



Pin Definition:

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)	I_D (A)
-20	30 @ $V_{GS} = -4.5V$	-4.5
	42 @ $V_{GS} = -2.5V$	-3
	68 @ $V_{GS} = -1.8V$	-2

Features

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

Application

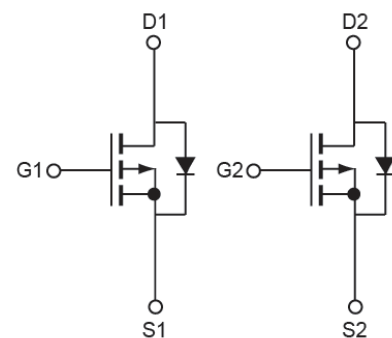
- Load Switch
- PA Switch

Ordering Information

Part No.	Package	Packing
TSM6963SDCA RVG	TSSOP-8	3Kpcs / 13" Reel

Note: "G" denote for Halogen Free Product

Block Diagram



Dual P-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current, $V_{GS} @ 4.5V$.	I_D	-4.5	A
Pulsed Drain Current, $V_{GS} @ 4.5V$	I_{DM}	-16	A
Continuous Source Current (Diode Conduction) ^{a,b}	I_S	-1.0	A
Maximum Power Dissipation	P_D	$T_a = 25^\circ C$	1.14
		$T_a = 70^\circ C$	0.73
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 (Drain) Thermal Resistance	$R_{\theta_{JF}}$	75	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta_{JA}}$	90	$^\circ C/W$

Notes:

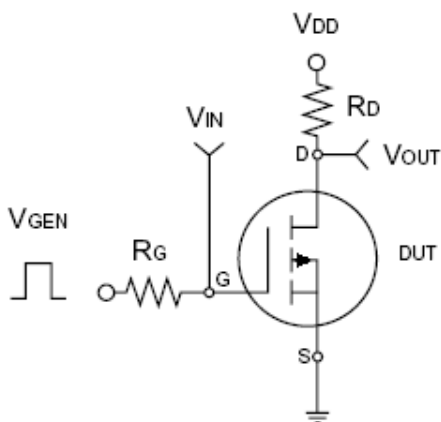
- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

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

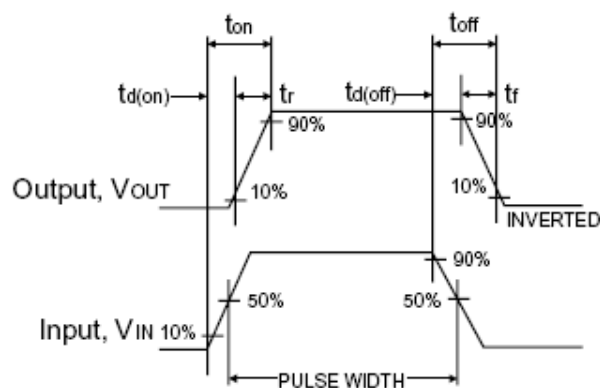
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-0.5	-0.7	-1.0	V
Zero Gate Voltage Drain Current	$V_{DS} = -16V, V_{GS} = 0V$	I_{DSS}	--	--	-1	μA
Gate Body Leakage	$V_{GS} = \pm 12V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
On-State Drain Current	$V_{DS} = -5V, V_{GS} = -4.5V$	$I_{D(ON)}$	-25	--	--	A
Drain-Source On-State Resistance	$V_{GS} = -4.5V, I_D = -4.5A$	$R_{DS(ON)}$	--	23	30	m Ω
	$V_{GS} = -2.5V, I_D = -3A$		--	30	42	
	$V_{GS} = -1.8V, I_D = -2A$		--	45	68	
Forward Transconductance	$V_{DS} = -5V, I_D = -4.5A$	g_{fs}	--	16	--	S
Diode Forward Voltage	$I_S = -0.5A, V_{GS} = 0V$	V_{SD}	--	-0.8	-1.3	V
Dynamic^b						
Total Gate Charge	$V_{DS} = -10V, I_D = -4.5A, V_{GS} = -4.5V$	Q_g	--	14	20	nC
Gate-Source Charge		Q_{gs}	--	2.1	10	
Gate-Drain Charge		Q_{gd}	--	4.7	--	
Input Capacitance	$V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz$	C_{iss}	--	1500	--	pF
Output Capacitance		C_{oss}	--	220	--	
Reverse Transfer Capacitance		C_{rss}	--	160	--	
Switching^{b,c}						
Turn-On Delay Time	$V_{DD} = -10V, R_L = 10\Omega, I_D = -1A, V_{GEN} = -4.5V, R_G = 6\Omega$	$t_{d(on)}$	--	6	11	nS
Turn-On Rise Time		t_r	--	13	23	
Turn-Off Delay Time		$t_{d(off)}$	--	86	145	
Turn-Off Fall Time		t_f	--	42	70	

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.



