

## N-Channel Power MOSFET

20V, 4A, 70mΩ

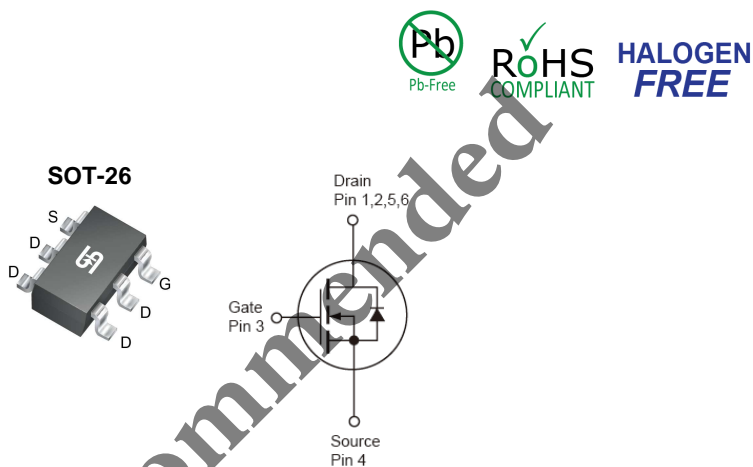
### FEATURES

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

### APPLICATION

- Load Switch
- PA Switch

KEY PERFORMANCE PARAMETERS			
PARAMETER		VALUE	UNIT
$V_{DS}$		20	V
$R_{DS(on)}$ (max)	$V_{GS} = 4.5V$	70	mΩ
	$V_{GS} = 2.5V$	90	
$Q_g$		5.4	nC



**Notes:** Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ 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 <sup>(Note 1)</sup>	$I_D$	$T_C = 25^\circ C$	4
		$T_C = 100^\circ C$	2.4
Pulsed Drain Current <sup>(Note 2)</sup>	$I_{DM}$	8	A
Total Power Dissipation @ $T_C = 25^\circ C$	$P_{DTOT}$	1.25	W
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	$R_{\theta JA}$	80	$^\circ C/W$

**Notes:**  $R_{\theta JA}$  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.  $R_{\theta JA}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.  $R_{\theta JA}$  shown below for single device operation on FR-4 PCB in still air

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b> (Note 3)						
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	$\mu A$
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 4A$	$R_{DS(ON)}$	--	50	70	m $\Omega$
	$V_{GS} = 2.5V, I_D = 3.5A$		--	60	90	
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$V_{DS} = 10V, I_D = 4A,$ $V_{GS} = 4.5V$	$Q_g$	--	5.4	--	nC
Gate-Source Charge		$Q_{gs}$	--	0.65	--	
Gate-Drain Charge		$Q_{gd}$	--	1.4	--	
Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	$C_{iss}$	--	340	--	pF
Output Capacitance		$C_{oss}$	--	115	--	
Reverse Transfer Capacitance		$C_{rss}$	--	33	--	
<b>Switching</b> (Note 5)						
Turn-On Delay Time	$V_{DD} = 6V, R_L = 10\Omega,$ $I_D = 1A, V_{GEN} = 4.5V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	12	--	ns
Turn-On Rise Time		$t_r$	--	36	--	
Turn-Off Delay Time		$t_{d(off)}$	--	34	--	
Turn-Off Fall Time		$t_f$	--	10	--	
<b>Source-Drain Diode</b> (Note 3)						
Forward On Voltage	$I_S = 1.6A, V_{GS} = 0V$	$V_{SD}$	--	0.76	1.2	V

**Notes:**

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. Pulse test:  $PW \leq 300\mu s$ , duty cycle  $\leq 2\%$
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.

