



Pin Definition:

1. Source	8. Drain
2. Source	7. Drain
3. Source	6. Drain
4. Gate	5. Drain

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)	I _D (A)
-30	21 @ V _{GS} = -10V	-9.1
	35 @ V _{GS} = -4.5V	-6.9

Features

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

Application

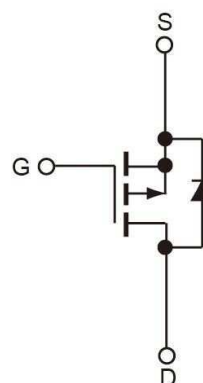
- DC-DC Conversion
- Battery Switch

Ordering Information

Part No.	Package	Packing
TSM4435BCS RL	SOP-8	2.5Kpcs / 13" Reel
TSM4435BCS RLG	SOP-8	2.5Kpcs / 13" Reel

Note: "G" denote for Halogen Free Product

Block Diagram



P-Channel MOSFET

Absolute Maximum Rating (T_A = 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	-9.1	A
Pulsed Drain Current	I _{DM}	-50	A
Continuous Source Current (Diode Conduction) ^{a,b}	I _S	-2.1	A
Maximum Power Dissipation	P _D	T _a = 25°C	2.5
		T _a = 75°C	1.6
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 Foot (Drain) Thermal Resistance	R _{θJF}	22	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	R _{θJA}	50	°C/W

Notes:

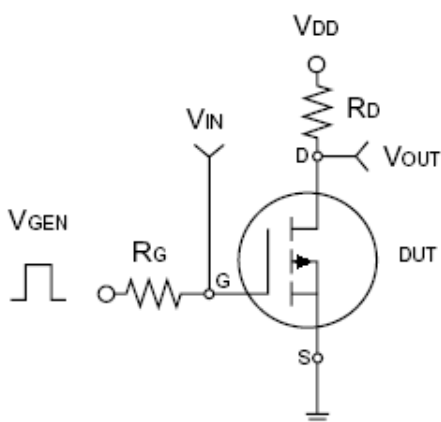
- Pulse width limited by the Maximum junction temperature
- Surface Mounted on FR4 Board, t ≤ 10 sec.

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

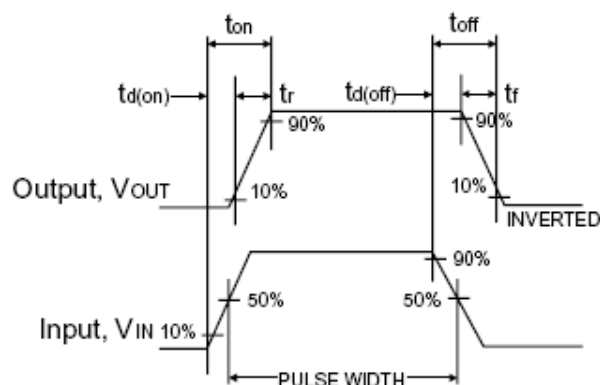
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250uA	BV _{DSS}	-30	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	V _{GS(TH)}	-1	--	-3	V
Gate Body Leakage	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} = 0V	I _{DSS}	--	--	-1.0	μA
On-State Drain Current ^a	V _{DS} = -5V, V _{GS} = -10V	I _{D(ON)}	-40	--	--	A
Drain-Source On-State Resistance ^a	V _{GS} = -10V, I _D = -9.1A	R _{DS(ON)}	--	17	21	mΩ
	V _{GS} = -4.5V, I _D = -6.9A		--	25	35	
Forward Transconductance ^a	V _{DS} = -10V, I _D = -9.1A	g _{fs}	--	24	--	S
Diode Forward Voltage	I _S = -2.1A, V _{GS} = 0V	V _{SD}	--	-0.8	-1.2	V
Dynamic^b						
Total Gate Charge	V _{DS} = -15V, I _D = -9.1A, V _{GS} = -10V	Q _g	--	33	70	nC
Gate-Source Charge		Q _{gs}	--	5.8	--	
Gate-Drain Charge		Q _{gd}	--	8.6	--	
Input Capacitance	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	1573	1900	pF
Output Capacitance		C _{oss}	--	319	--	
Reverse Transfer Capacitance		C _{rss}	--	211	295	
Switching^{b,c}						
Turn-On Delay Time	V _{DD} = -15V, R _L = 15Ω, I _D = -1A, V _{GEN} = -10V, R _G = 6Ω	t _{d(on)}	--	10	15	nS
Turn-On Rise Time		t _r	--	15	25	
Turn-Off Delay Time		t _{d(off)}	--	110	170	
Turn-Off Fall Time		t _f	--	70	110	