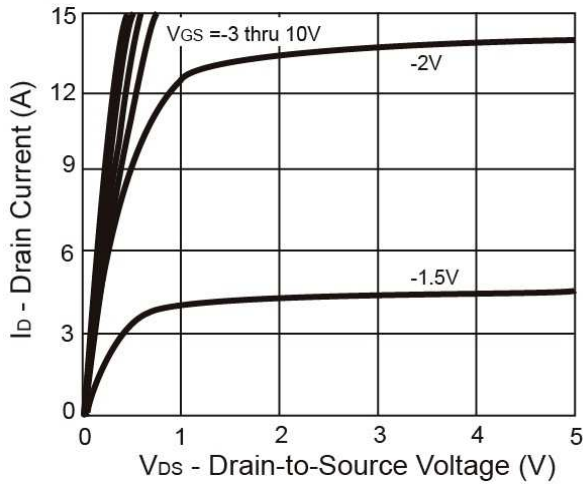
Switching Test Circuit



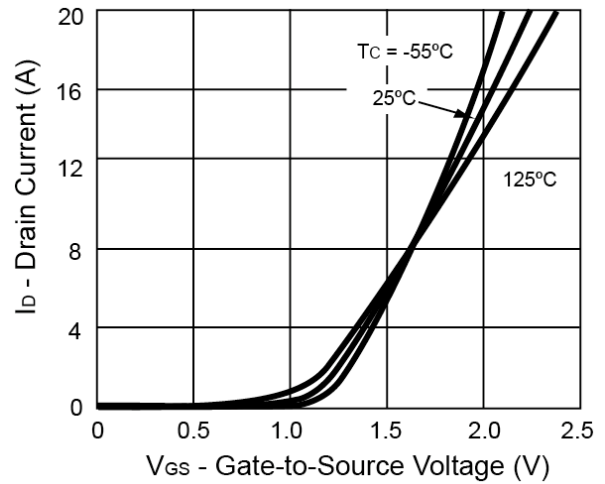
Switchin Waveforms

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

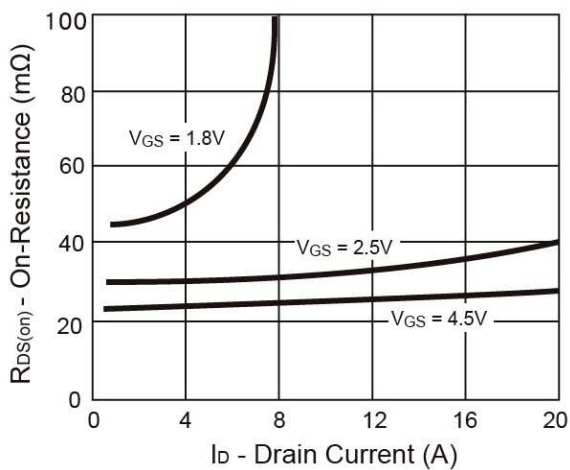
Output Characteristics



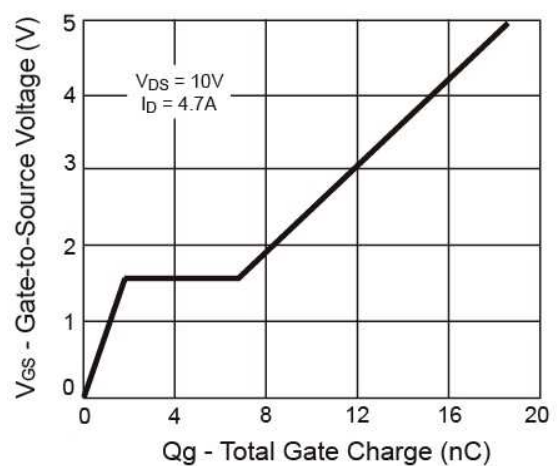
Transfer Characteristics



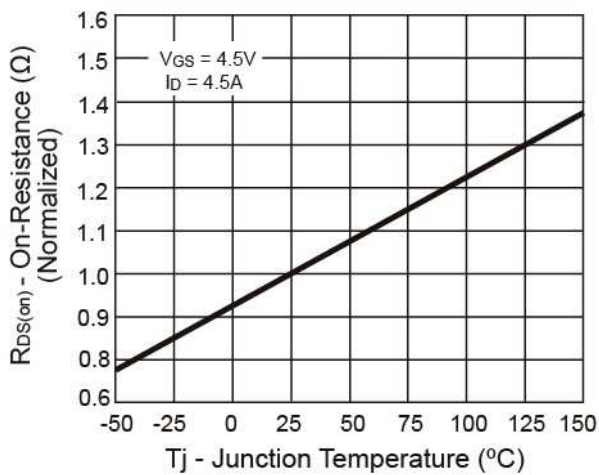
