



**Pin Definition:**  
 1. Drain 6. Drain  
 2. Drain 5, Drain  
 3. Gate 4. Source

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
20	33 @ $V_{GS} = 4.5V$	5.3
	40 @ $V_{GS} = 2.5V$	4.4

### Features

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

### Application

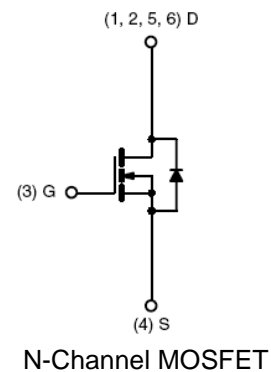
- Load Switch
- PA Switch

### Ordering Information

Part No.	Package	Packing
TSM3446CX6 RFG	SOT-26	3Kpcs / 7" Reel
TSM3446CX6 RKG	SOT-26	10Kpcs / 13" Reel

Note: "G" denote for Halogen Free Product

### Block Diagram



### 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	$V_{GS}$	$\pm 12$	V
Continuous Drain Current, $V_{GS} @ 4.5V$ .	$I_D$	5.3	A
Pulsed Drain Current, $V_{GS} @ 4.5V$	$I_{DM}$	20	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	1.7	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:

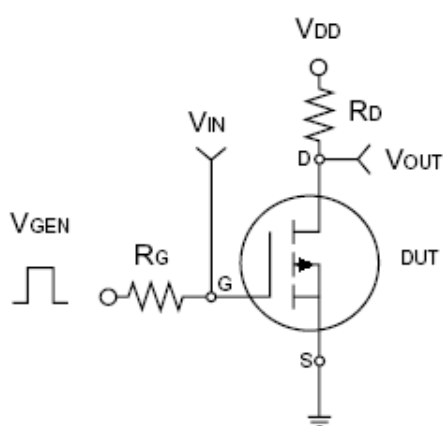
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

### Electrical Specifications

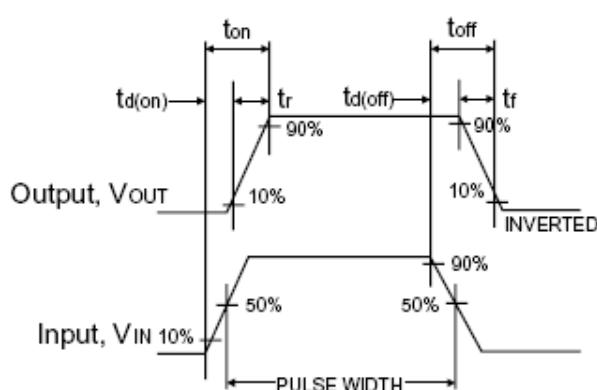
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.5	0.7	1.0	V
Gate Body Leakage	$V_{GS} = \pm 10V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 16, V_{GS} = 0V$	$I_{DSS}$	--	--	1.0	$\mu A$
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 5.3A$	$R_{DS(ON)}$	--	27	33	m $\Omega$
	$V_{GS} = 2.5V, I_D = 4.4A$		--	33	40	
Forward Transconductance	$V_{DS} = 10V, I_D = 5.3A$	$g_{fs}$	--	20	--	S
Diode Forward Voltage	$I_S = 1A, V_{GS} = 0V$	$V_{SD}$	--	0.7	1.3	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$V_{DS} = 10V, I_D = 5.3A, V_{GS} = 4.5V$	$Q_g$	--	12.5	--	nC
Gate-Source Charge		$Q_{gs}$	--	0.72	--	
Gate-Drain Charge		$Q_{gd}$	--	4.3	--	
Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz$	$C_{iss}$	--	700	--	pF
Output Capacitance		$C_{oss}$	--	125	--	
Reverse Transfer Capacitance		$C_{rss}$	--	110	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	$V_{DD} = 10V, R_L = 10\Omega, I_D = 1A, V_{GEN} = 4.5V, R_G = 6\Omega$	$t_{d(on)}$	--	4.6	--	nS
Turn-On Rise Time		$t_r$	--	14	--	
Turn-Off Delay Time		$t_{d(off)}$	--	30	--	
Turn-Off Fall Time		$t_f$	--	5	--	