Notes:

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



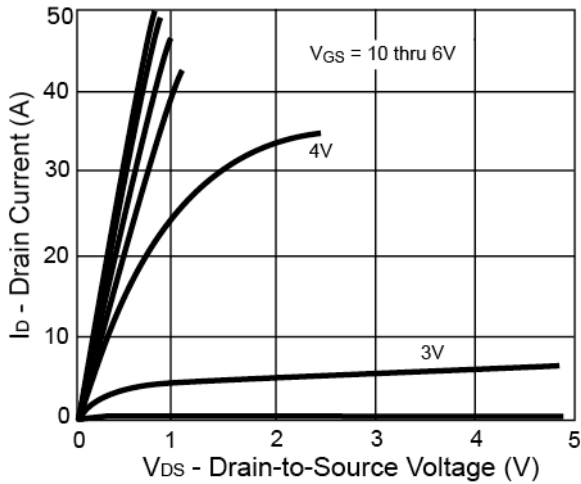
Switching Test Circuit



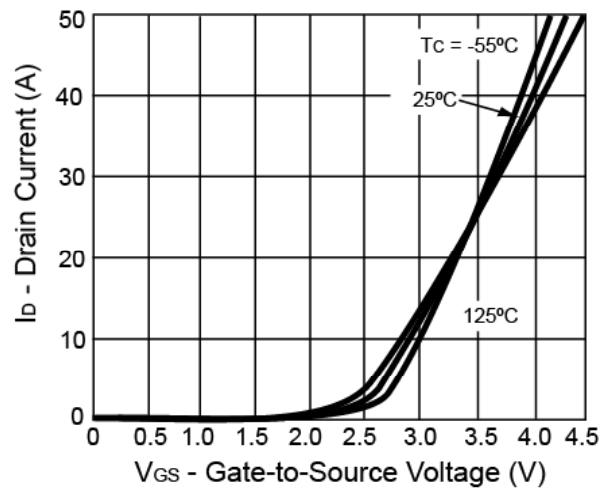
Switchin Waveforms

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

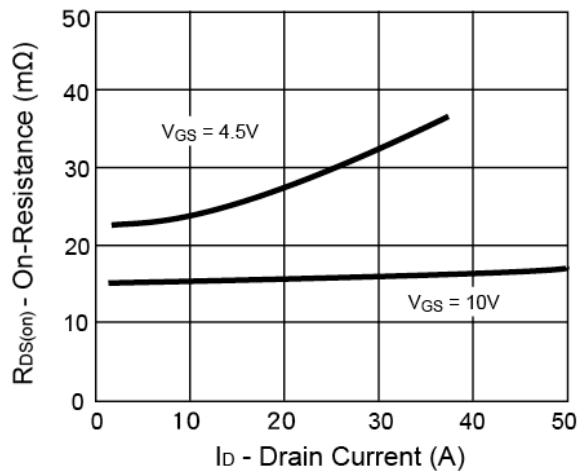
Output Characteristics



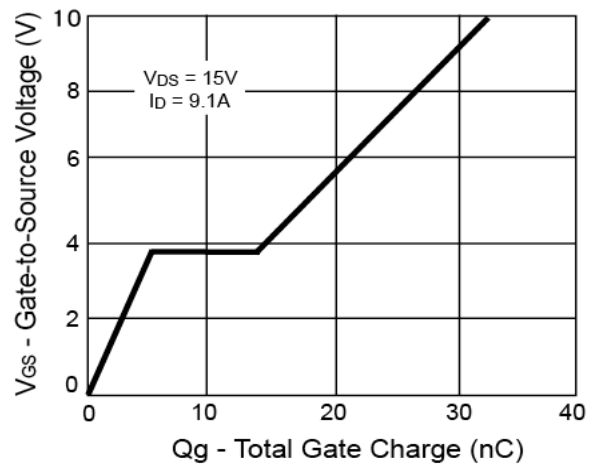
Transfer Characteristics



