

General Description

The WSP6956 is the highest performance trench Dual N-ch MOSFET with extreme high cell density, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications.

Features

- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

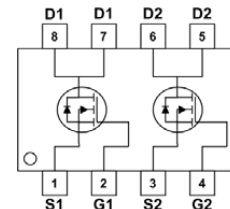
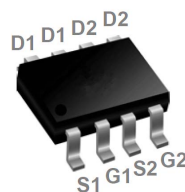
Product Summary

BVDSS	R _{DS(on)}	I _D
60V	15mΩ	10A

Applications

- SMPS Synchronous Rectification.
- DC-DC Conversion.
- Load Switch.

SOP-8 Pin Configuration



Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit	
Common Ratings				
V _{DSS}	Drain-Source Voltage	60	V	
V _{GSS}	Gate-Source Voltage	±20		
T _J	Maximum Junction Temperature	150	°C	
T _{STG}	Storage Temperature Range	-55 to 150		
I _S	Diode Continuous Forward Current	T _A =25°C	5	A
I _D	Continuous Drain Current	T _A =25°C	10	
		T _A =70°C	8	
I _{DM} ^a	Pulsed Drain Current	T _A =25°C	38	
P _D	Maximum Power Dissipation	T _A =25°C	3.5	W
		T _A =70°C	2.2	
P _{θJA} ^c	Thermal Resistance-Junction to Ambient	t ≤ 10s	35	°C/W
		Steady State	70	
I _{AS} ^b	Avalanche Current, Single pulse	L=0.1mH	27	A
E _{AS} ^b	Avalanche Energy, Single pulse	L=0.1mH	36	mJ

Note a : Pulse width limited by max. junction temperature.

Note b : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).

Note c : Surface Mounted on 1in² pad area.

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

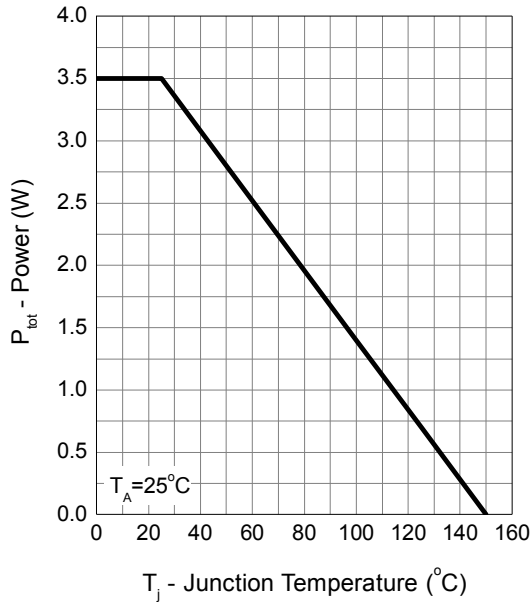
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	60		-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=48V, V_{GS}=0V$	-	-	1	μA
		$T_J=85^\circ C$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1	1.5	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$	-	15	20	m Ω
		$V_{GS}=4.5V, I_{DS}=9A$	-	18	24	
Diode Characteristics						
V_{\sim}^d	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=0V$	-	0.8	1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD}=10A, di_{SD}/dt=100A/\mu s$	-	21	-	ns
Q_{rr}	Reverse Recovery Charge		-	22	-	nC
Dynamic Characteristics^e						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	2.5	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=30V,$ Frequency=1.0MHz	-	1370	1780	pF
C_{oss}	Output Capacitance		-	135	-	
C_{rss}	Reverse Transfer Capacitance		-	60	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=30V, R_L=30\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	-	14	26	ns
t_r	Turn-on Rise Time		-	8	15	
$t_{d(OFF)}$	Turn-off Delay Time		-	38	69	
t_f	Turn-off Fall Time		-	12	22	
Gate Charge Characteristics^e						
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=4.5V,$ $I_{DS}=10A$	-	12	-	nC
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V,$ $I_{DS}=10A$	-	26	37	
Q_{gs}	Gate-Source Charge		-	5	-	
Q_{gd}	Gate-Drain Charge		-	5	-	

 Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

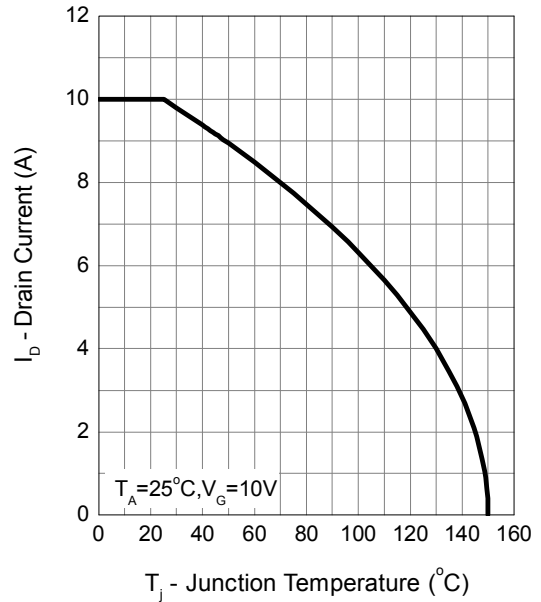
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

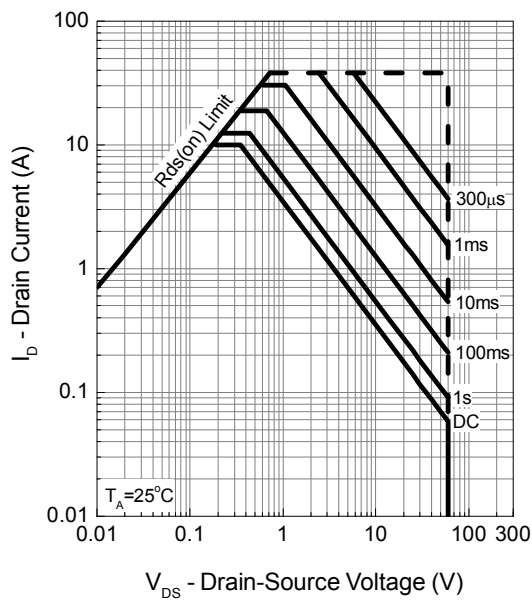
Power Dissipation



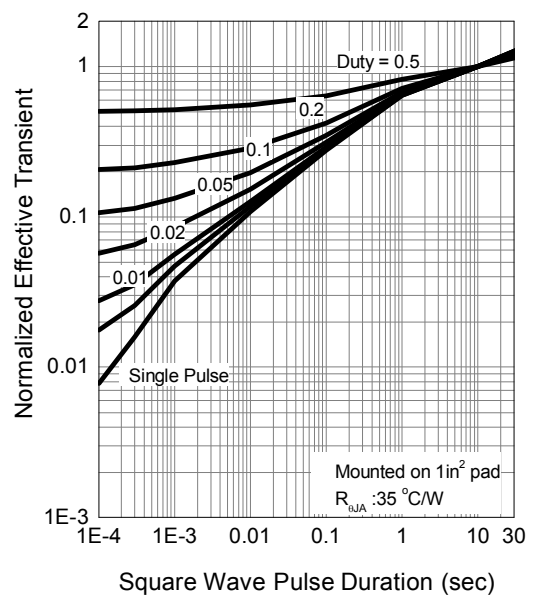
Drain Current



Safe Operation Area

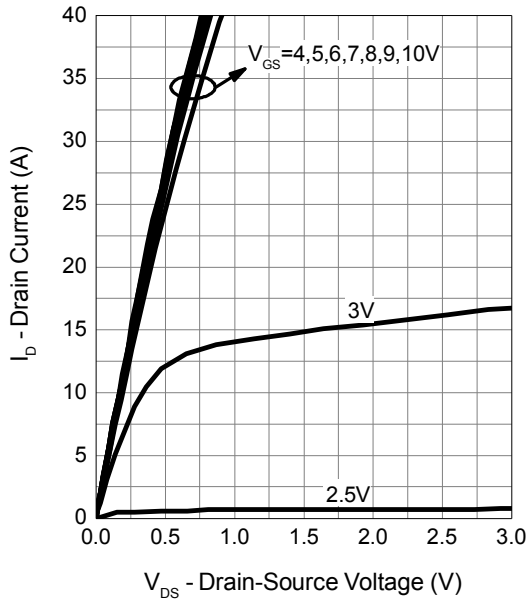


Thermal Transient Impedance

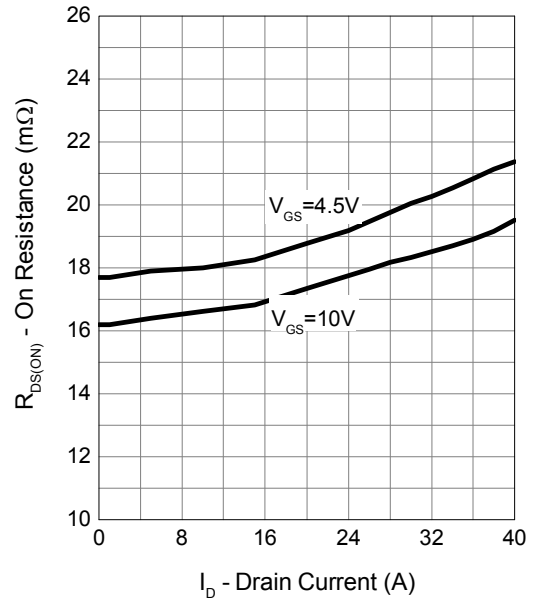


Typical Operating Characteristics (Cont.)