**Notes:**

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



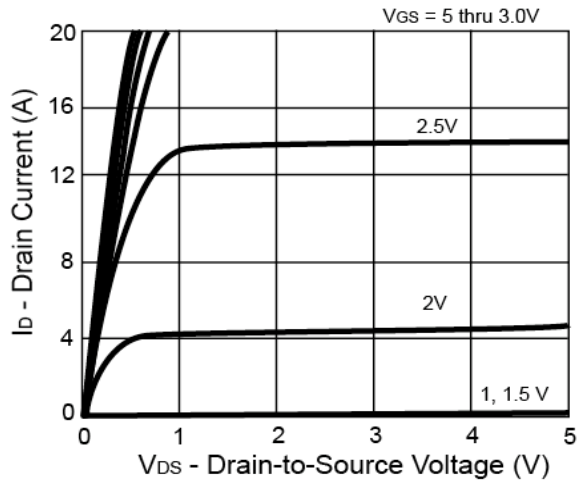
**Switching Test Circuit**



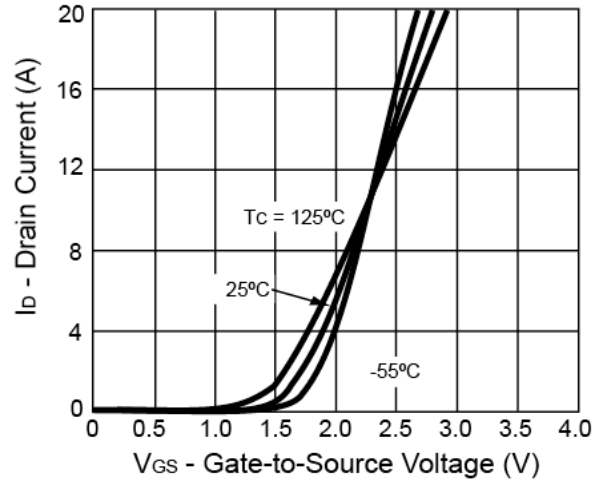
**Switchin Waveforms**

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

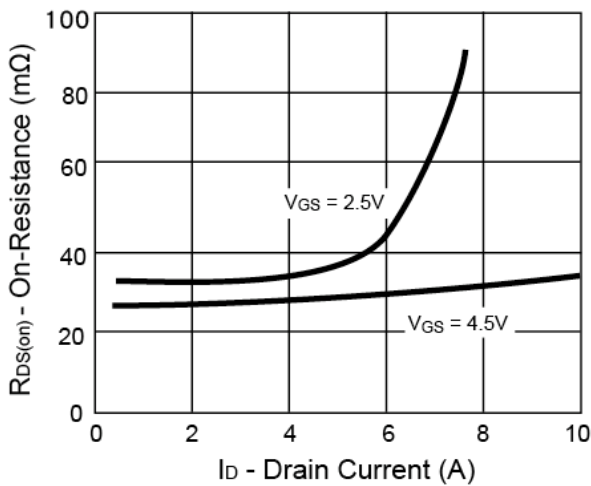
**Output Characteristics**



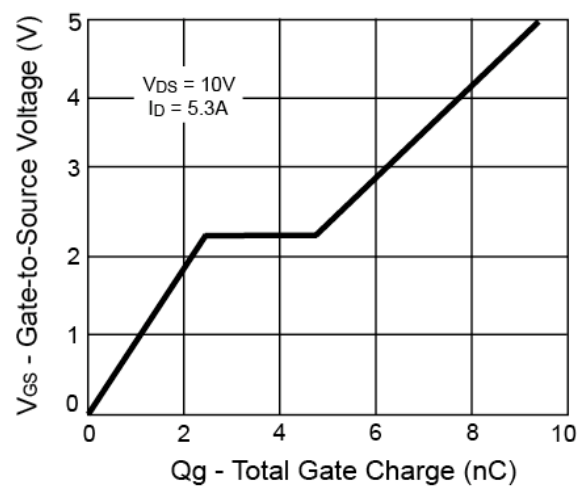
**Transfer Characteristics**



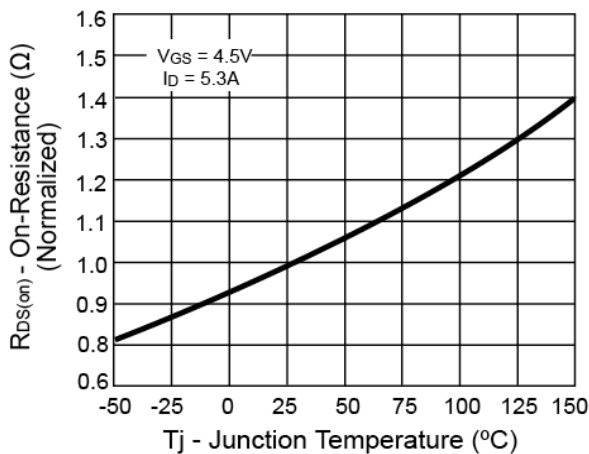
