



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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)	I_D (A)
-30	48 @ $V_{GS} = -10V$	-5.3
	79 @ $V_{GS} = -4.5V$	-4.1

Features

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

Application

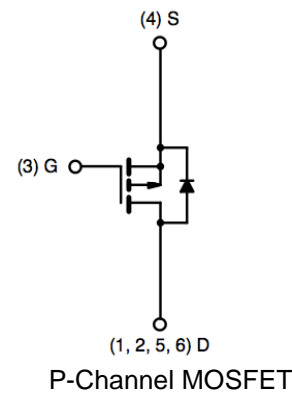
- DC-DC Conversion
- Asynchronous Buck Converter

Ordering Information

Part No.	Package	Packing
TSM3481CX6 RFG	SOT-26	3Kpcs / 7" Reel

Note: "G" denotes for Halogen Free

Block Diagram



Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	-5.7	A
Pulsed Drain Current	I_{DM}	-22.8	A
Single Pulse Avalanche Current ^c	I_{AS}	-13	A
Single Pulse Avalanche Energy ^c	E_{AS}	25	mJ
Maximum Power Dissipation	P_D	Ta = 25°C	1.6
		Ta = 75°C	0.9
Operating Junction Temperature	T_J	+150	°C
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R_{\theta JC}$	53	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	80	°C/W

Notes:

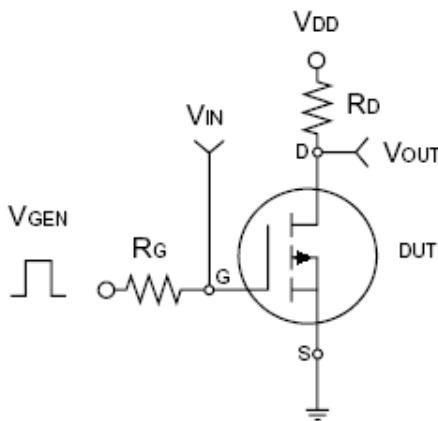
- Pulse width limited by the Maximum junction temperature
- Surface Mounted on FR4 Board, $t \leq 10$ sec.
- L = 0.3mH, $V_{GS} = -10V$, $V_{DD} = -25V$, $R_G = 25\Omega$, $I_{AS} = -13A$, Starting $T_J = 25^\circ C$

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

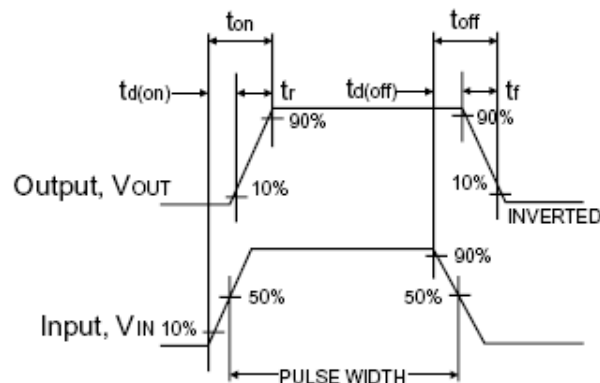
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-30	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-1	--	-3	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = -24V, V_{GS} = 0V$	I_{DSS}	--	--	1.0	μA
On-State Drain Current ^a	$V_{DS} \leq -5V, V_{GS} = -4.5V$	$I_{D(ON)}$	-20	--	--	A
Drain-Source On-State Resistance ^a	$V_{GS} = -10V, I_D = -5.3A$	$R_{DS(ON)}$	--	38	48	m Ω
	$V_{GS} = -4.5V, I_D = -4.1A$		--	63	79	
Forward Transconductance ^a	$V_{DS} = -15V, I_D = -5.3A$	g_{fs}	--	12	--	S
Diode Forward Voltage	$I_S = -1.7A, V_{GS} = 0V$	V_{SD}	--	-0.85	-1.2	V
Dynamic^b						
Total Gate Charge	$V_{DS} = -15V, I_D = -5.3A, V_{GS} = -10V$	Q_g	--	18.09	--	nC
Gate-Source Charge		Q_{gs}	--	6.52	--	
Gate-Drain Charge		Q_{gd}	--	3.25	--	
Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz$	C_{iss}	--	1047.98	--	pF
Output Capacitance		C_{oss}	--	172.82	--	
Reverse Transfer Capacitance		C_{rss}	--	115.50	--	
Switching^c						
Turn-On Delay Time	$V_{DD} = -15V, R_L = 15\Omega, I_D = -1A, V_{GEN} = -10V, R_G = 6\Omega$	$t_{d(on)}$	--	20.52	--	nS
Turn-On Rise Time		t_r	--	4.43	--	
Turn-Off Delay Time		$t_{d(off)}$	--	42.81	--	
Turn-Off Fall Time		t_f	--	7.35	--	

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.