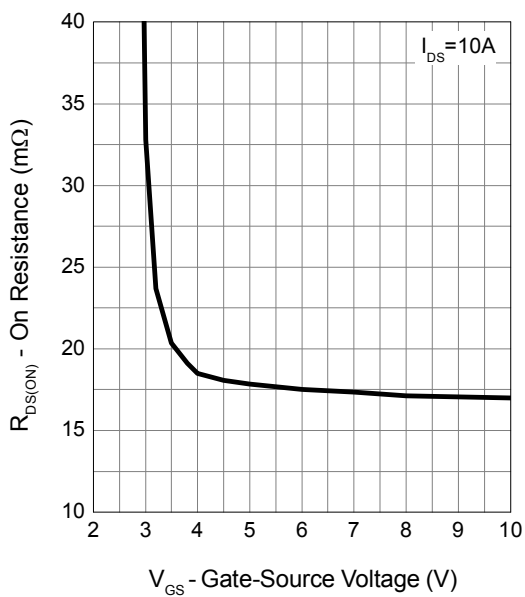
Output Characteristics



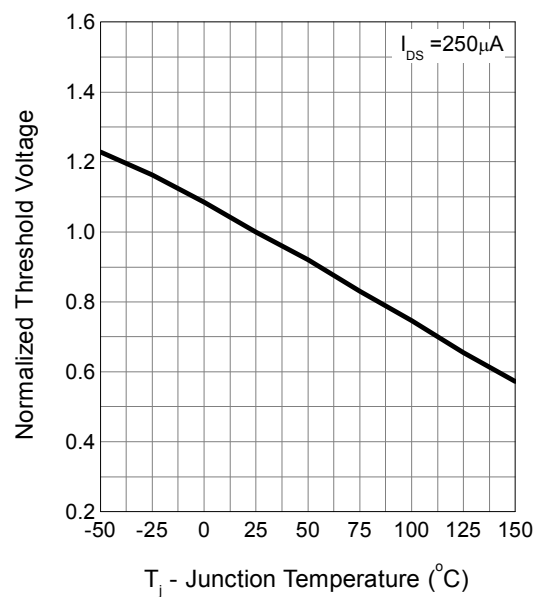
Drain-Source On Resistance



Gate-Source On Resistance

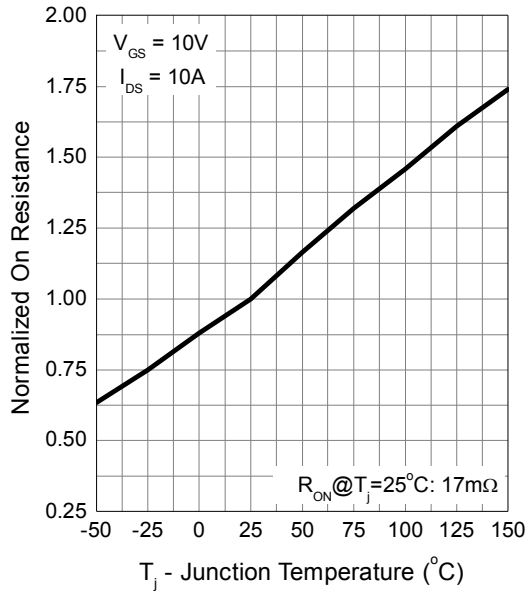


Gate Threshold Voltage

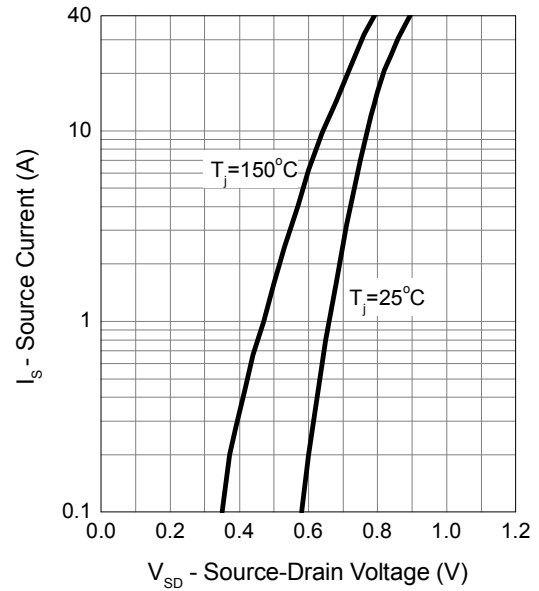


Typical Operating Characteristics (Cont.)