**On-Resistance vs. Drain Current**



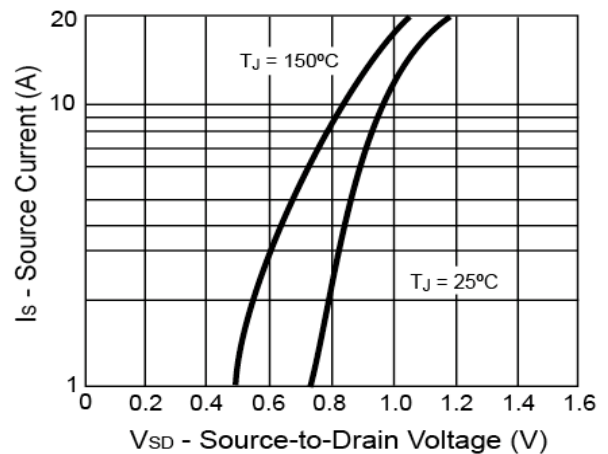
**Gate Charge**



**On-Resistance vs. Junction Temperature**

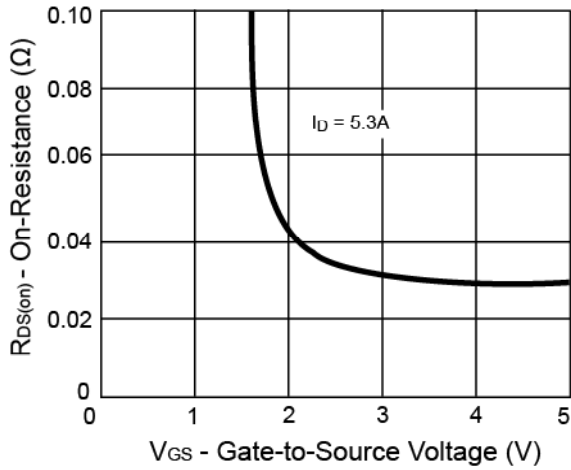


**Source-Drain Diode Forward Voltage**

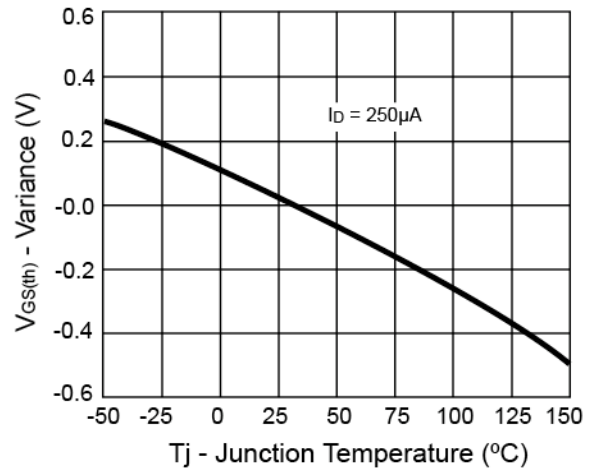


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

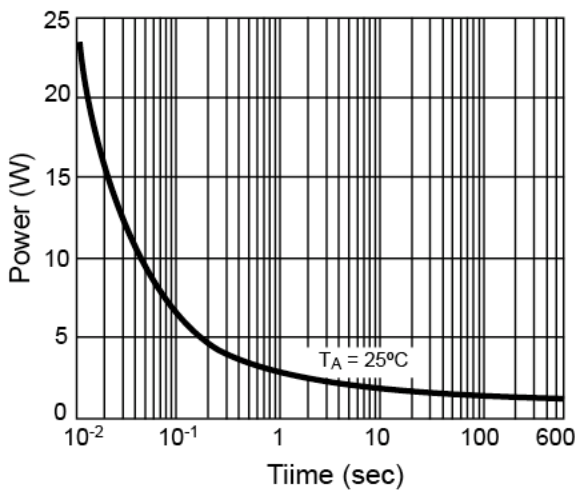
**On-Resistance vs. Gate-Source Voltage**