On-Resistance vs. Drain Current



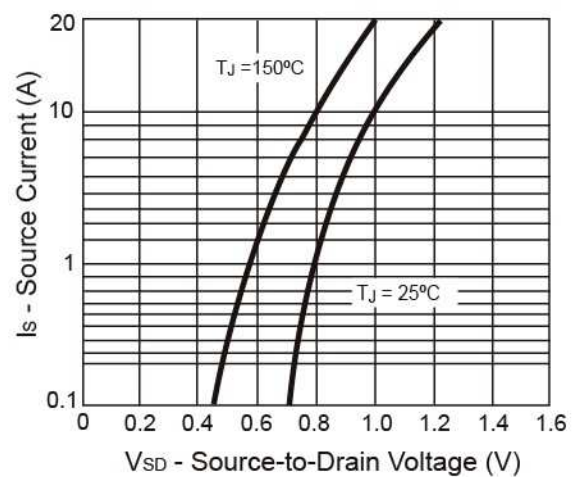
Gate Charge



On-Resistance vs. Junction Temperature

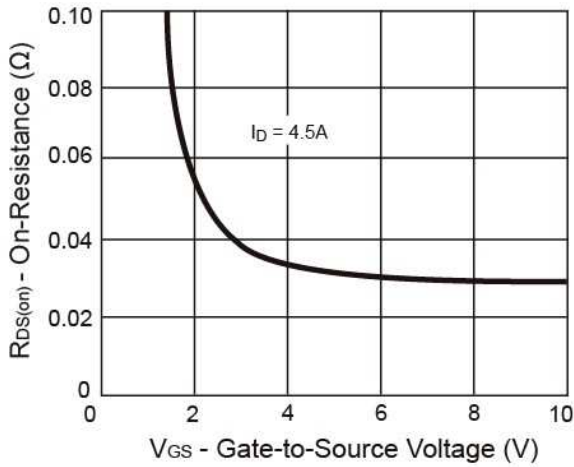


Source-Drain Diode Forward Voltage

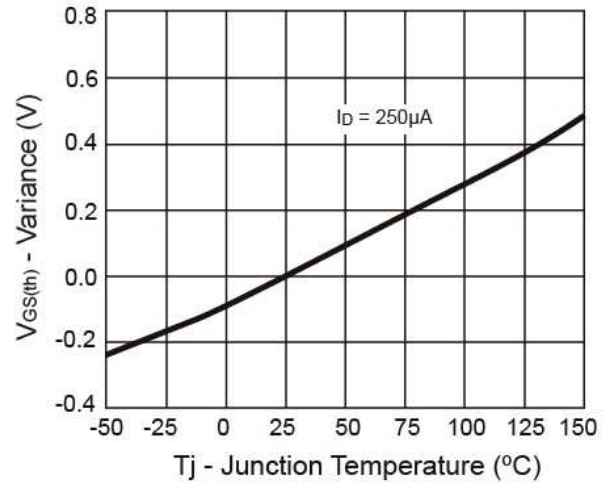


Electrical Characteristics Curve ($T_A = 25^\circ\text{C}$, unless otherwise noted)

