

**SOT-26**

**Pin Definition:**

- |             |             |
|-------------|-------------|
| 1. Gate 1   | 6. Drain 1  |
| 2. Source 2 | 5. Source 1 |
| 3. Gate 2   | 4. Drain 2  |

**PRODUCT SUMMARY**

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
20	55 @ $V_{GS} = 4.5V$	2.0
	70 @ $V_{GS} = 2.5V$	1.5
	110 @ $V_{GS} = 1.8V$	1.0

**Features**

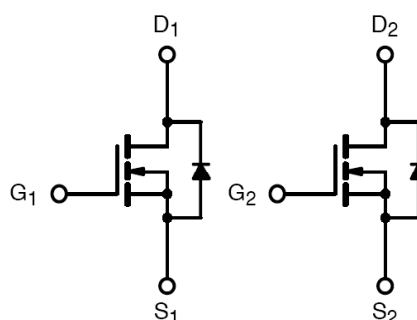
- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

**Application**

- Load Switch
- PA Switch

**Ordering Information**

Part No.	Package	Packing
TSM3900DCX6 RF	SOT-26	T&R

**Block Diagram**


Dual N-Channel MOSFET

**Absolute Maximum Rating ( $T_a = 25^\circ C$  unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current	$I_D$	2	A
Pulsed Drain Current	$I_{DM}$	8	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	1.6	A
Maximum Power Dissipation	$P_D$	$T_a = 25^\circ C$	2.0
		$T_a = 70^\circ C$	1.3
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	$R_{\theta JC}$	30	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	80	$^\circ C/W$

**Notes:**

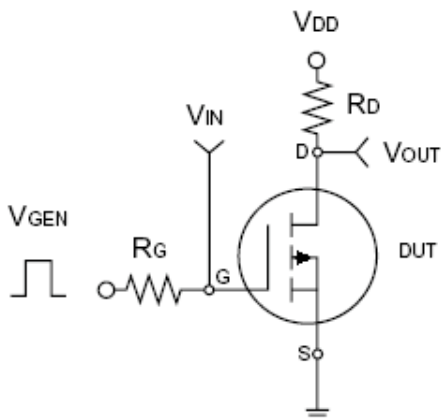
- a. Pulse width limited by the Maximum junction temperature  
 b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

### Electrical Specifications

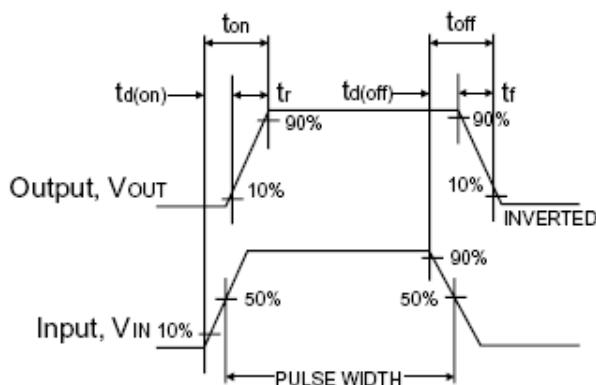
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.65	0.95	1.2	V
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 16V, V_{GS} = 0V$	$I_{DSS}$	--	--	1.0	$\mu A$
On-State Drain Current	$V_{DS} \geq 5V, V_{GS} = 4.5V$	$I_{D(ON)}$	5	--	--	A
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 2.0A$	$R_{DS(ON)}$	--	45	55	m $\Omega$
	$V_{GS} = 2.5V, I_D = 1.5A$		--	50	70	
	$V_{GS} = 1.8V, I_D = 1.0A$		--	80	110	
Forward Transconductance	$V_{DS} = 5V, I_D = 2.4A$	$g_{fs}$	--	5	--	S
Diode Forward Voltage	$I_S = 1.6A, V_{GS} = 0V$	$V_{SD}$	--	0.79	1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$V_{DS} = 10V, I_D = 2.4A, V_{GS} = 4.5V$	$Q_g$	--	3.69	--	nC
Gate-Source Charge		$Q_{gs}$	--	0.70	--	
Gate-Drain Charge		$Q_{gd}$	--	1.06	--	
Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz$	$C_{iss}$	--	427.12	--	pF
Output Capacitance		$C_{oss}$	--	80.56	--	
Reverse Transfer Capacitance		$C_{rss}$	--	57	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	$V_{DD} = 10V, R_L = 10\Omega, I_D = 1A, V_{GEN} = 4.5V, R_G = 6\Omega$	$t_{d(on)}$	--	6.16	--	nS
Turn-On Rise Time		$t_r$	--	7.56	--	
Turn-Off Delay Time		$t_{d(off)}$	--	16.61	--	
Turn-Off Fall Time		$t_f$	--	4.07	--	

Notes:

- a. pulse test:  $PW \leq 300\mu S$ , duty cycle  $\leq 2\%$
- b. For DESIGN AID ONLY, not subject to production testing.
- b. Switching time is essentially independent of operating temperature.



