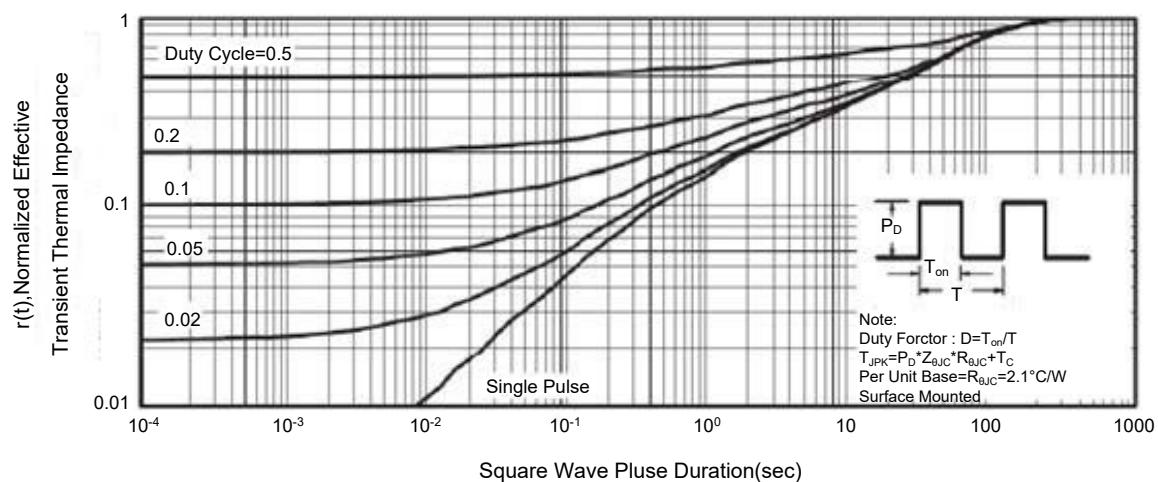
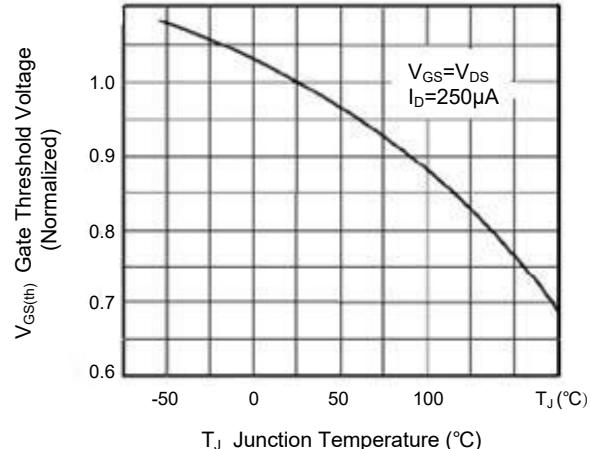
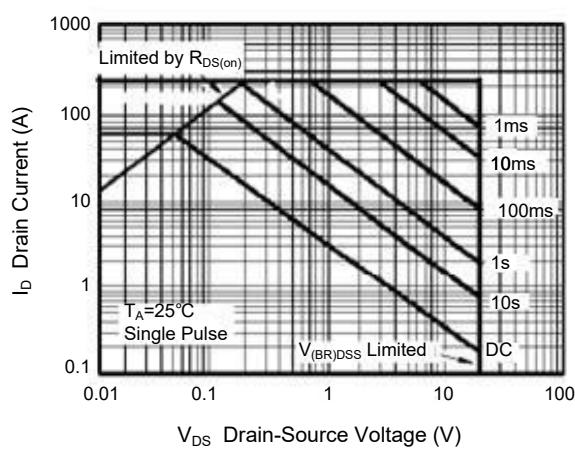
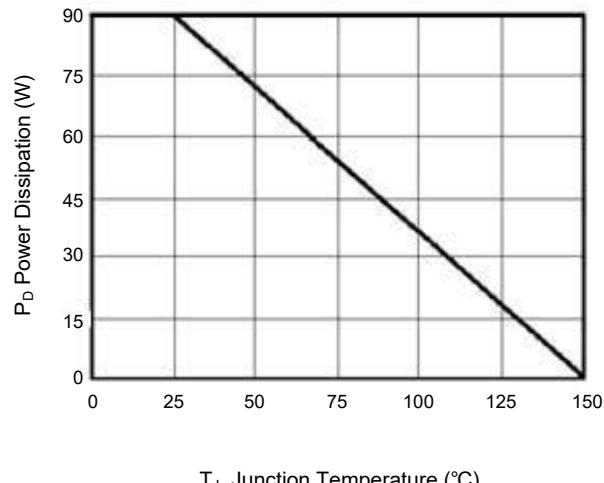
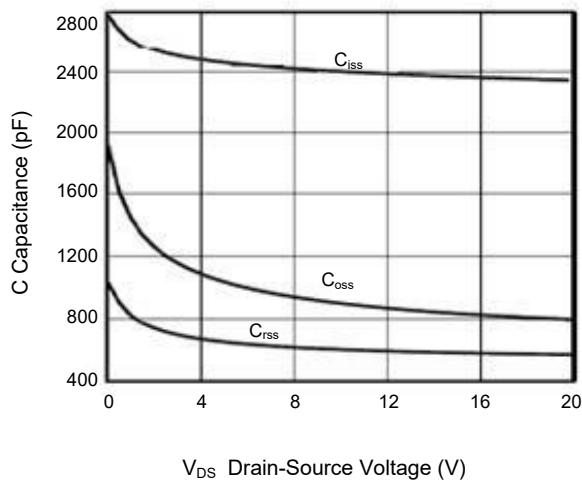
2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.