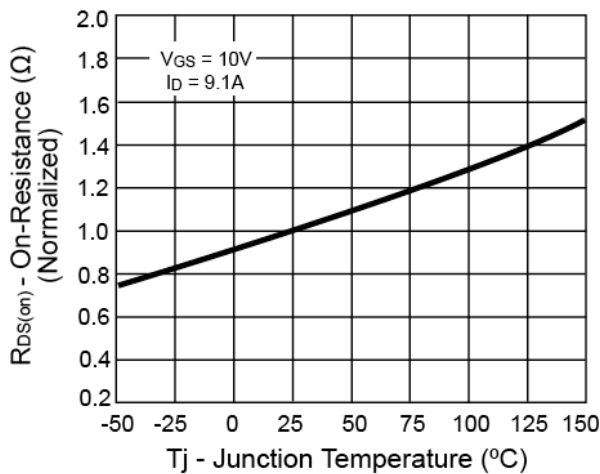
On-Resistance vs. Drain Current



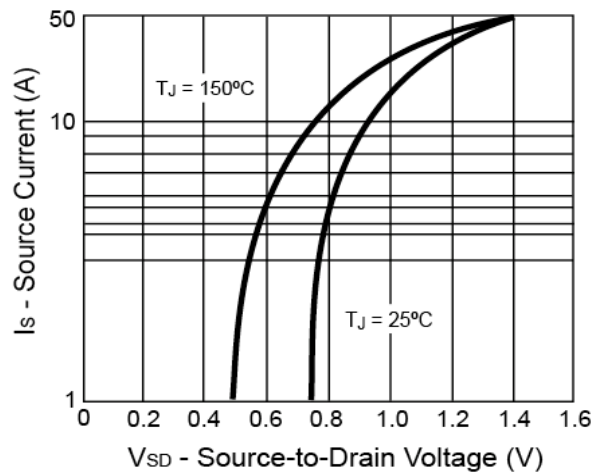
Gate Charge



On-Resistance vs. Junction Temperature

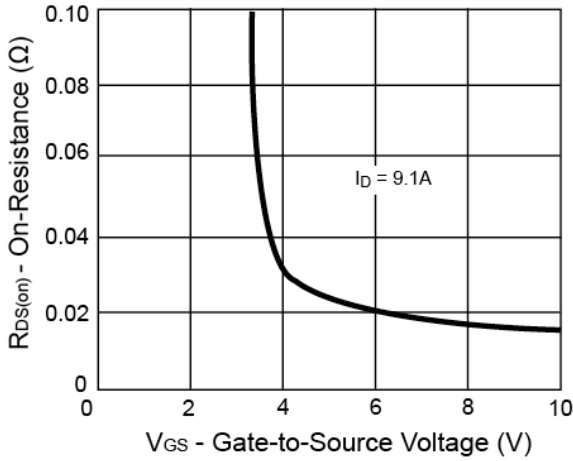


Source-Drain Diode Forward Voltage

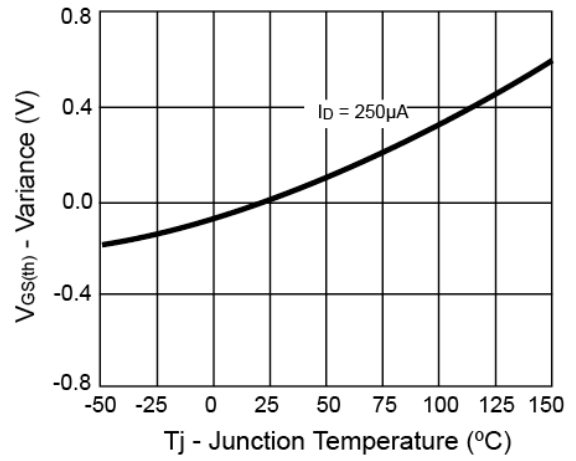


Electrical Characteristics Curve ($T_A = 25^\circ\text{C}$, unless otherwise noted)