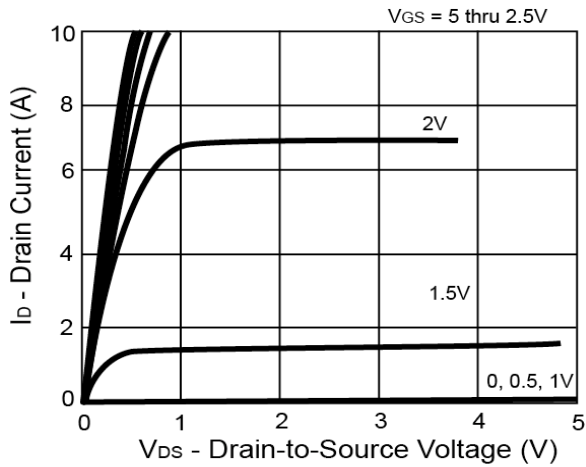
Switching Test Circuit



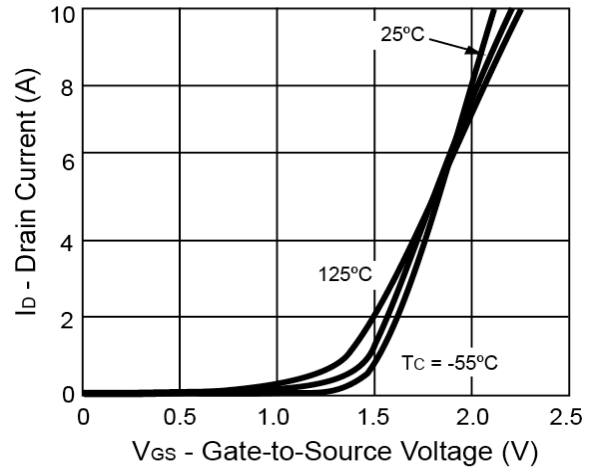
Switchin Waveforms

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

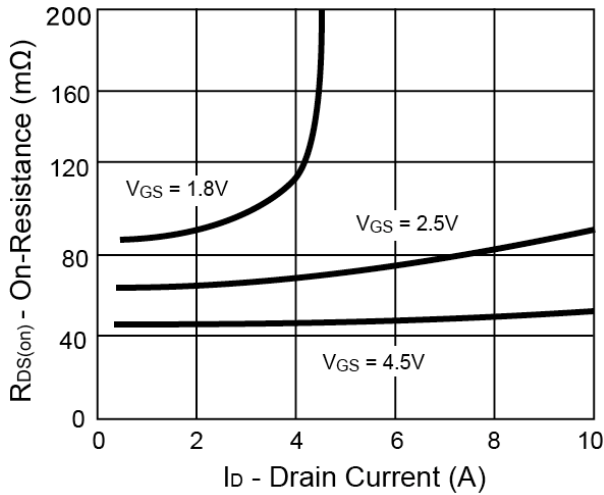
**Output Characteristics**



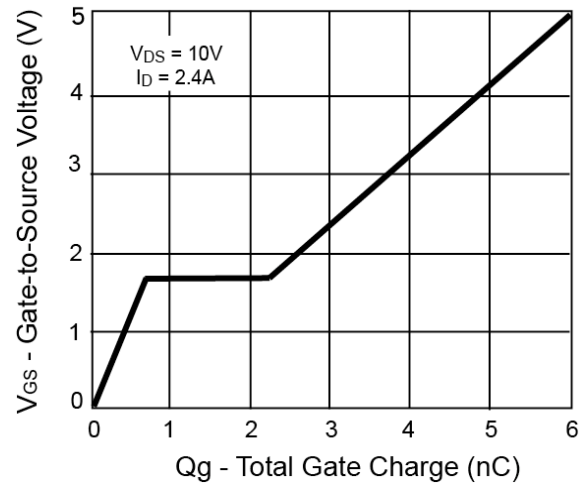
**Transfer Characteristics**



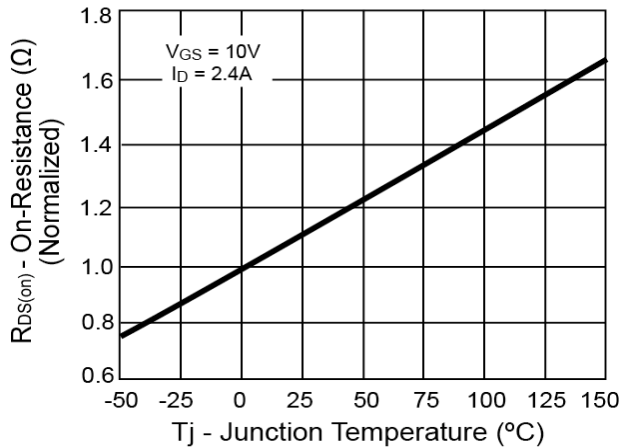