4. E<sub>AS</sub> condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=1.0mH, R<sub>g</sub>=25Ω.

## Typical Characteristic Curves

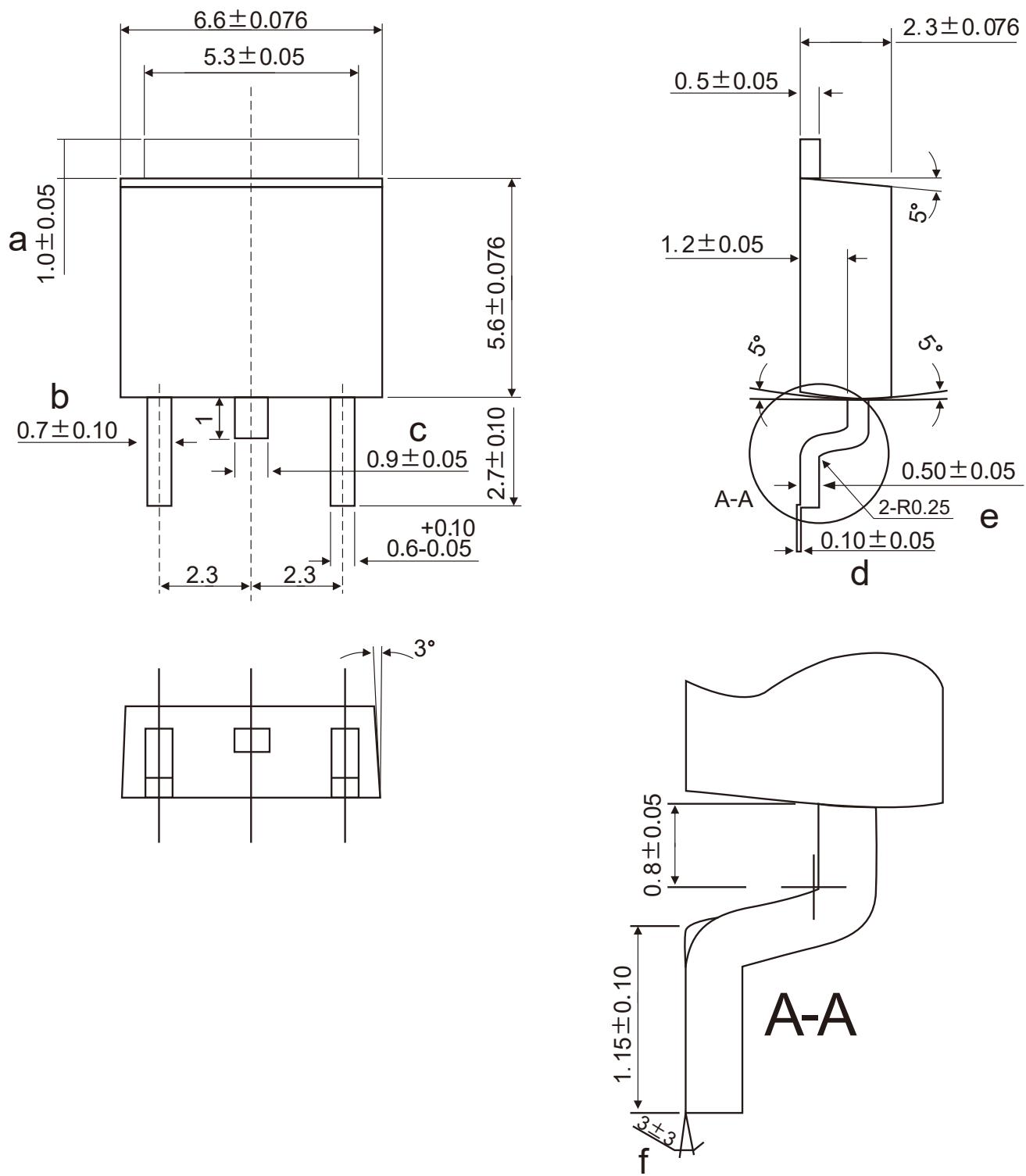




**Package Outline**

TO-252

Dimensions in mm



## 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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