



TSM4410D

Dual N-Channel Enhancement Mode MOSFET

SOP-8



Pin assignment:

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

$V_{ds} = 25V$

$I_d = 10A$

$R_{ds(on)}, V_{gs} @ 10V, I_{ds} @ 10A = 21m\Omega$

$R_{ds(on)}, V_{gs} @ 4.5V, I_{ds} @ 8A = 15m\Omega$

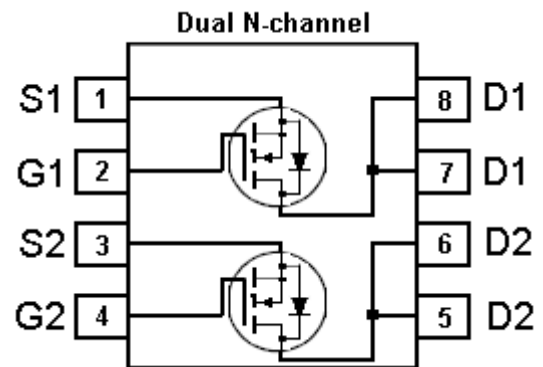
Features

- ◇ Advanced trench process technology
- ◇ High density cell design for ultra low on-resistance
- ◇ Excellent thermal and electrical capabilities
- ◇ Fully characterized avalanche voltage and current

Ordering Information

Part No.	Packing	Package
TSM4410DCS RL	Tape & Reel 2,500/per reel	SOP-8

Block Diagram



Absolute Maximum Rating ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	25	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	10	A
Pulsed Drain Current	I_{DM}	50	
Maximum Power Dissipation	P_D	$T_A = 25^\circ C$	2.5
		$T_A = 70^\circ C$	1.6
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

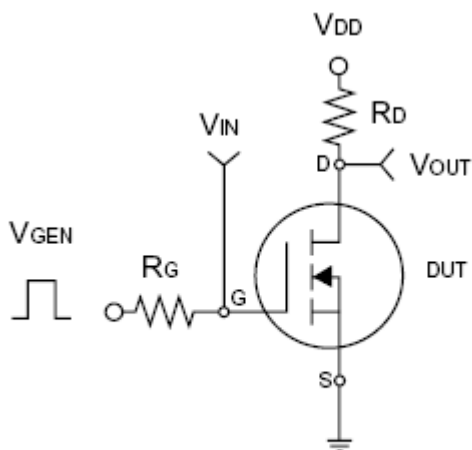
Parameter	Symbol	Limit	Unit
Junction-to-Foot Thermal Resistance	$R_{\theta jF}$	22	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta ja}$	50	

Note: 1. Maximum DC current limited by the package
2. 1-in² 2oz Cu PCB board

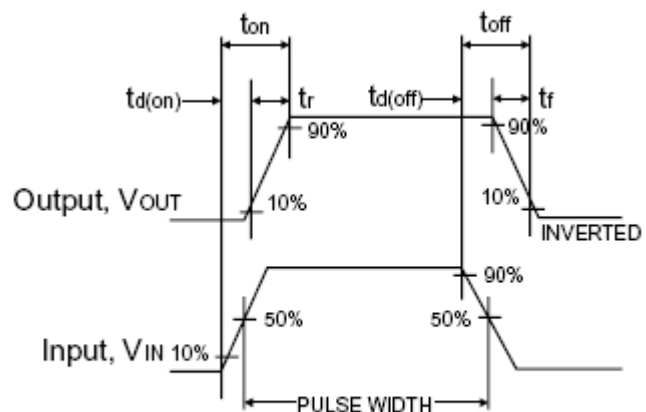
Electrical Characteristics (single channel)						
$T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu\text{A}$	BV_{DSS}	25	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 8A$	$R_{DS(ON)}$	--	13	15	m Ω
	$V_{GS} = 10V, I_D = 10A$	$R_{DS(ON)}$	--	18	21	m Ω
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	1.0	--	3.0	V
Zero Gate Voltage Drain Current	$V_{DS} = 25V, V_{GS} = 0V$	I_{DSS}	--	--	1.0	μA
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Forward Transconductance	$V_{DS} = 10V, I_D = 10A$	g_{fs}	--	15	--	S
Dynamic						
Total Gate Charge	$V_{DS} = 15V, I_D = 10A, V_{GS} = 10V$	Q_g	--	15	26	nC
Gate-Source Charge		Q_{gs}	--	2.5	--	
Gate-Drain Charge		Q_{gd}	--	3	--	
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	--	nS
Turn-On Rise Time		t_r	--	6	--	
Turn-Off Delay Time		$t_{d(off)}$	--	49	--	
Turn-Off Fall Time		t_f	--	16	--	
Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V, f = 1.0\text{MHz}$	C_{iss}	--	921	--	pF
Output Capacitance		C_{oss}	--	208	--	
Reverse Transfer Capacitance		C_{rss}	--	108	--	
Source-Drain Diode						
Max. Diode Forward Current		I_S	--	--	3	A
Diode Forward Voltage	$I_S = 3A, V_{GS} = 0V$	V_{SD}	--	0.87	1.5	V