**On-Resistance vs. Drain Current**



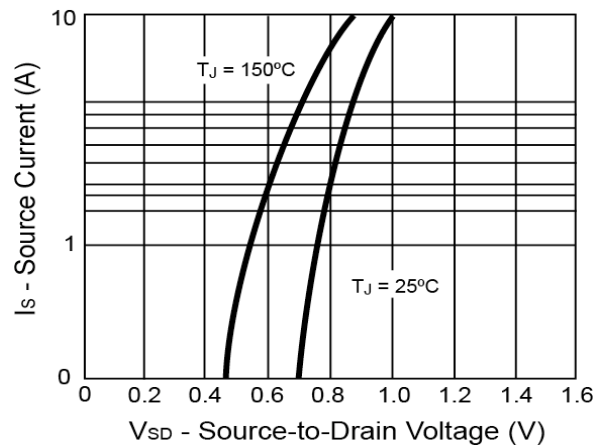
**Gate Charge**



**On-Resistance vs. Junction Temperature**

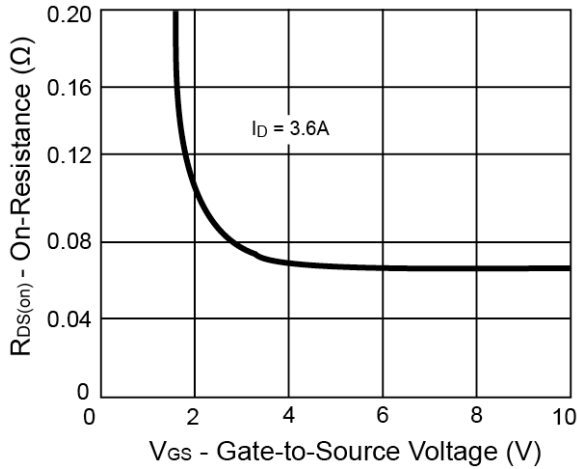


**Source-Drain Diode Forward Voltage**

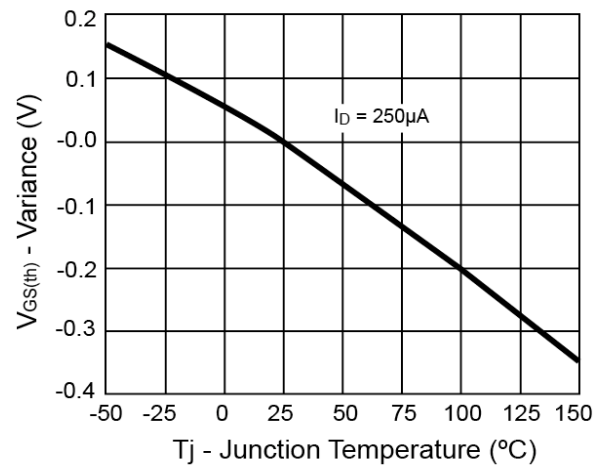


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

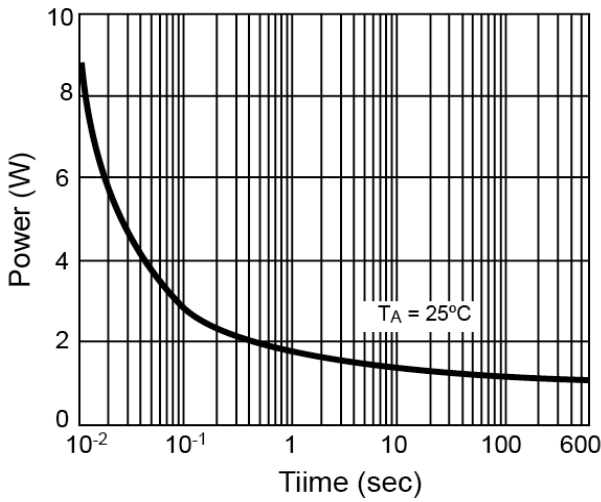
**On-Resistance vs. Gate-Source Voltage**



