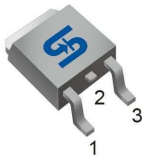


TO-252  
(DPAK)



Pin Definition:

1. Gate
2. Drain
3. Source

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
60	65 @ $V_{GS} = 10V$	10
	80 @ $V_{GS} = 5V$	10
	110 @ $V_{GS} = 4V$	9

### Features

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

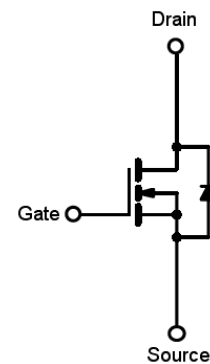
### Application

- Load Switch
- PA Switch

### Ordering Information

Part No.	Package	Packing
TSM10N06CP RO	TO-252	2.5Kpcs / 13" Reel

### Block Diagram



N-Channel MOSFET

### Absolute Maximum Rating ( $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	10	A
Pulsed Drain Current	$I_{DM}$	50	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	10	A
Total Power Dissipation @ $T_C=25C$	$P_{DTOT}$	45	W
Operating Junction Temperature	$T_J$	+150	$^\circ C$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	$^\circ C$

### Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R_{\theta JC}$	2.78	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	50	$^\circ C/W$

### Notes:

- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

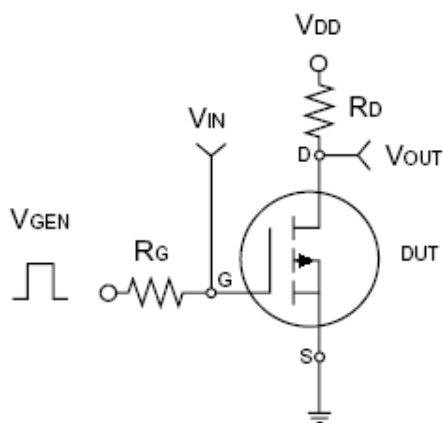
### Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	60	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1	--	3	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 60V, V_{GS} = 0V$	$I_{DSS}$	--	--	2	$\mu A$
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 10A$	$R_{DS(ON)}$	--	--	65	m $\Omega$
	$V_{GS} = 5V, I_D = 10A$		--	--	80	
	$V_{GS} = 4V, I_D = 9A$		--	--	110	
Forward Transconductance	$V_{DS} = 25V, I_D = 6A$	$g_{fs}$	--	13	--	S
Diode Forward Voltage	$I_S = 2A, V_{GS} = 0V$	$V_{SD}$	--	0.9	1.2	V
<b>Dynamic<sup>2</sup></b>						
Total Gate Charge	$V_{DS} = 30V, I_D = 9A,$ $V_{GS} = 4.5V$	$Q_g$	--	10.5	16	nC
Gate-Source Charge		$Q_{gs}$	--	3.5	--	
Gate-Drain Charge		$Q_{gd}$	--	4.2	--	
Input Capacitance	$V_{DS} = 30V, V_{GS} = 0V,$ $f = 1.0MHz$	$C_{iss}$	--	1100	--	pF
Output Capacitance		$C_{oss}$	--	90	--	
Reverse Transfer Capacitance		$C_{rss}$	--	55	--	
<b>Switching<sup>2,3</sup></b>						
Turn-On Delay Time	$V_{DD} = 30V, R_L = 5.4\Omega,$ $I_D = 9A, V_{GEN} = 10V,$ $R_G = 1\Omega$	$t_{d(on)}$	--	10	15	nS
Turn-On Rise Time		$t_r$	--	15	25	
Turn-Off Delay Time		$t_{d(off)}$	--	25	40	
Turn-Off Fall Time		$t_f$	--	10	15	

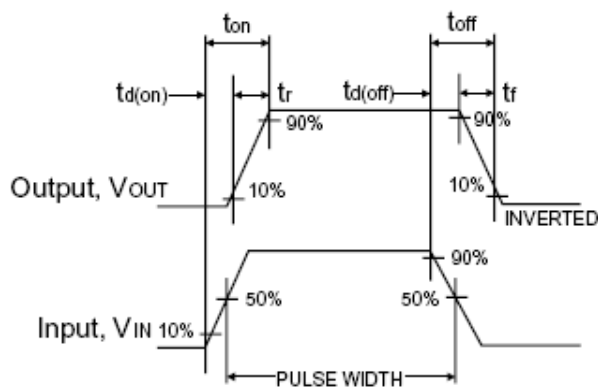
**Notes 1:** Pulse test:  $PW \leq 300\mu S$ , duty cycle  $\leq 2\%$