Note: 1. pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

2. Negligible, Dominated by circuit inductance.



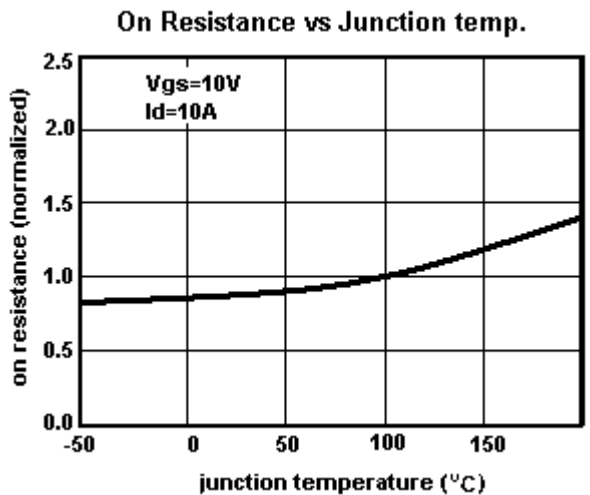
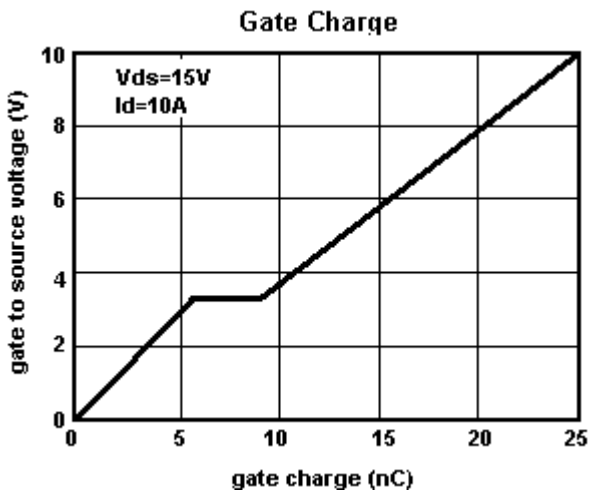
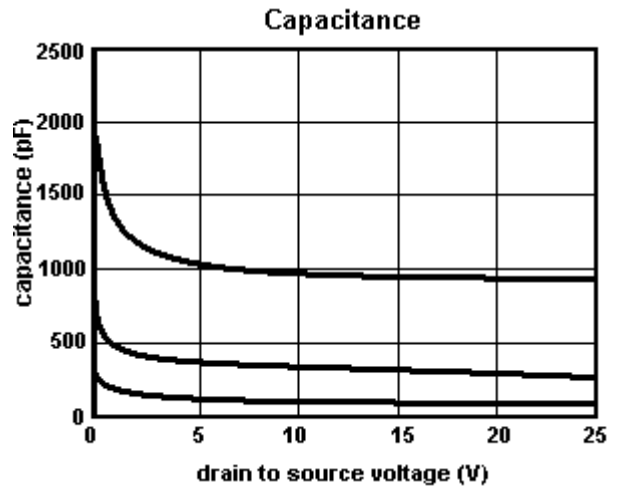
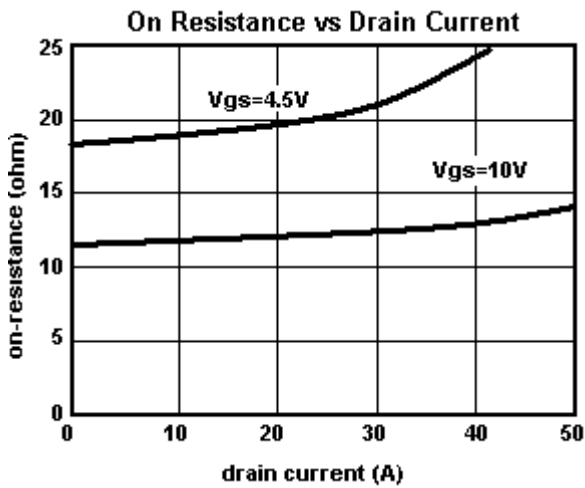
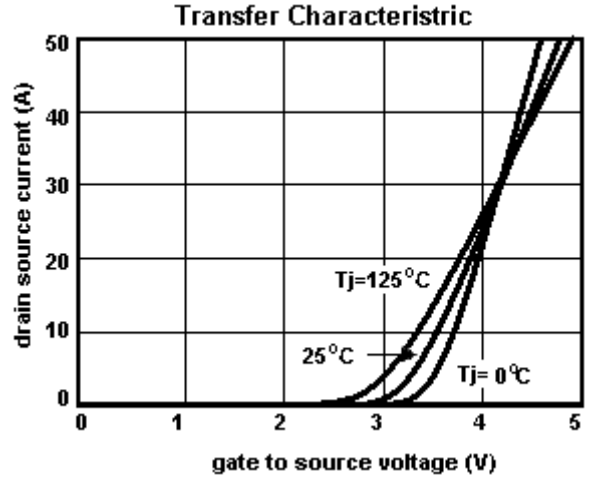
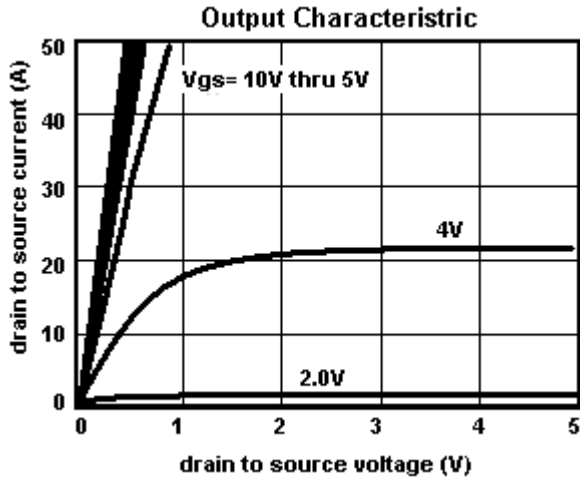
Switching Test Circuit