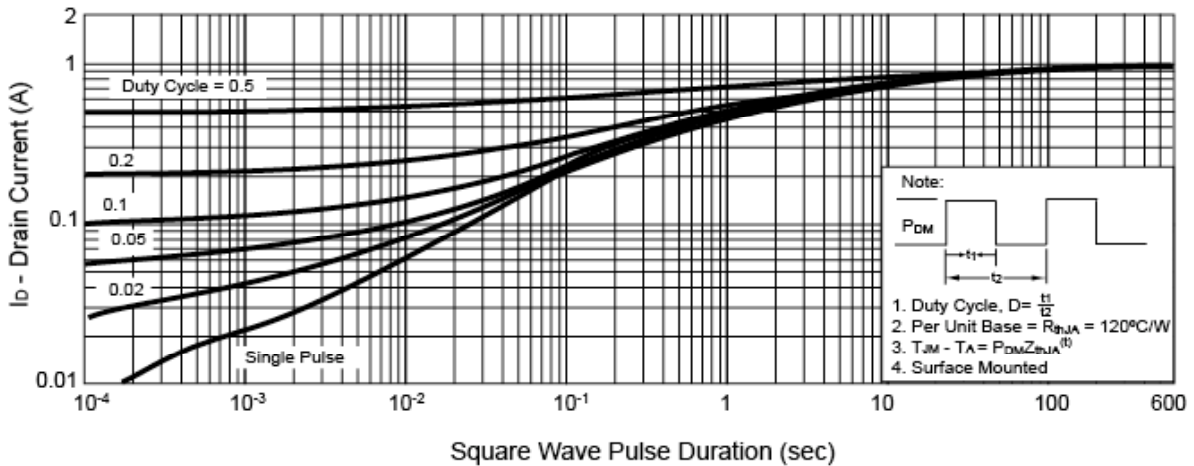
**Threshold Voltage**



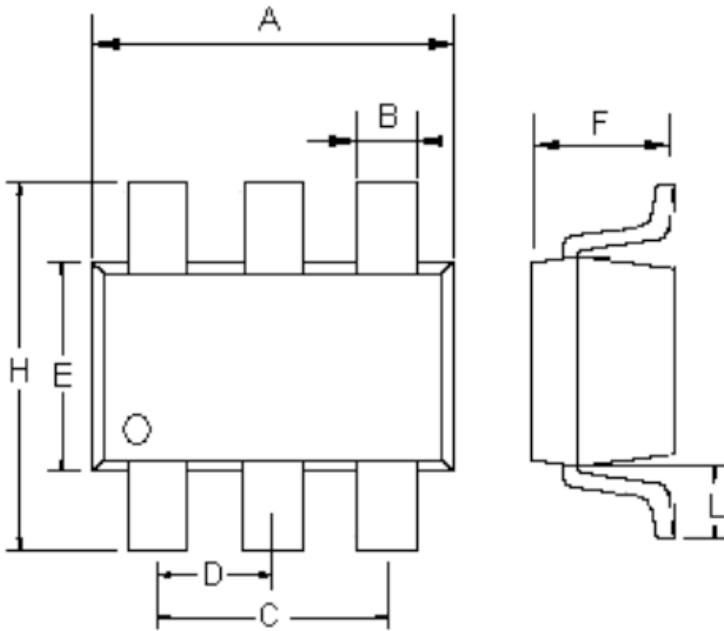
**Single Pulse Power**



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



**SOT-26 Mechanical Drawing**



SOT-26 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.70	3.00	0.106	0.118
B	0.25	0.50	0.010	0.020
C	1.90(typ)		0.075(typ)	
D	0.95(typ)		0.037(typ)	
E	1.50	1.70	0.059	0.067
F	1.05	1.35	0.041	0.053
H	2.60	3.00	0.102	0.118
L	0.60(typ)		0.024(typ)	

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