**Notes 2:** For DESIGN AID ONLY, not subject to production testing.

**Notes 3:** Switching time is essentially independent of operating temperature.



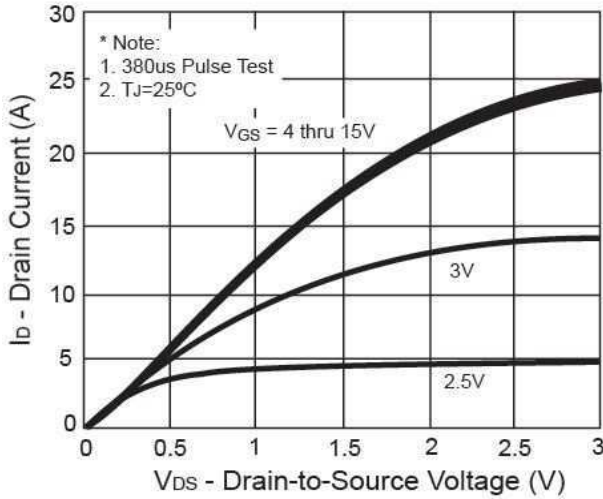
Switching Test Circuit



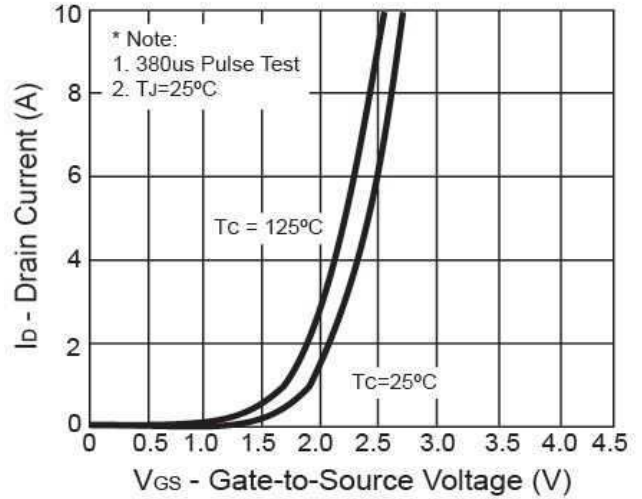
Switchin Waveforms

**Electrical Characteristics Curve** (Ta = 25°C, unless otherwise noted)

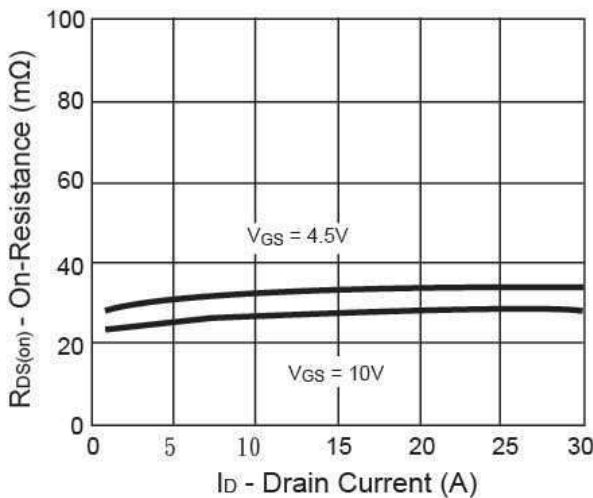
**Output Characteristics**



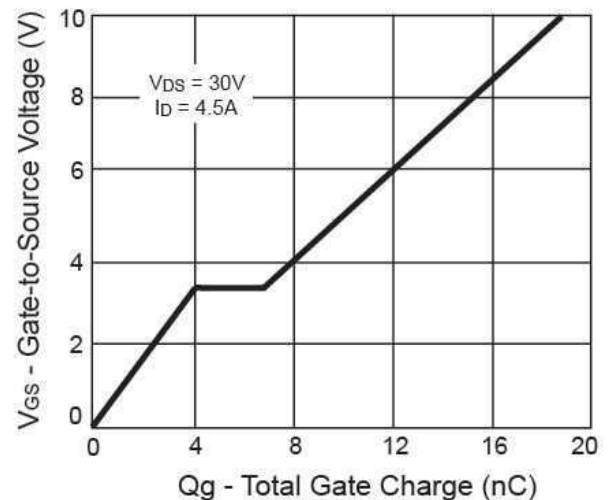
**Transfer Characteristics**



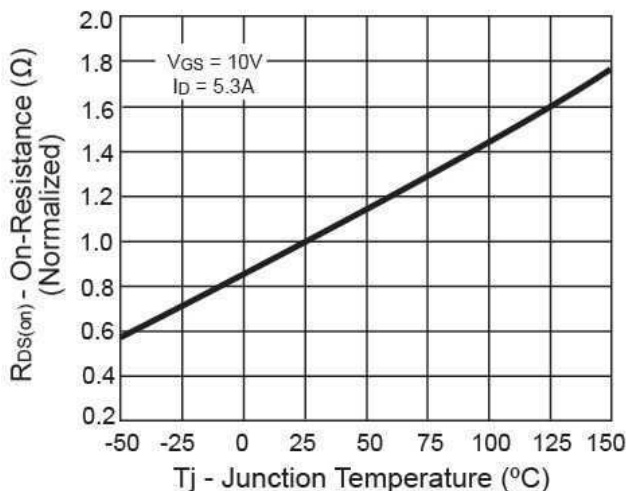