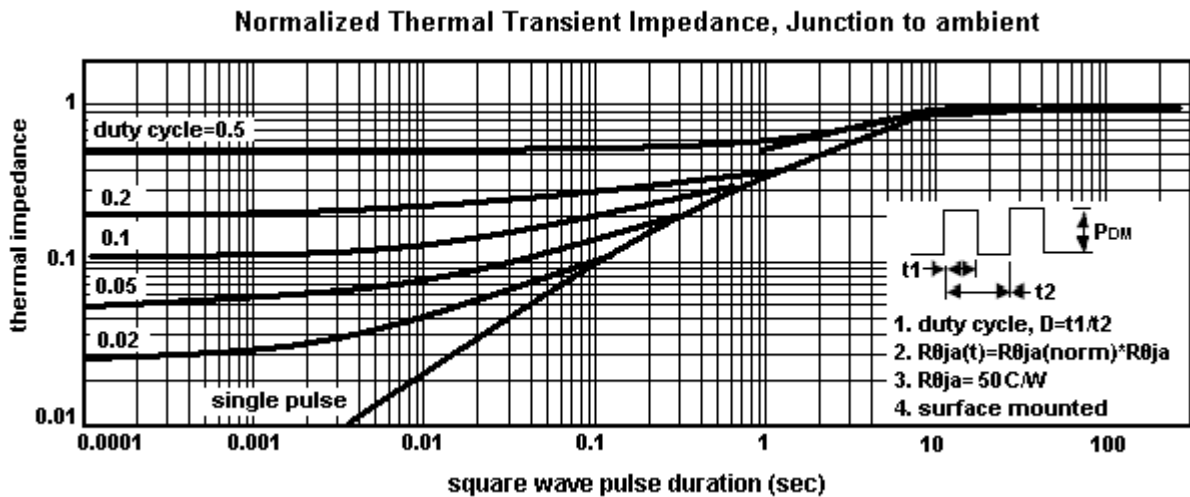
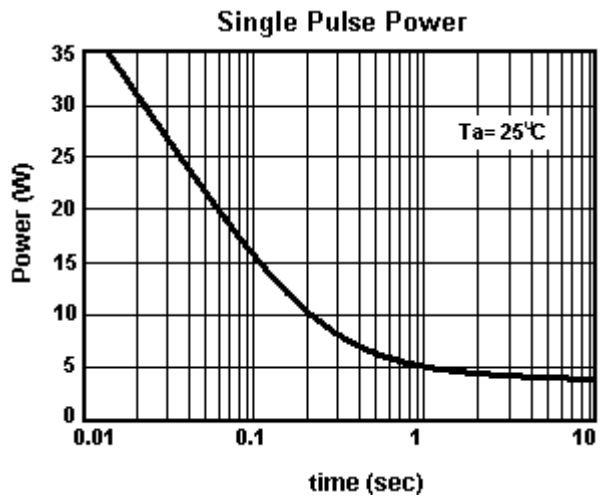
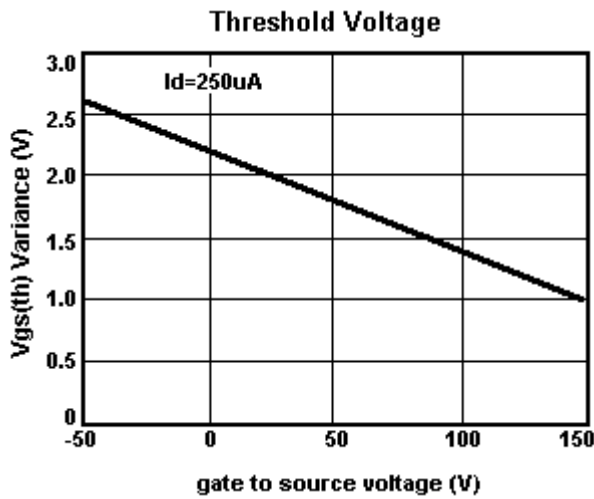
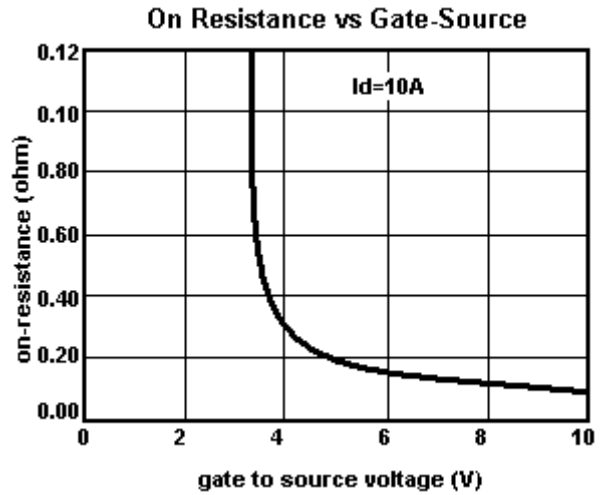
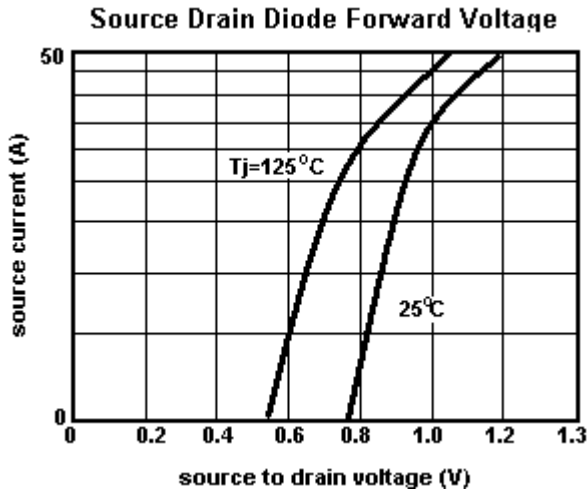
Switchin Waveforms