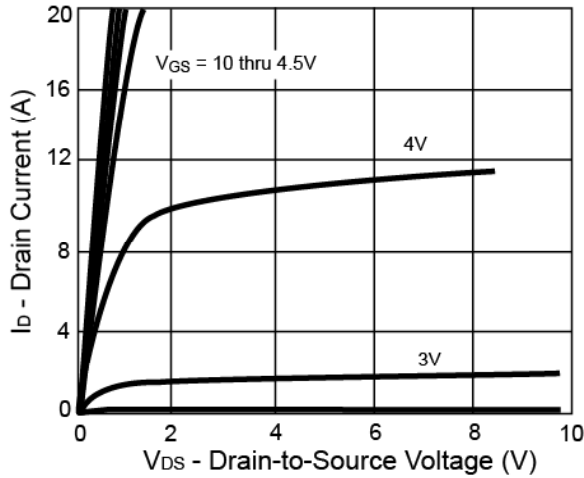
Switching Test Circuit



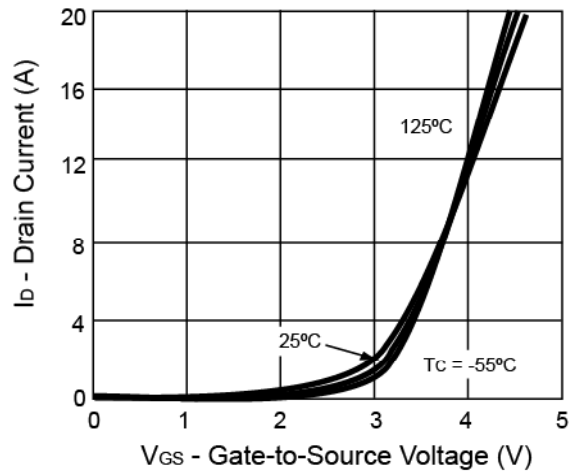
Switchin Waveforms

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

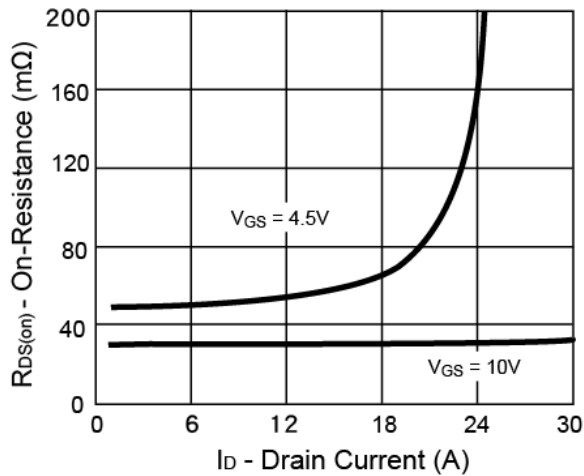
Output Characteristics



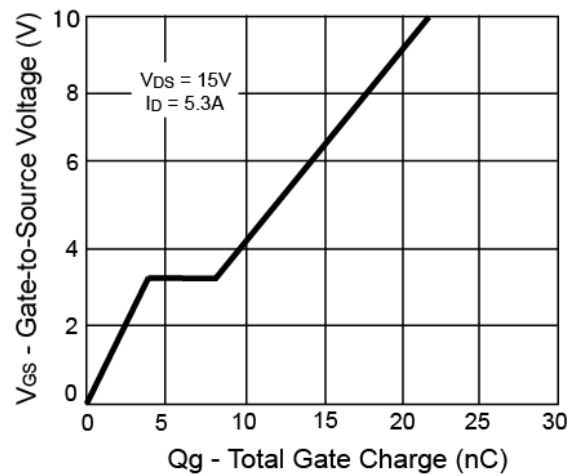
Transfer Characteristics



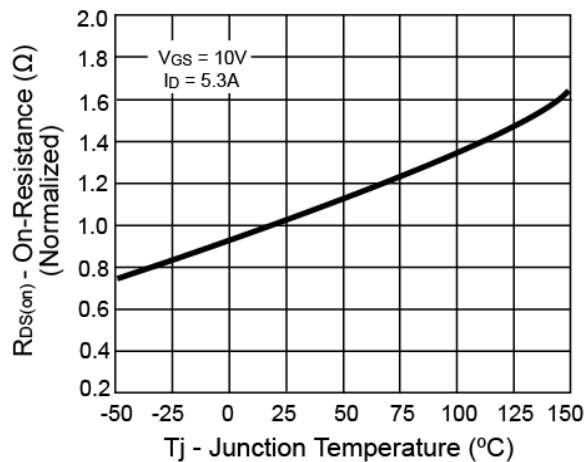
On-Resistance vs. Drain Current



