TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSM4433D

20V Dual P-Channel MOSFET

SOP-8

Pin Definition:

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$(mΩ)	I_D (A)
-20	90 @ V_{GS} = -4.5V	-3.9
	110 @ V_{GS} = -2.5V	-3.2
	150 @ V_{GS} = -1.8V	-2.6

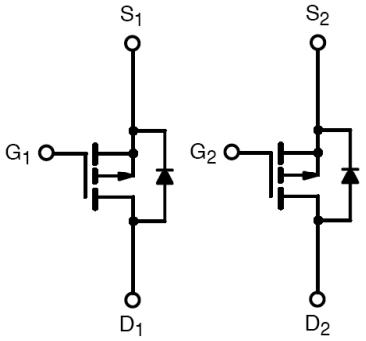
Features

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

Application

- DC-DC Conversion
- Asynchronous Buck Converter

Block Diagram



Dual P-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM4433DCS RL	SOP-8	2.5Kpcs / 13" Reel

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current, V_{GS} @4.5V.		I_D	-3.9	A
Pulsed Drain Current, V_{GS} @4.5V		I_{DM}	-10	A
Continuous Source Current (Diode Conduction)[a,b]		I_S	-1.2	A
Maximum Power Dissipation	Ta = 25°C	P_D	2.5	W
	Ta = 75°C		1.3	
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	$R\Theta_{JF}$	19	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	$R\Theta_{JA}$	40	°C/W

Notes:

a. Pulse width limited by the Maximum junction temperature

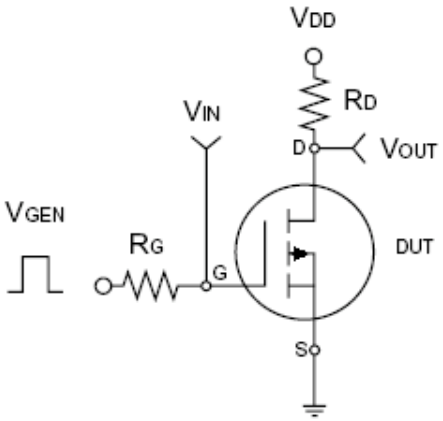
b. Surface Mounted on FR4 Board, t ≤ 10 sec.

TSM4433D
20V Dual P-Channel MOSFET

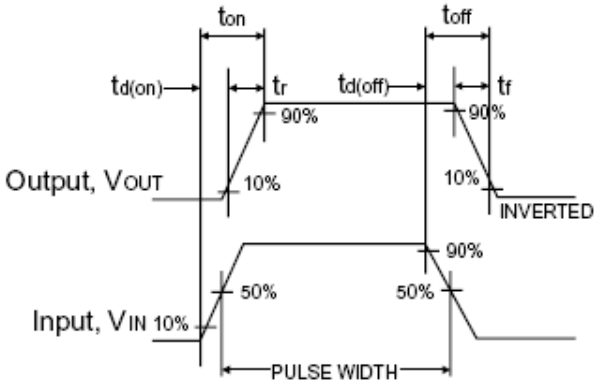
Electrical Specifications

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250uA	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	$V_{GS(TH)}$	-0.45	--	-0.95	V
Gate Body Leakage	V_{GS} = ±8V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = -16V, V_{GS} = 0V	I_{DSS}	--	--	-1.0	μA
On-State Drain Current[a]	V_{DS} ≤ -5V, V_{GS} = -4.5V	$I_{D(ON)}$	-6	--	--	A
Drain-Source On-State Resistance[a]	V_{GS} = -4.5V, I_D = -3.9A	$R_{DS(ON)}$	--	75	90	mΩ
	V_{GS} = -2.5V, I_D = -3.2A		--	90	110	
	V_{GS} = -1.8V, I_D = -2.6A		--	105	150	
Forward Transconductance[a]	V_{DS} = -5V, I_D = -4A	g_{fs}	--	6.5	--	S
Diode Forward Voltage	I_S = -0.9A, V_{GS} = 0V	V_{SD}	--	- 0.8	-1.2	V
Dynamic[b]						
Total Gate Charge	V_{DS} = -6V, I_D = -2.8A, V_{GS} = -4.5V	Q_g	--	15.23	--	nC
Gate-Source Charge		Q_{gs}	--	5.49	--	
Gate-Drain Charge		Q_{gd}	--	2.74	--	
Input Capacitance	V_{DS} = -6V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	882.51	--	pF
Output Capacitance		C_{oss}	--	145.54	--	
Reverse Transfer Capacitance		C_{rss}	--	97.26	--	
Switching[c]						
Turn-On Delay Time	V_{DD} = -6V, R_L = 6Ω, I_D = -1A, V_{GEN} = -4.5V, R_G = 6Ω	$t_{d(on)}$	--	17.28	--	nS
Turn-On Rise Time		t_r	--	3.73	--	
Turn-Off Delay Time		$t_{d(off)}$	--	36.05	--	
Turn-Off Fall Time		t_f	--	6.19	--	