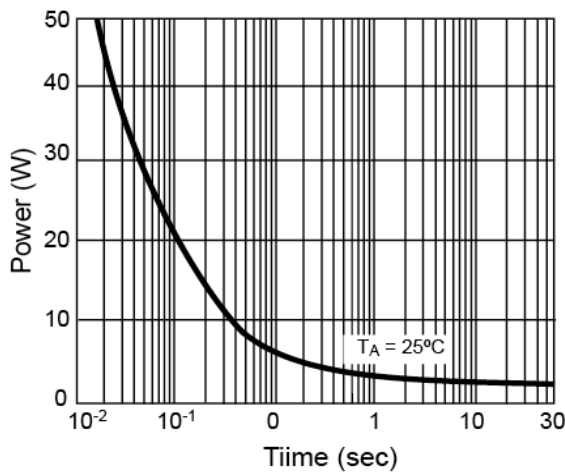
On-Resistance vs. Gate-Source Voltage



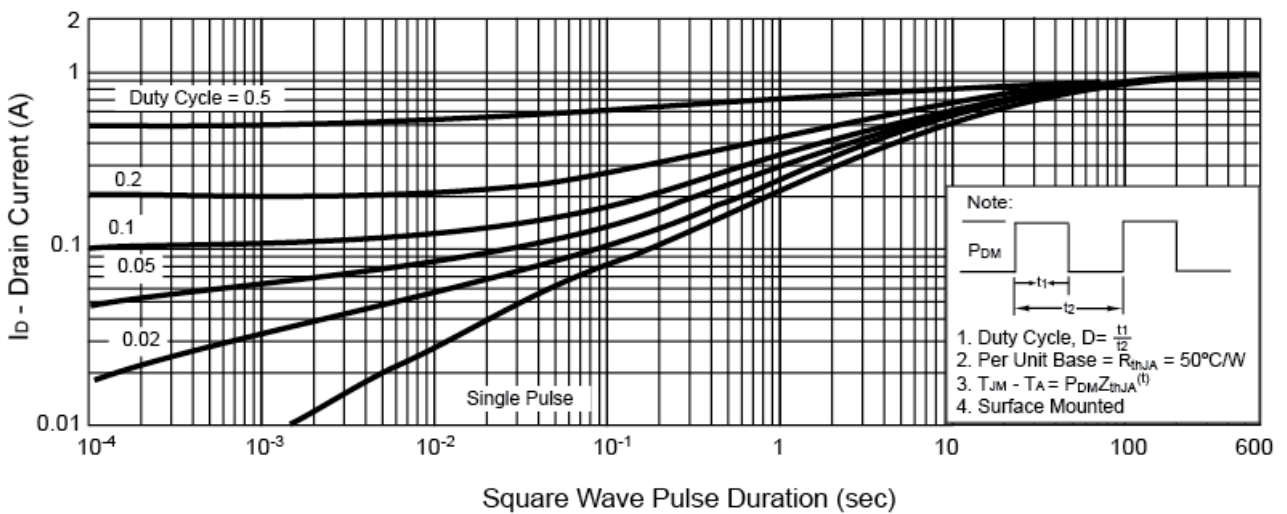
Threshold Voltage



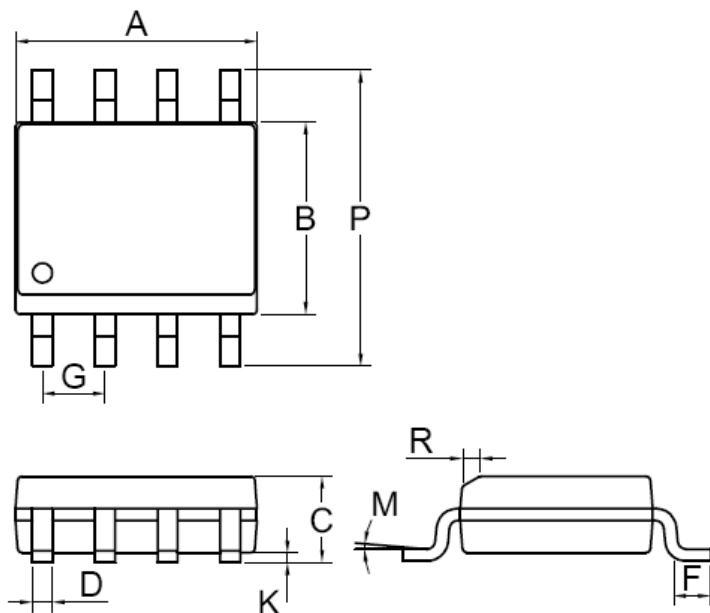
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

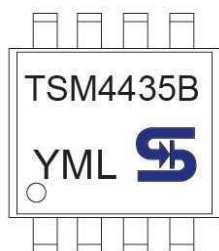


SOP-8 Mechanical Drawing



DIM	SOP-8 DIMENSION			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27BSC		0.05BSC	
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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)
- = 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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