**ORDERING INFORMATION**

<b>PART NO.</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSM3442CX6 RFG	SOT-26	3,000pcs / 7" Reel

**Note:**

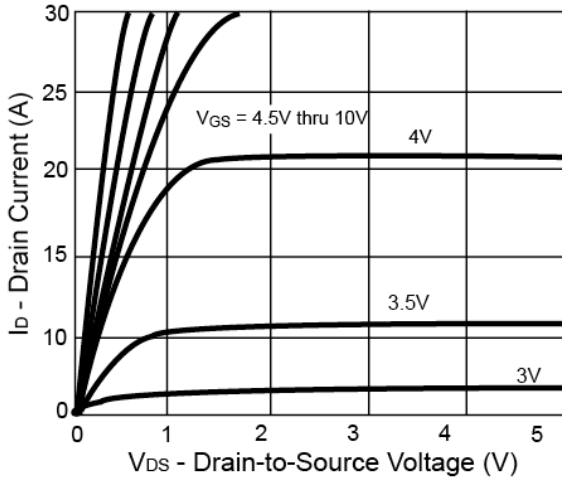
1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

*Not Recommended*

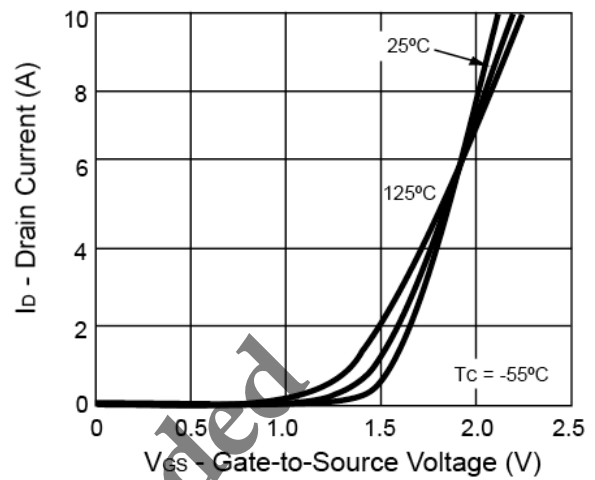
**CHARACTERISTICS CURVES**

( $T_C = 25^\circ\text{C}$  unless otherwise noted)