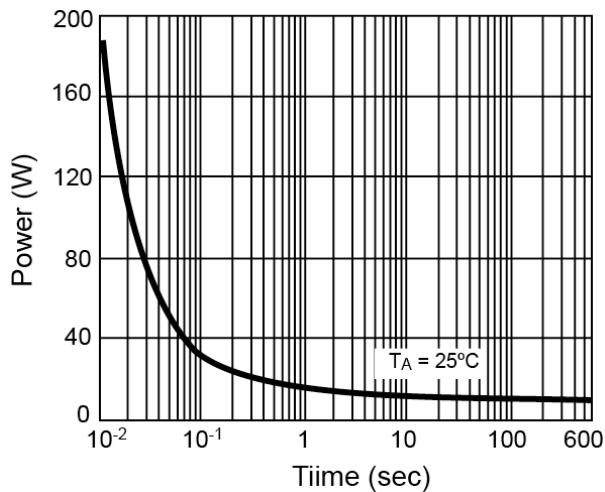
On-Resistance vs. Gate-Source Voltage



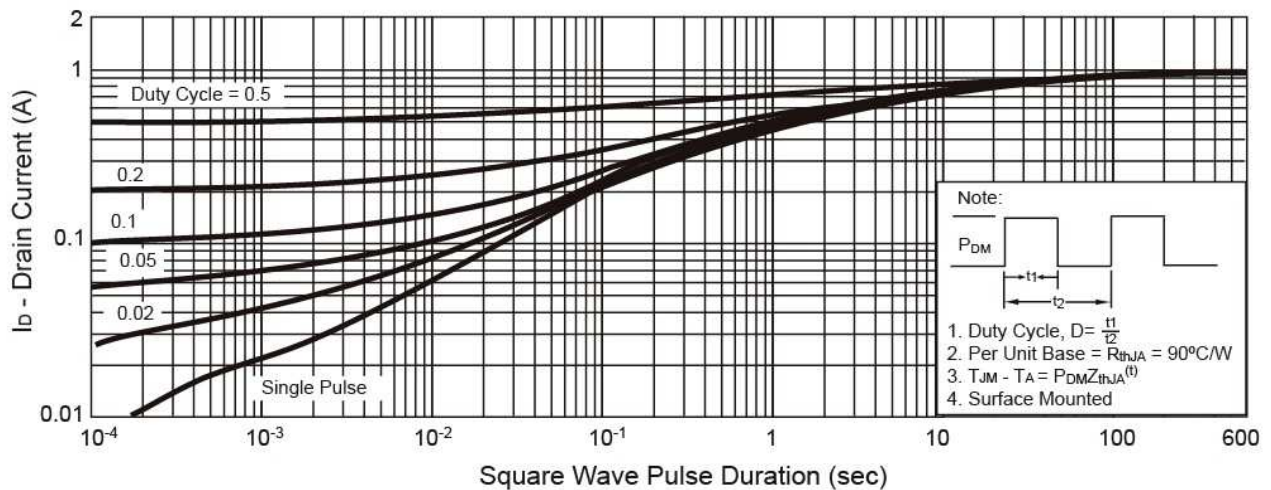
Threshold Voltage



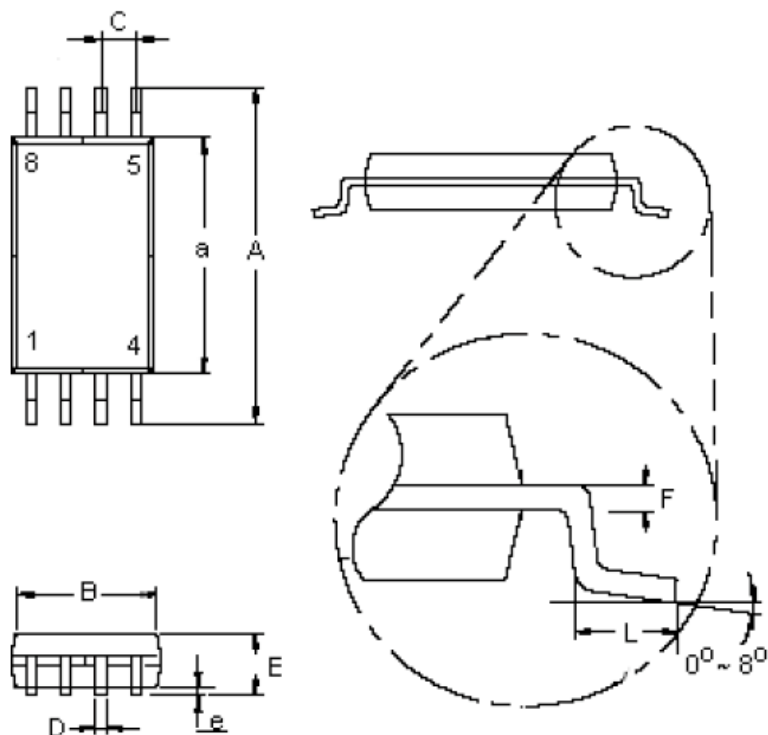
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

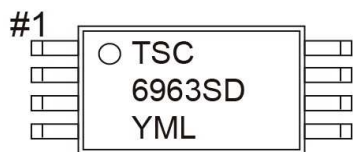


TSSOP-8 Mechanical Drawing



TSSOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.20	6.60	0.244	0.260
a	4.30	4.50	0.170	0.177
B	2.90	3.10	0.114	0.122
C	0.65 (typ)		0.025 (typ)	
D	0.25	0.30	0.010	0.019
E	1.05	1.20	0.041	0.049
e	0.05	0.15	0.002	0.009
F	0.127		0.005	
L	0.50	0.70	0.020	0.028

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

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