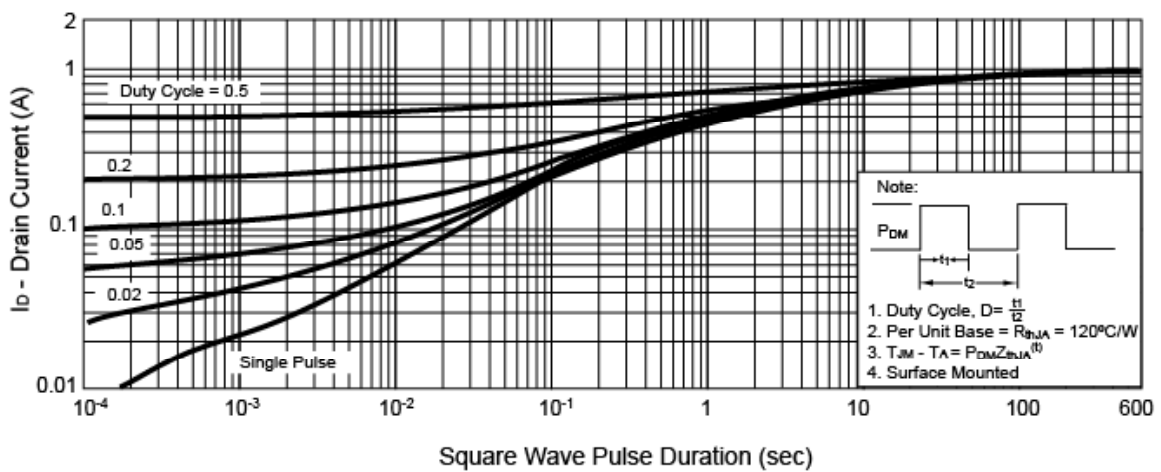
**Threshold Voltage**



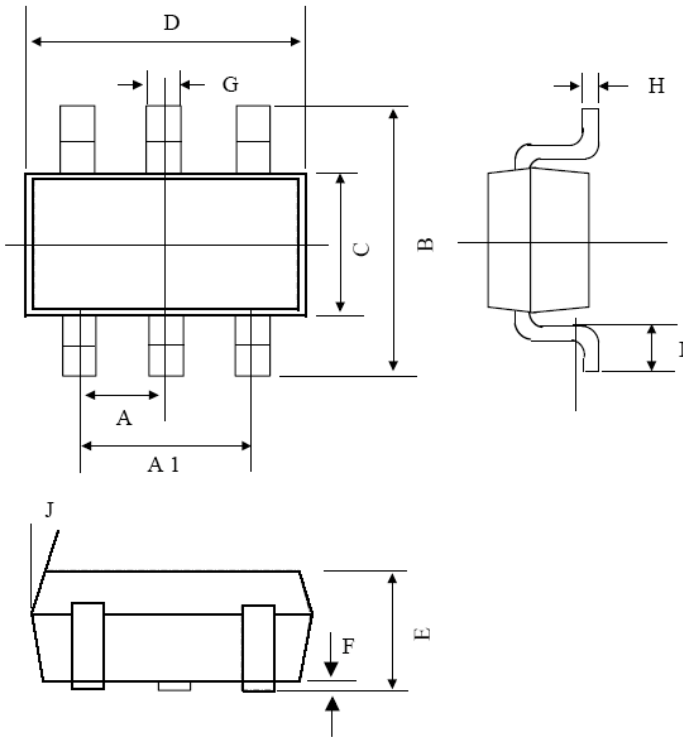
**Single Pulse Power**



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

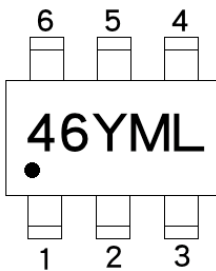


**SOT-26 Mechanical Drawing**



SOT-26 DIMENSION						
DIM	MILLIMETERS			INCHES		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.95 BSC			0.0374 BSC		
A1	1.9 BSC			0.0748 BSC		
B	2.60	2.80	3.00	0.1024	0.1102	0.1181
C	1.40	1.50	1.70	0.0551	0.0591	0.0669
D	2.80	2.90	3.10	0.1101	0.1142	0.1220
E	1.00	1.10	1.20	0.0394	0.0433	0.0472
F	0.00	--	0.10	0.00		0.0039
G	0.35	0.40	0.50	0.0138	0.0157	0.0197
H	0.10	0.15	0.20	0.0039	0.0059	0.0079
I	0.30	--	0.60	0.0118	--	0.0236
J	5°	--	10°	5°	--	10°

**Marking Diagram**



- 46** = Device Code
- Y** = Year Code
- M** = Month Code for Halogen Free Product
  - 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

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