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



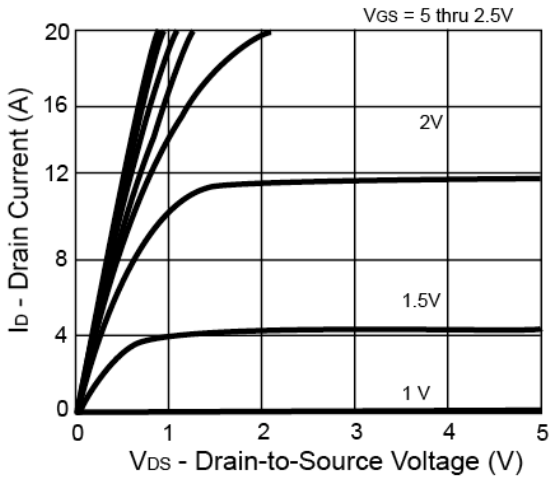
Switching Test Circuit



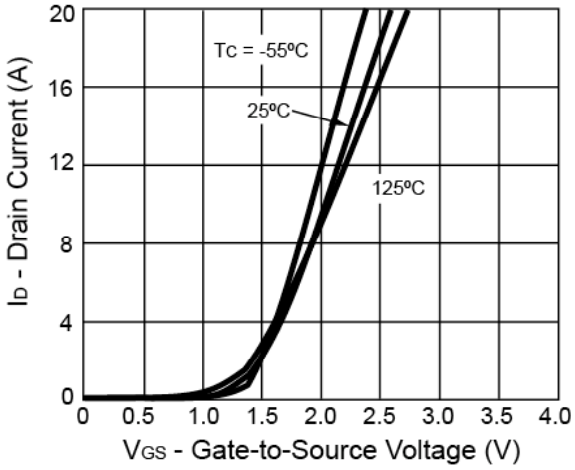
Switchin Waveforms

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

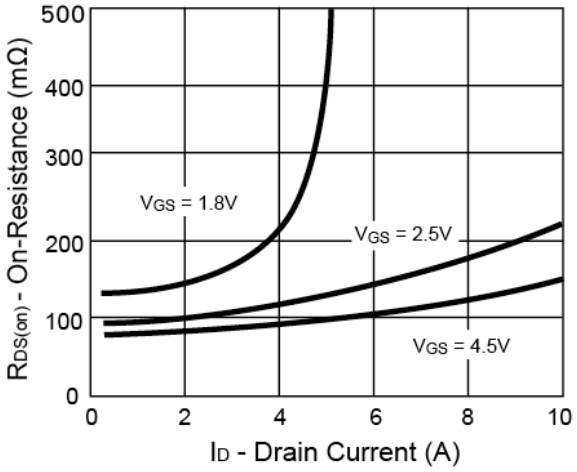
Output Characteristics



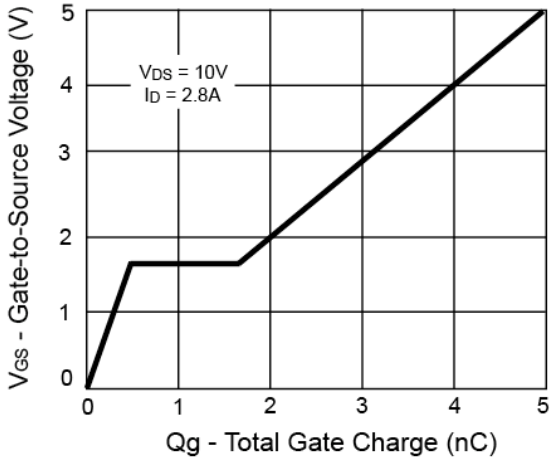
Transfer Characteristics



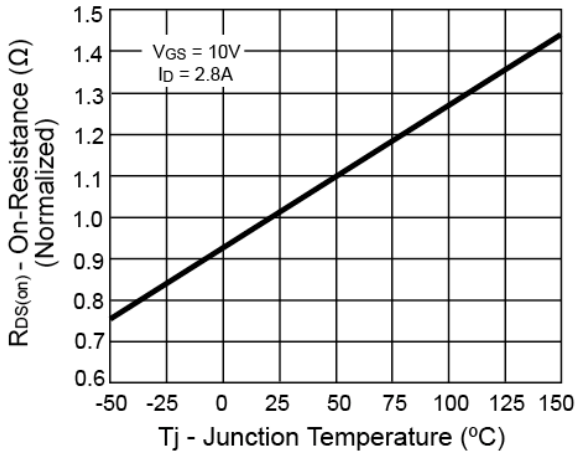