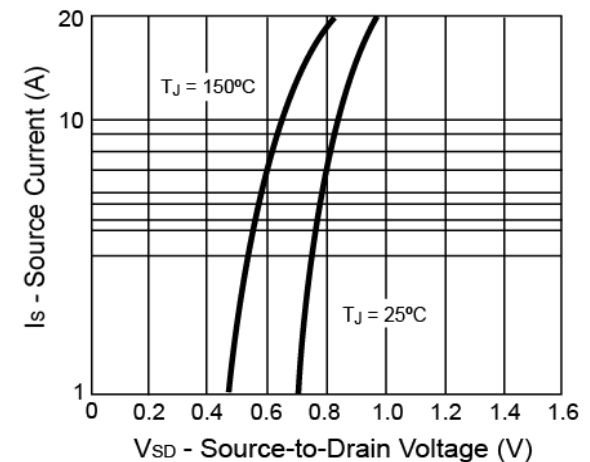
Gate Charge



On-Resistance vs. Junction Temperature

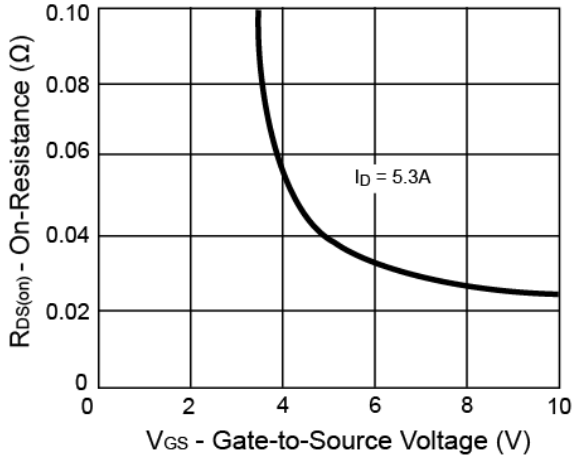


Source-Drain Diode Forward Voltage

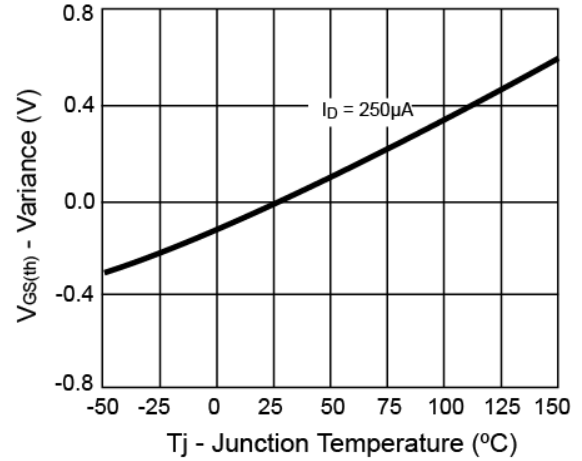


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

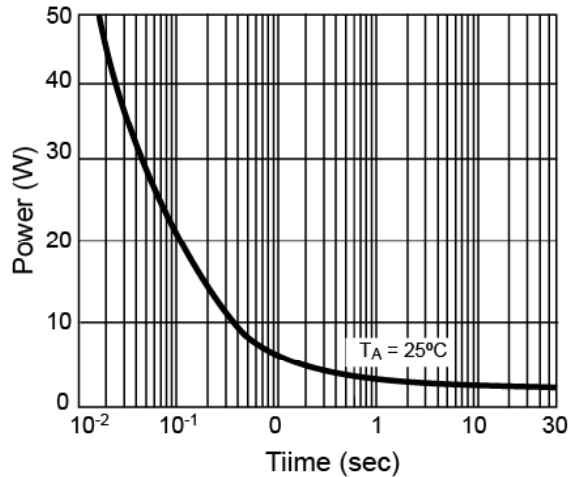
On-Resistance vs. Gate-Source Voltage



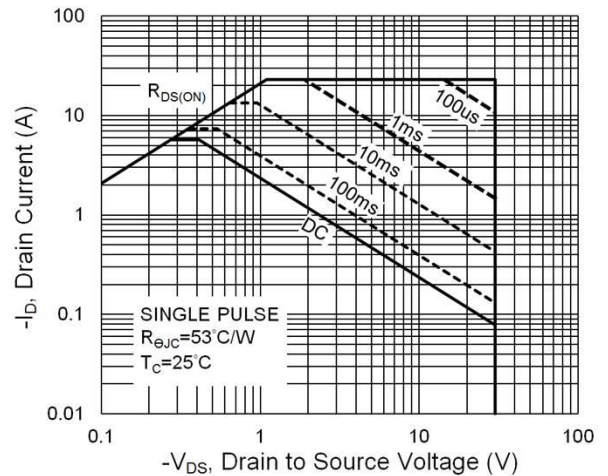
Threshold Voltage