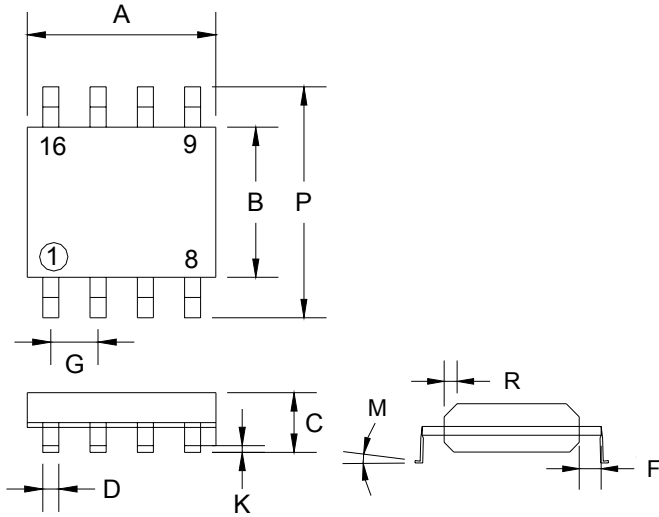
Typical Characteristics Curve (single channel) (Ta = 25 °C unless otherwise noted)



Electrical Characteristics Curve (continued)



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	1.27 (typ)		0.05 (typ)	
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