On-Resistance vs. Drain Current



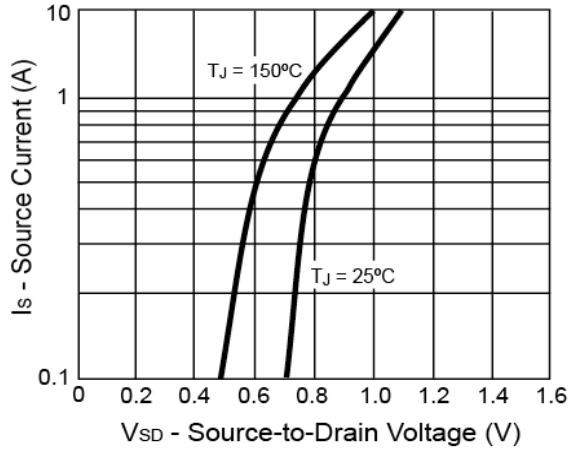
Gate Charge



On-Resistance vs. Junction Temperature

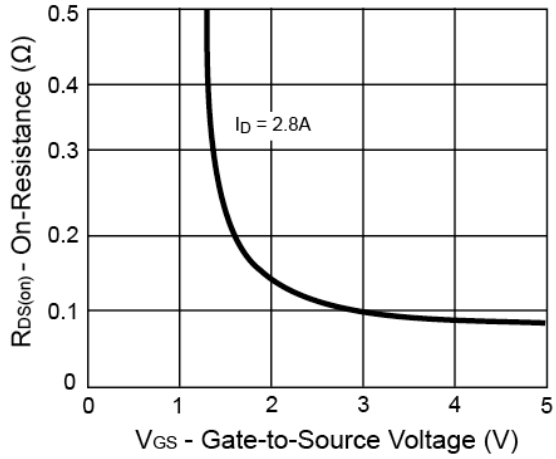


Source-Drain Diode Forward Voltage

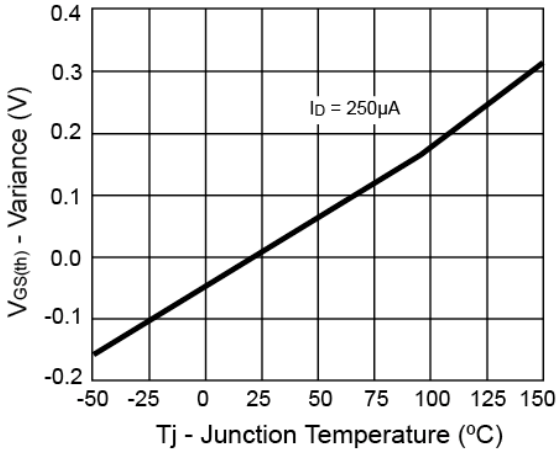


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

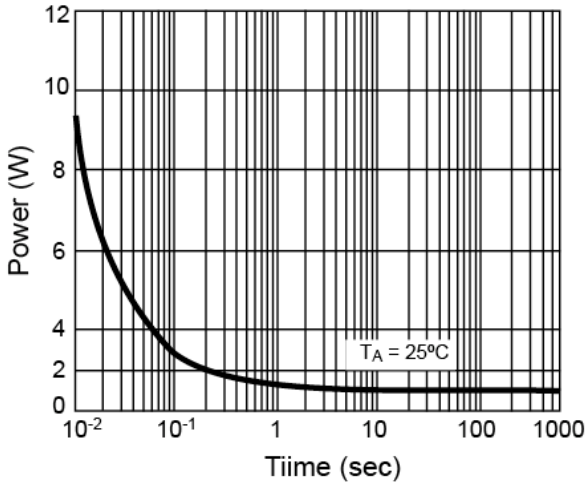
On-Resistance vs. Gate-Source Voltage



