

General Description

The WSP6024 is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications .

The WSP6024 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

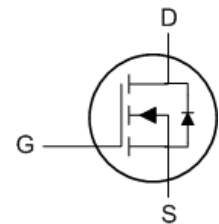
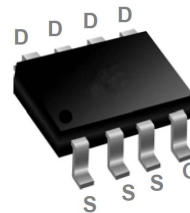
Product Summary

BVDSS	R _{DS(on)}	I _D
60V	8mΩ	15A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

SOP-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	15	A
I _D @T _C =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	9.6	A
I _{DM} ^a	Pulsed Drain Current ²	43	A
EAS ^b	Single Pulse Avalanche Energy ³	81	mJ
I _{AS} ^b	Avalanche Current	16	A
P _D @T _A =25°C	Total Power Dissipation ⁴	1.78	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA} ^c	Thermal Resistance Junction-ambient ¹	---	72	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	1.2	°C/W

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 ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.044	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=13A$	---	8	10	m Ω
		$V_{GS}=4.5V, I_D=8A$	---	11	13.7	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	2.0	3.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.6	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=60V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge (10V)	$V_{DS}=30V, V_{GS}=10V, I_D=6A$	---	25.4	---	nC
Q_{gs}	Gate-Source Charge		---	4.6	---	
Q_{gd}	Gate-Drain Charge		---	3.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GEN}=10V, R_G=6\Omega, I_D=1A, R_L=30\Omega$	---	15	---	ns
T_r	Rise Time		---	7	---	
$T_{d(off)}$	Turn-Off Delay Time		---	34	---	
T_f	Fall Time		---	30	---	
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	---	1500	---	pF
C_{oss}	Output Capacitance		---	280	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

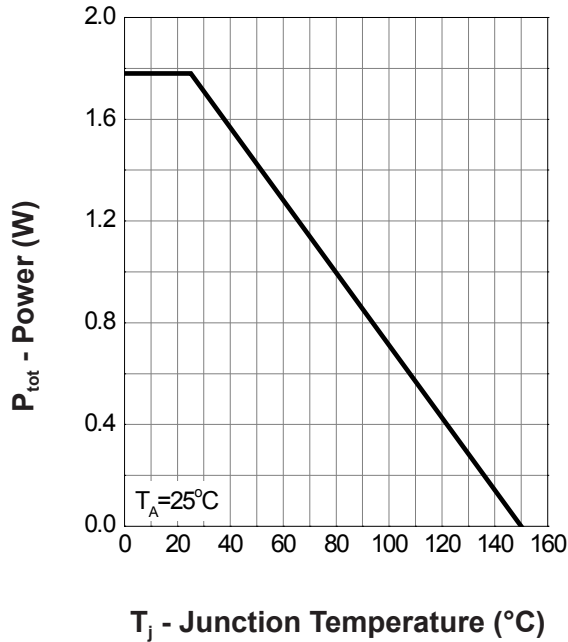
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.3	V
t_{rr}	Reverse Recovery Time	$I_F=6.0A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	30	---	nS
Q_{rr}	Reverse Recovery Charge		---	29	---	nC

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

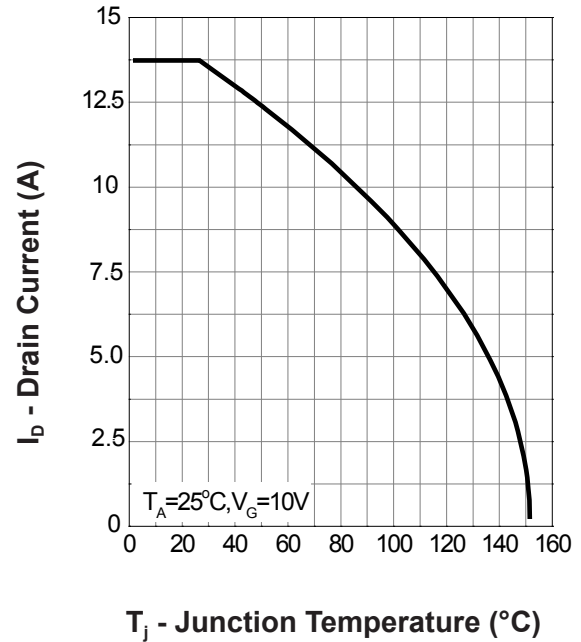
Note e : Guaranteed by design, not subject to production testing.