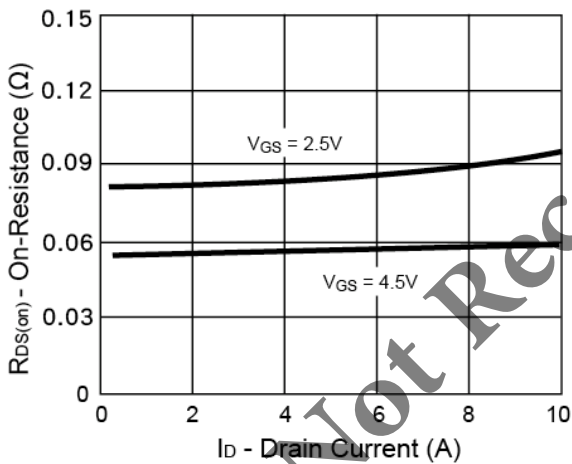
**Output Characteristics**



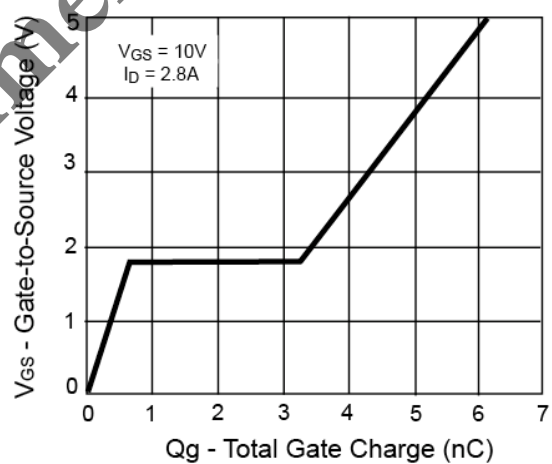
**Transfer Characteristics**



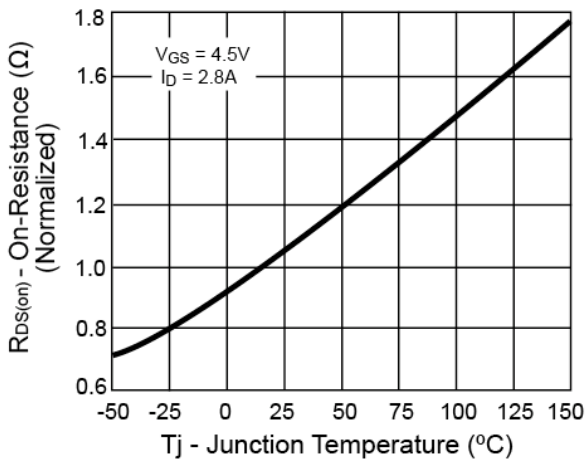
**On-Resistance vs. Drain Current**



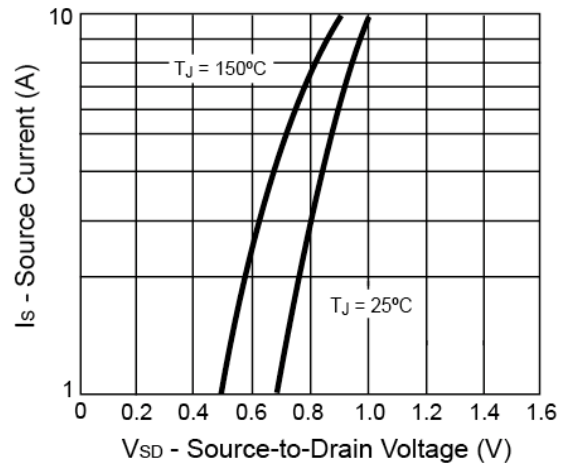
**Gate Charge**



**On-Resistance vs. Junction Temperature**



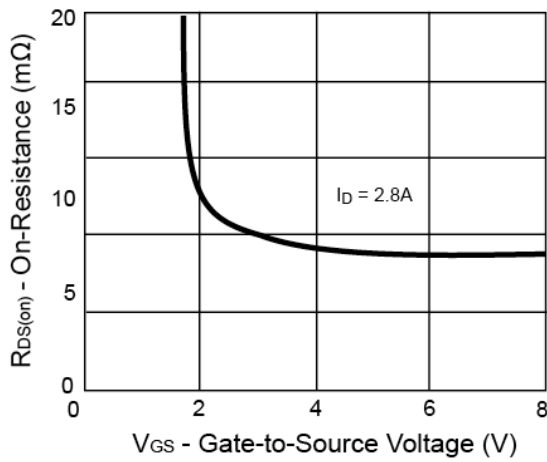
**Source-Drain Diode Forward Voltage**



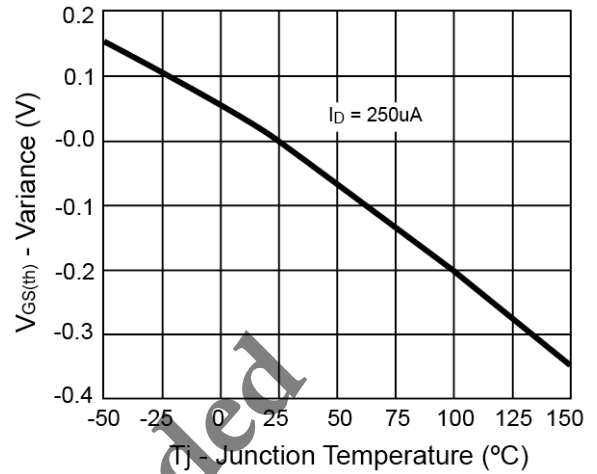
**CHARACTERISTICS CURVES**

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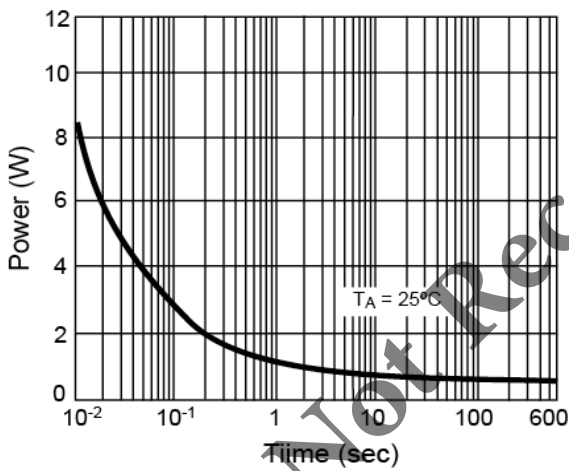
**On-Resistance vs. Gate-Source Voltage**



