

# TSM35N10CP

## 100V N-Channel Power MOSFET

TO-252  
(DPAK)



**Pin Definition:**

1. Gate
2. Drain
3. Source

**PRODUCT SUMMARY**

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ)	I <sub>D</sub> (A)
100	37 @ V <sub>GS</sub> =10V	32

**Features**

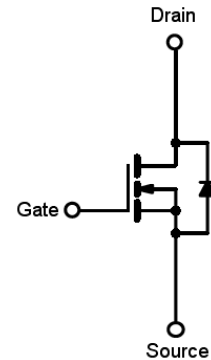
- Advanced Trench Technology
- Low R<sub>DS(ON)</sub> 37mΩ (Max.)
- Low gate charge typical @ 34nC (Typ.)
- Low Crss typical @ 45pF (Typ.)

**Ordering Information**

Ordering code	Package	Packing
TSM35N10CP ROG	TO-252	2.5Kpcs / 13" Reel

**Note:** Halogen-free according to IEC 61249-2-21 definition

**Block Diagram**



N-Channel MOSFET

**Absolute Maximum Rating** (T<sub>a</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	T <sub>C</sub> =25°C	32
		T <sub>C</sub> =70°C	26
		T <sub>A</sub> =25°C	5
		T <sub>A</sub> =70°C	4
Drain Current-Pulsed Note 1	I <sub>DM</sub>	70	A
Avalanche Current, L=0.1mH	I <sub>AS</sub> , I <sub>AR</sub>	35	A
Avalanche Energy, L=0.1mH	E <sub>AS</sub> , E <sub>AR</sub>	61	mJ
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	83.3
		T <sub>C</sub> =70°C	53.3
		T <sub>A</sub> =25°C	2
		T <sub>A</sub> =70°C	1.3
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-55 to +150	°C

\* Limited by maximum junction temperature

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	Rθ <sub>JC</sub>	1.5	°C/W
Thermal Resistance - Junction to Ambient	Rθ <sub>JA</sub>	62	°C/W

### Electrical Specifications (Ta = 25°C unless otherwise noted)

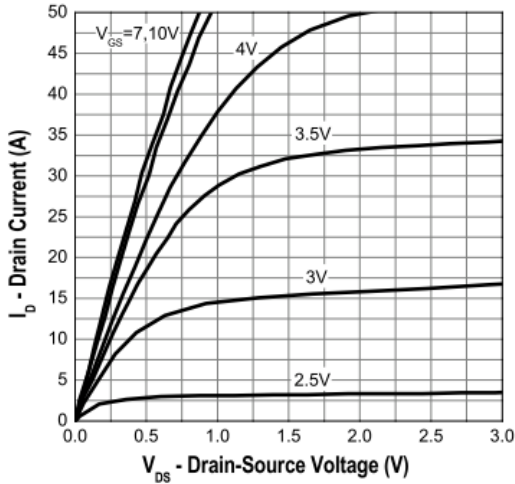
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	100	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 10A$	$R_{DS(ON)}$	--	30	37	mΩ
	$V_{GS} = 4.5V, I_D = 10A$	$R_{DS(ON)}$	--	32	42	mΩ
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1	2	3	V
Zero Gate Voltage Drain Current	$V_{DS} = 100V, V_{GS} = 0V$	$I_{DSS}$	--	--	1	μA
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	--	--	±100	nA
<b>Dynamic</b>						
Total Gate Charge	$V_{DS} = 50V, I_D = 10A,$ $V_{GS} = 10V$	$Q_g$	--	34	--	nC
Gate-Source Charge		$Q_{gs}$	--	6	--	
Gate-Drain Charge		$Q_{gd}$	--	9	--	
Input Capacitance	$V_{DS} = 30V, V_{GS} = 0V,$ $f = 1.0MHz$	$C_{iss}$	--	1598	--	pF
Output Capacitance		$C_{oss}$	--	132	--	
Reverse Transfer Capacitance		$C_{rss}$	--	45	--	
<b>Switching</b>						
Turn-On Delay Time	$V_{GS} = 10V, V_{DS} = 50V,$ $R_G = 3\Omega$	$t_{d(on)}$	--	7	--	nS
Turn-On Rise Time		$t_r$	--	7	--	
Turn-Off Delay Time		$t_{d(off)}$	--	29	--	
Turn-Off Fall Time		$t_f$	--	7	--	
<b>Drain-Source Diode Characteristics and Maximum Rating</b>						
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=10A$	$V_{SD}$	--	0.7	--	V
Reverse Recovery Time	$I_S = 10A, T_J=25^\circ C$ $di/dt = 500A/\mu s$	$t_{fr}$	--	32	--	nS
Reverse Recovery Charge		$Q_{fr}$	--	200	--	nC