**On-Resistance vs. Drain Current**



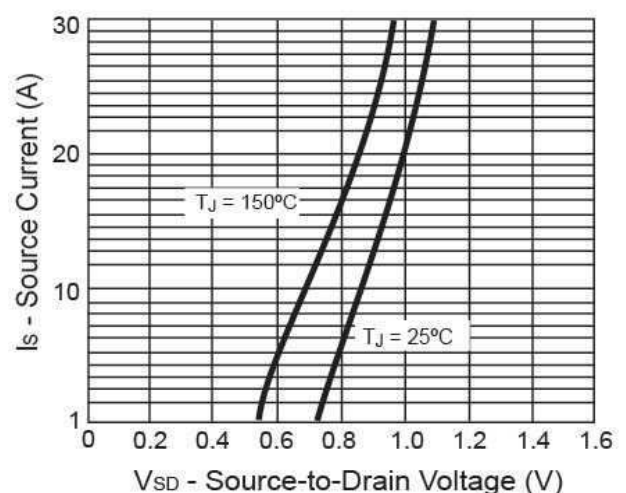
**Gate Charge**



**On-Resistance vs. Junction Temperature**

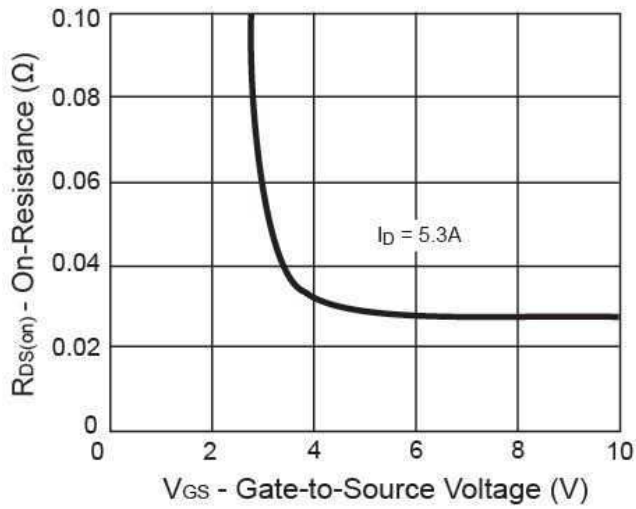


**Source-Drain Diode Forward Voltage**

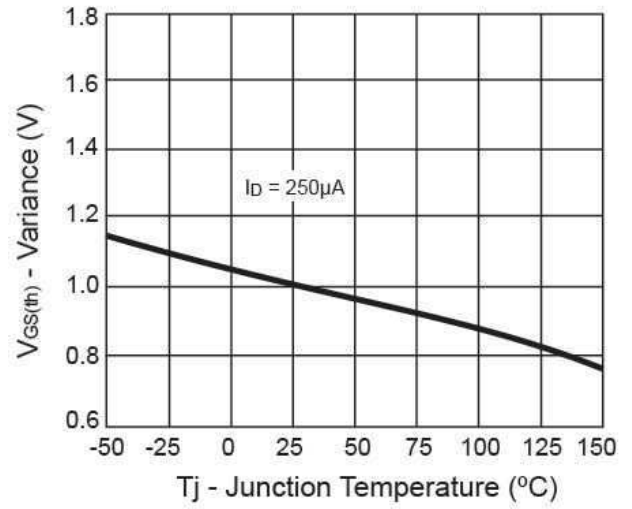


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

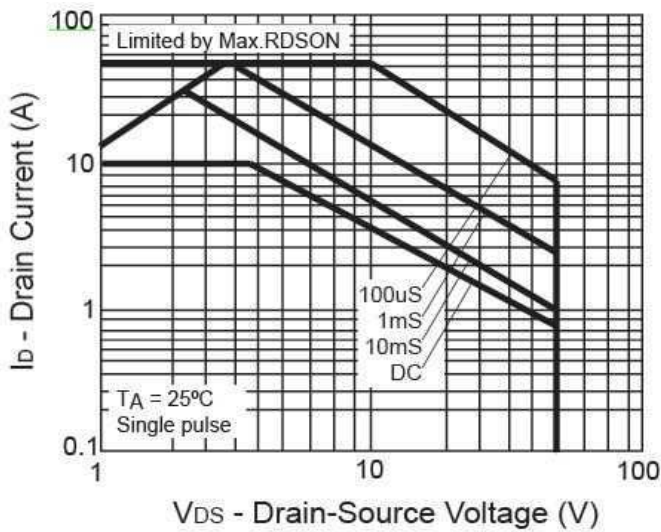
**On-Resistance vs. Gate-Source Voltage**



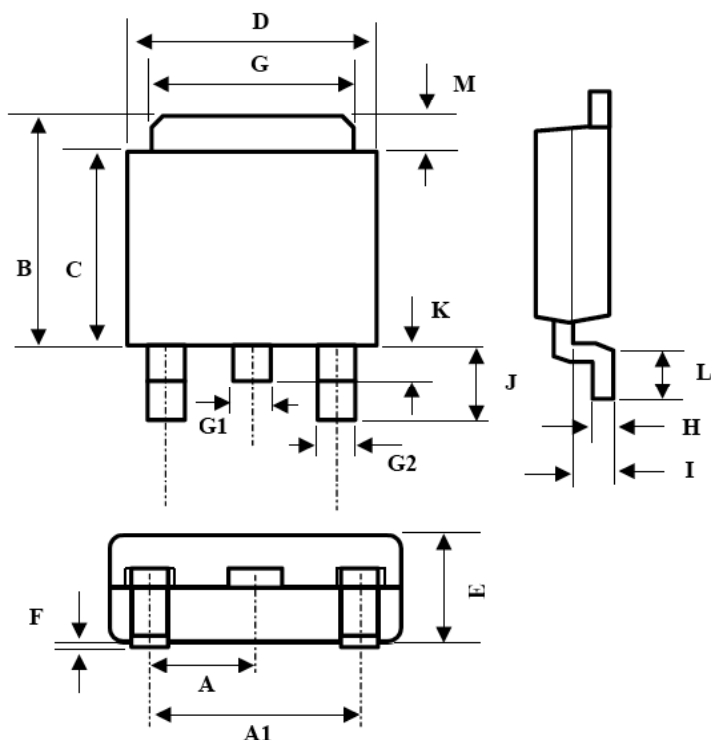
**Threshold Voltage**



**Maximum Safe Operating Area**



**TO-252 Mechanical Drawing**



TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.3BSC		0.09BSC	
A1	4.6BSC		0.18BSC	
B	6.80	7.20	0.268	0.283
C	5.40	5.60	0.213	0.220
D	6.40	6.65	0.252	0.262
E	2.20	2.40	0.087	0.094
F	0.00	0.20	0.000	0.008
G	5.20	5.40	0.205	0.213
G1	0.61	0.78	0.024	0.030
G2	0.51	0.71	0.020	0.028
H	0.35	0.65	0.014	0.026
I	0.90	1.50	0.035	0.059
J	2.20	2.80	0.087	0.110
K	0.50	1.10	0.020	0.043
L	0.90	1.50	0.035	0.059
M	1.30	1.70	0.051	0.67

**Marking Diagram**



- Y** = Year Code
- M** = Month Code  
(A=Jan, B=Feb, C=Mar, D=Apr, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code

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