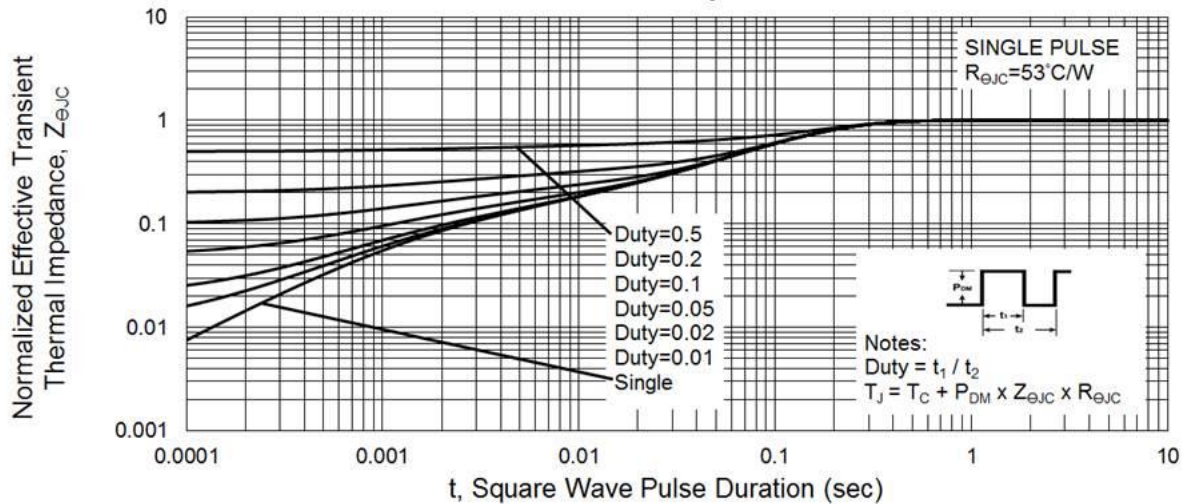
Single Pulse Power



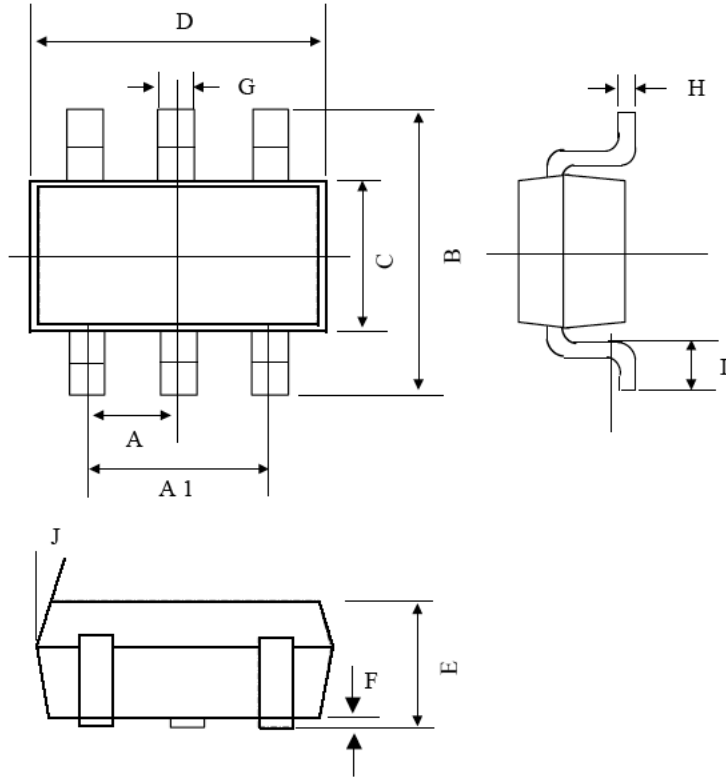
Maximum Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case

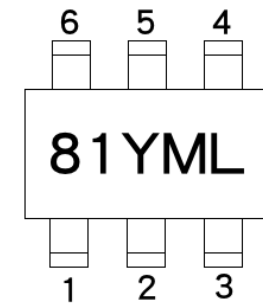


SOT-26 Mechanical Drawing



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



- 81** = 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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