#### Notes:

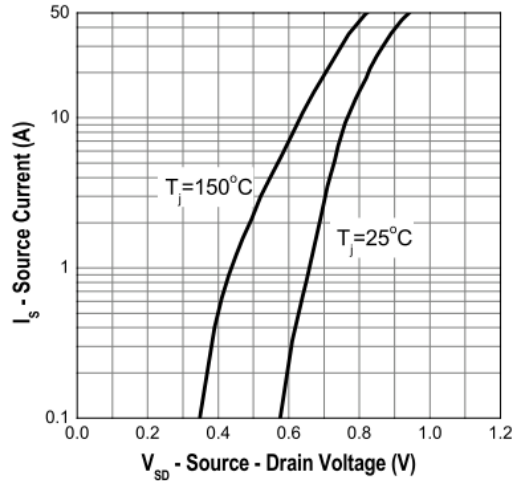
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.

**Electrical Characteristics Curve** ( $T_c = 25^\circ\text{C}$ , unless otherwise noted)

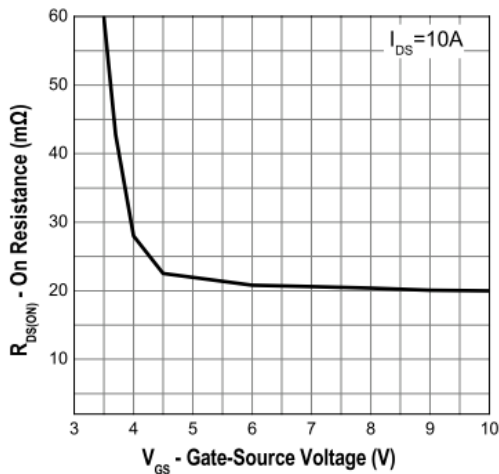
**Output Characteristics**



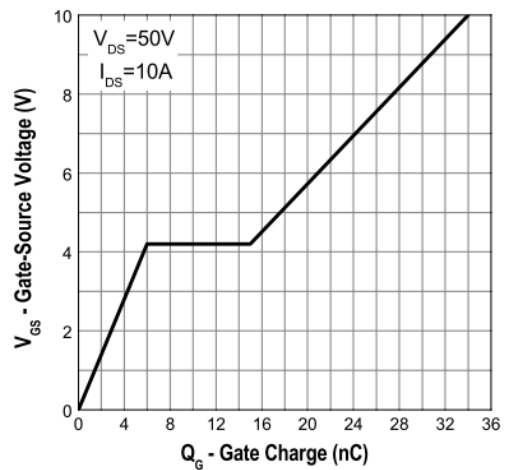
**Transfer Characteristics**



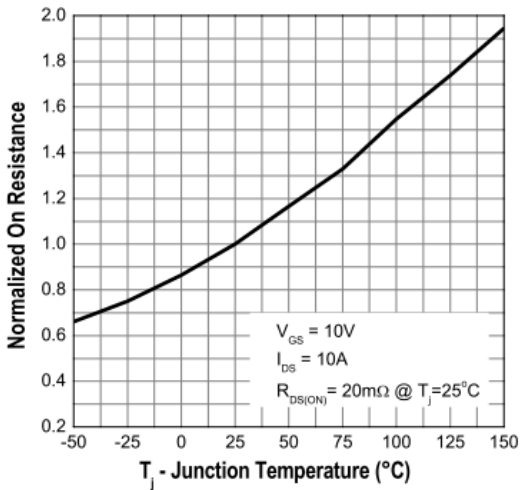
**On-Resistance vs. Gate-Source Voltage**