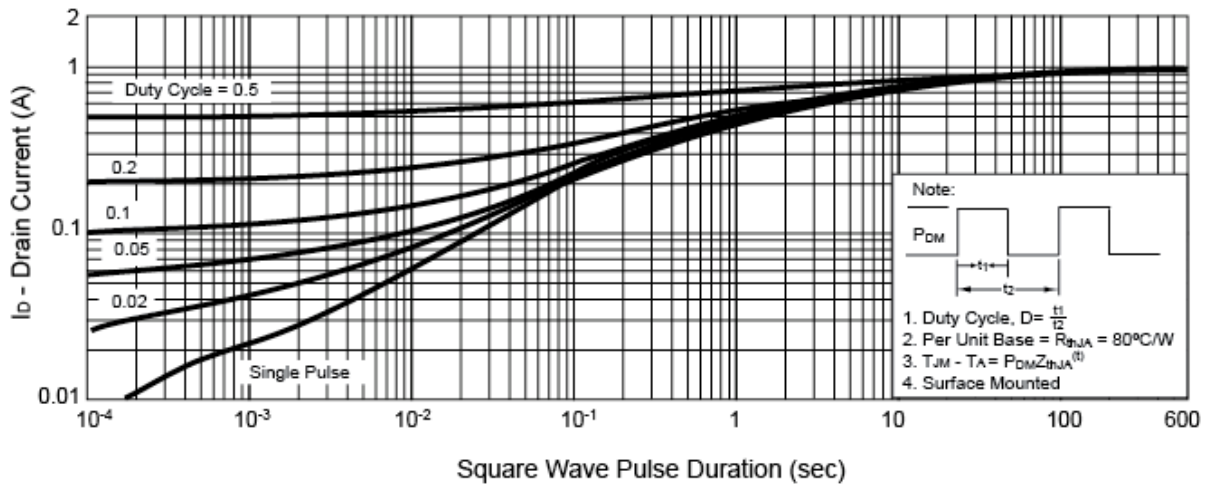
**Threshold Voltage**



**Single Pulse Power**

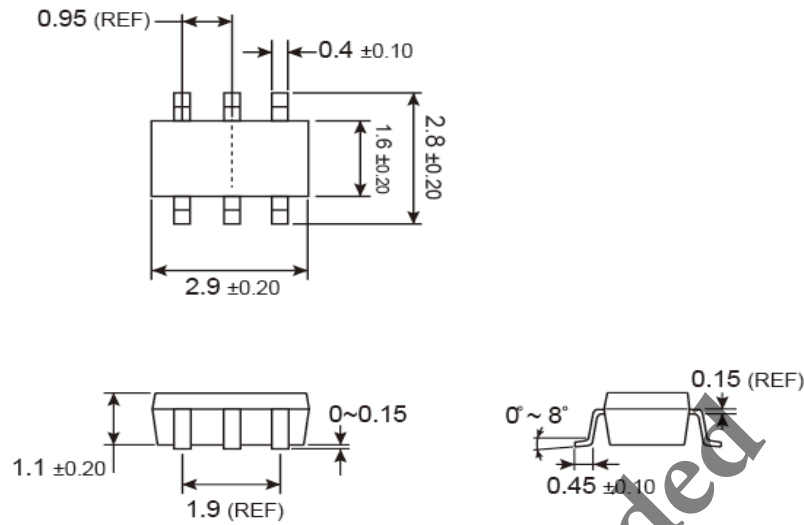


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

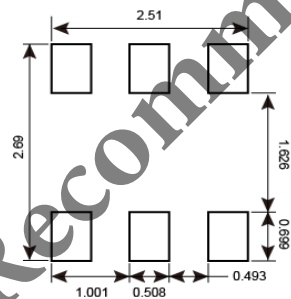


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

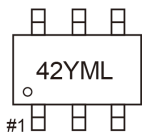
**SOT-26**



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



**MARKING DIAGRAM**



- 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 (1~9, A~Z)

**Not Recommended**

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