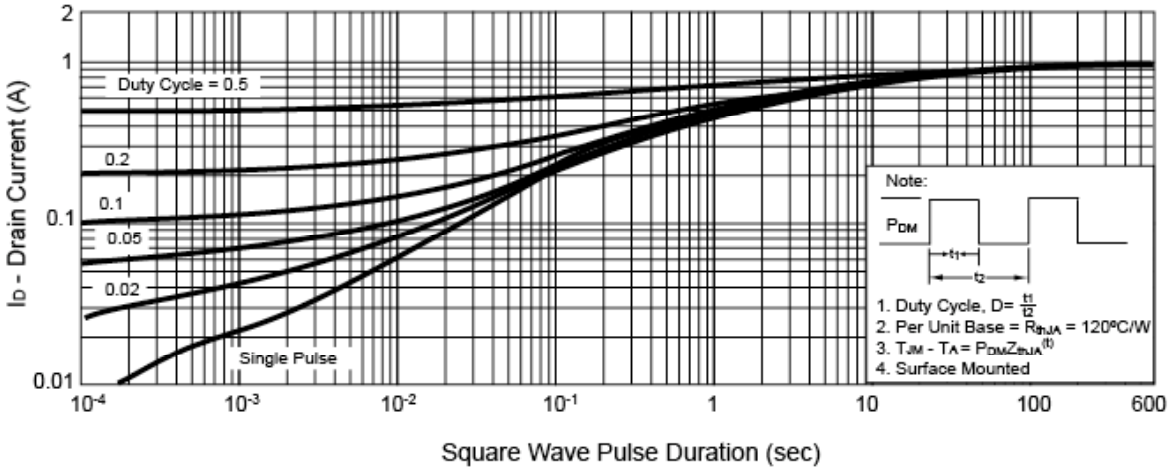
Threshold Voltage



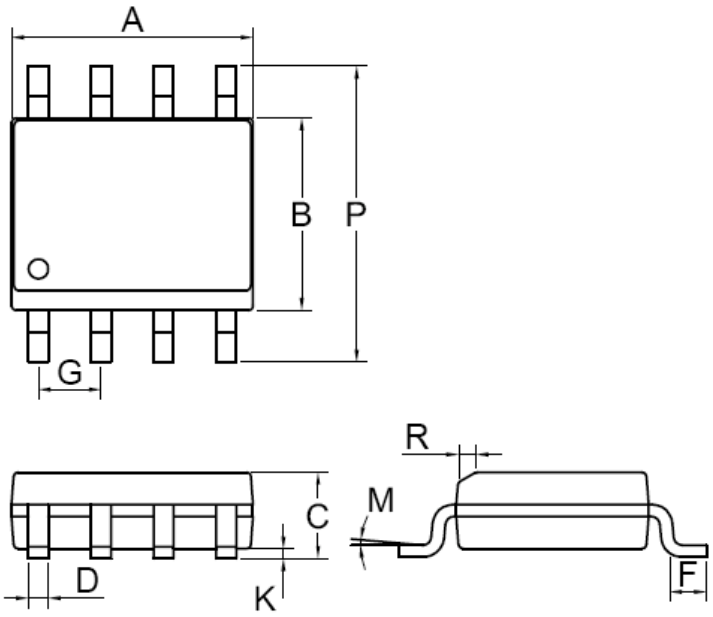
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

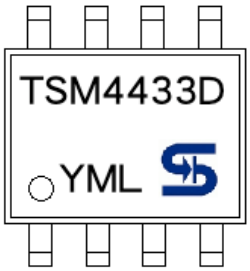


SOP-8 Mechanical Drawing



SOP-8 DIMENSION				
DIM	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**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
L = Lot Code

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