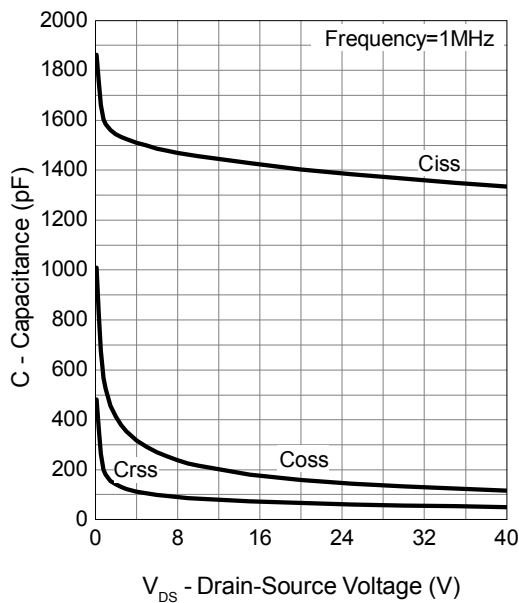
Drain-Source On Resistance



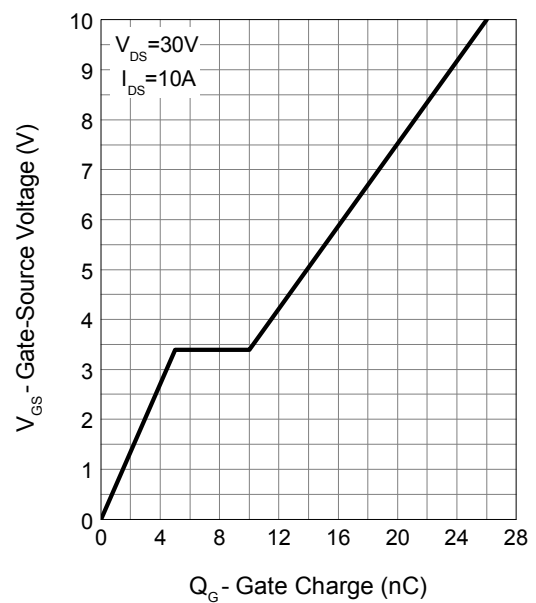
Source-Drain Diode Forward



Capacitance

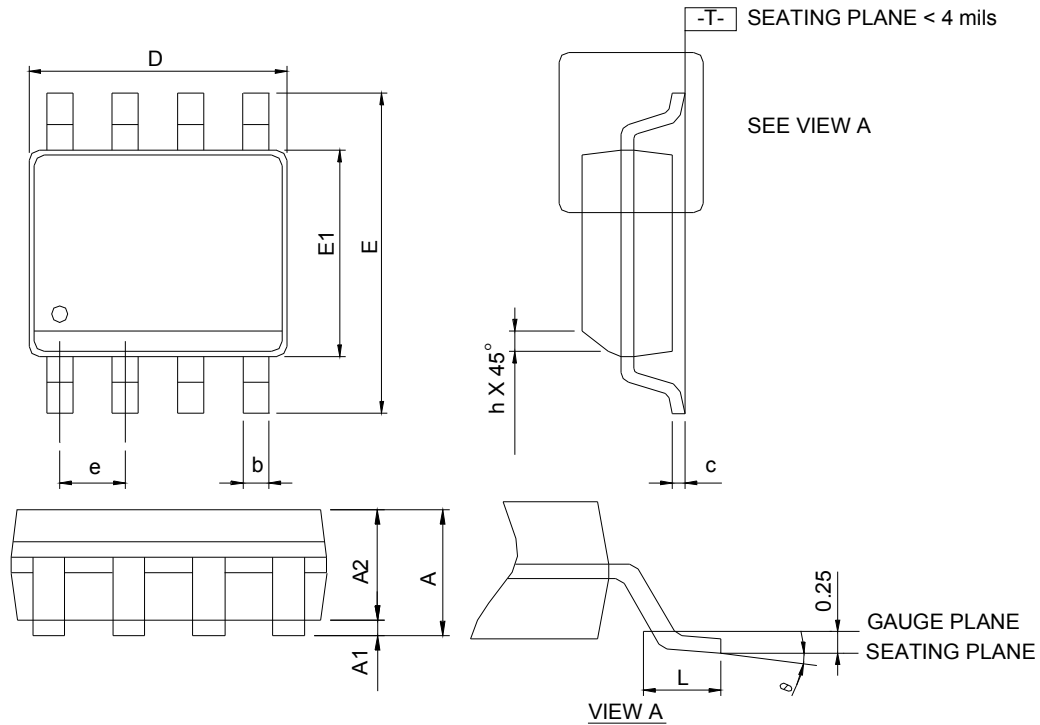


Gate Charge



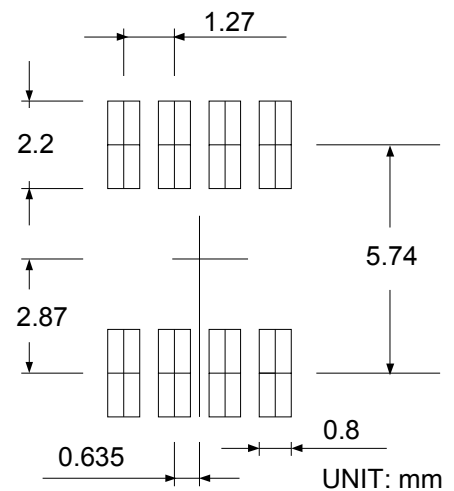
Package Information

SOP-8



DIMENSIONS	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.75	-	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	-	0.049	-
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



Note: 1. Follow JEDEC MS-012 AA.

- Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
- Dimension "E" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.



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