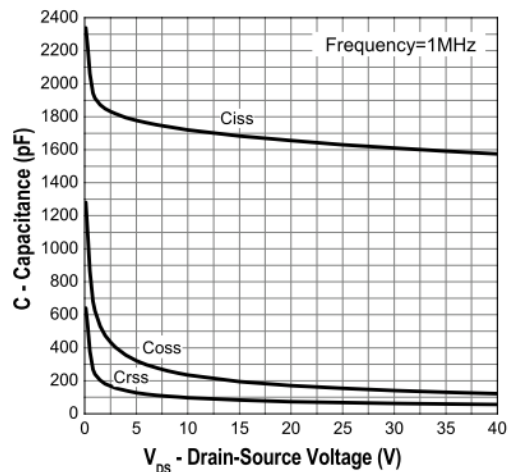
**Gate Charge**



**On-Resistance vs. Junction Temperature**

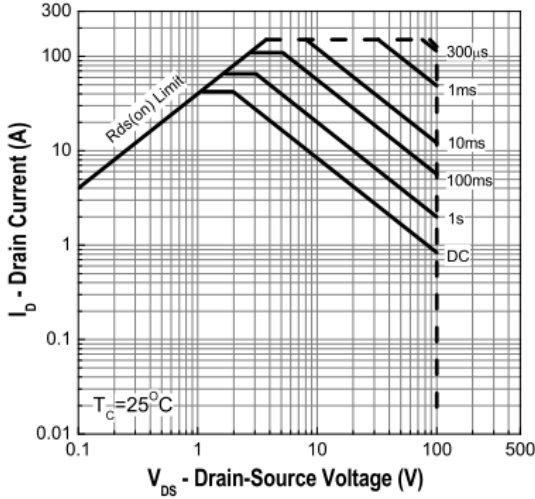


**Capacitance**

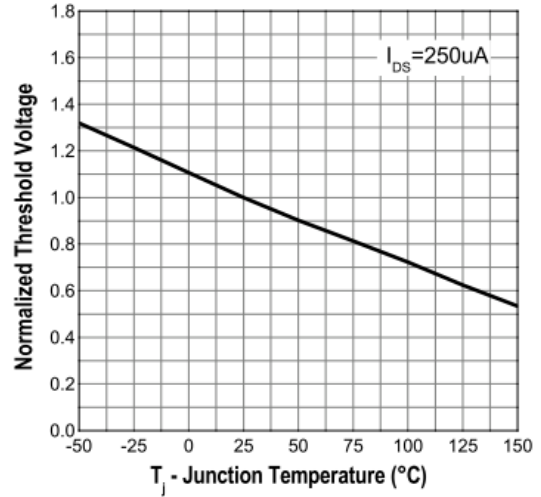


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

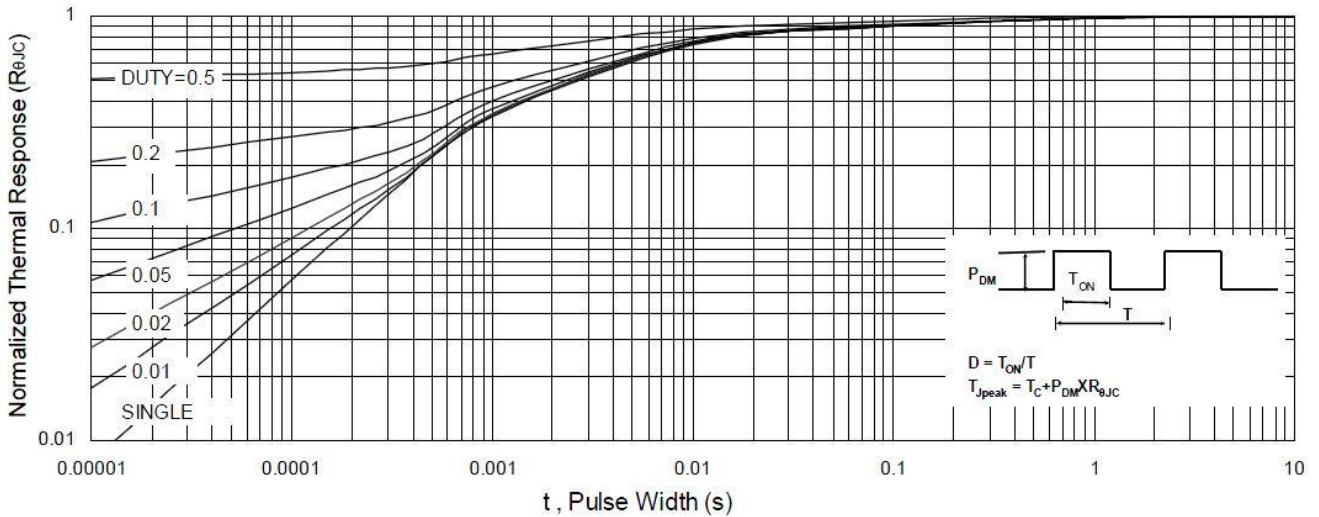
**Maximum Safe Operating Area**



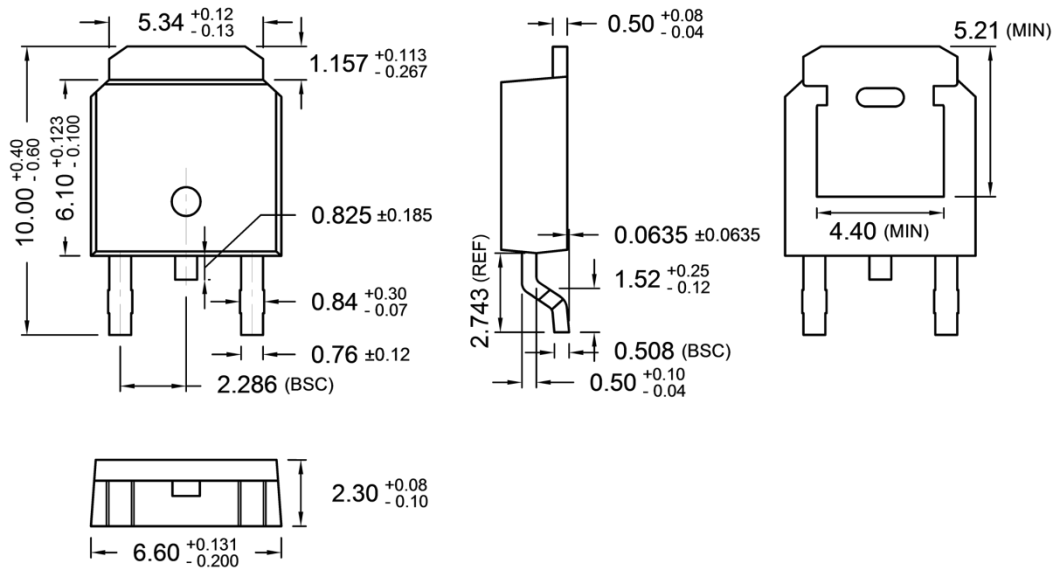
**Threshold Voltage vs. Temperature**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

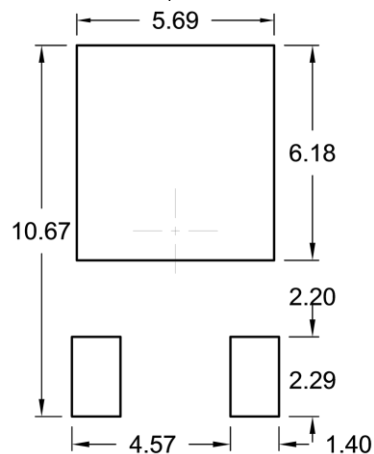


### TO-252 Mechanical Drawing



Unit: Millimeters

### **SUGGESTED PAD LAYOUT** (Unit: Millimeters)



### Marking Diagram



- Y** = Year Code
- M** = Month Code
- O** =Jan   **P** =Feb   **Q** =Mar   **R** =Apr
- S** =May   **T** =Jun   **U** =Jul   **V** =Aug
- W** =Sep   **X** =Oct   **Y** =Nov   **Z** =Dec
- L** = Lot Code (1~9, A~Z)

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