Typical Characteristics

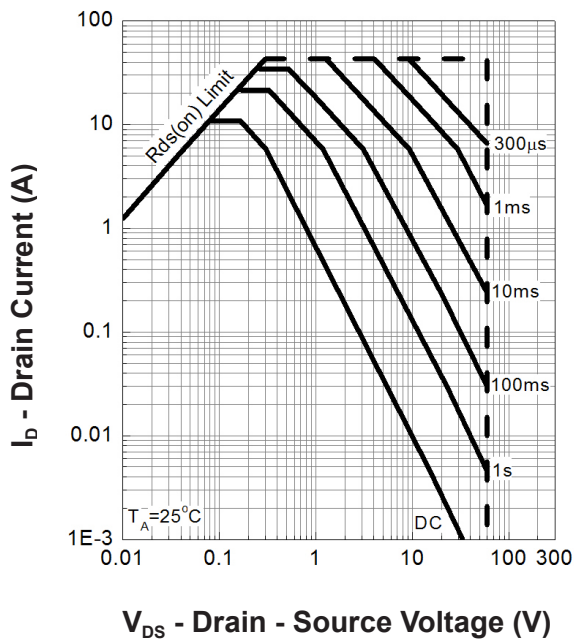
Power Dissipation



Drain Current



Safe Operation Area



Thermal Transient Impedance

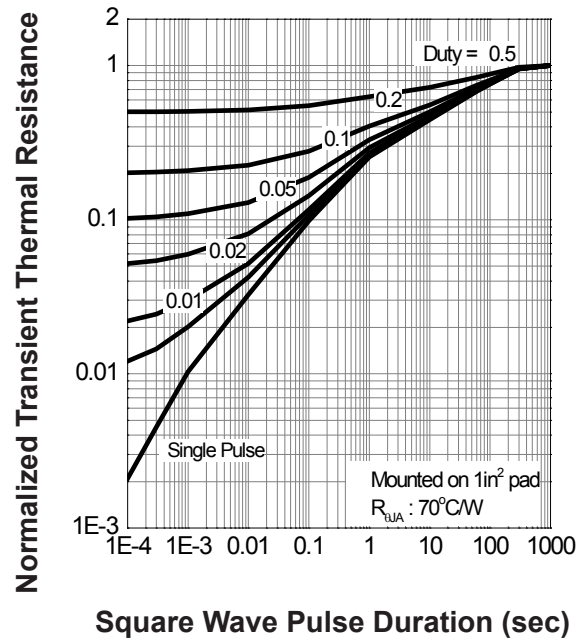
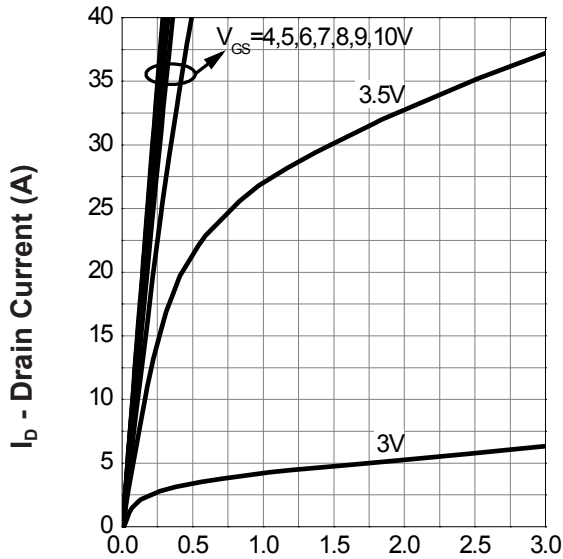


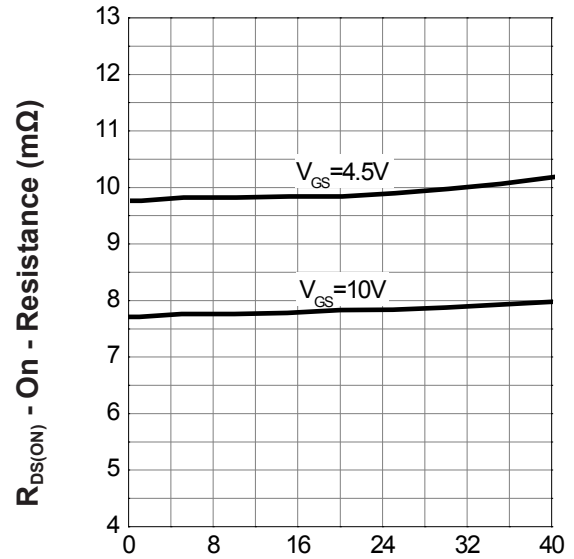
Fig5. Typical Source-Drain Diode Forward Voltage

Output Characteristics



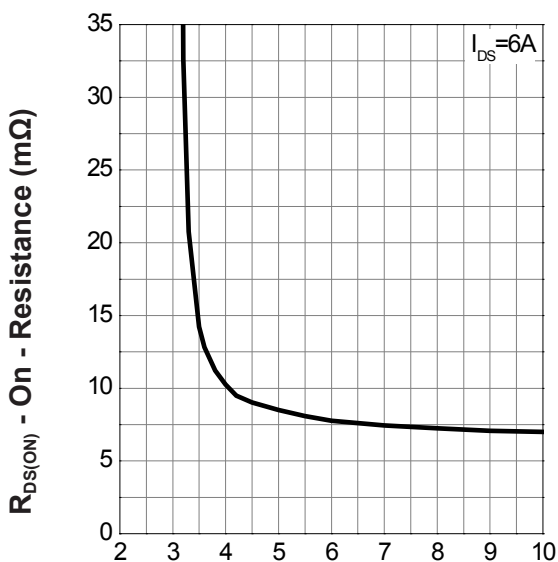
V_{DS} - Drain - Source Voltage (V)

Drain-Source On Resistance



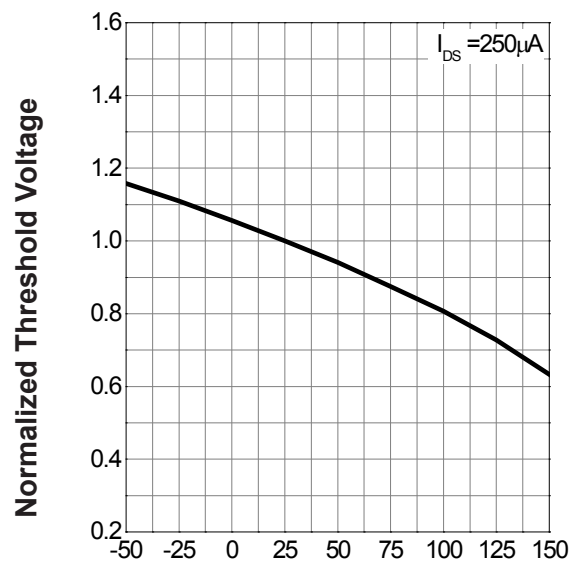
I_D - Drain Current (A)

Gate-Source On Resistance



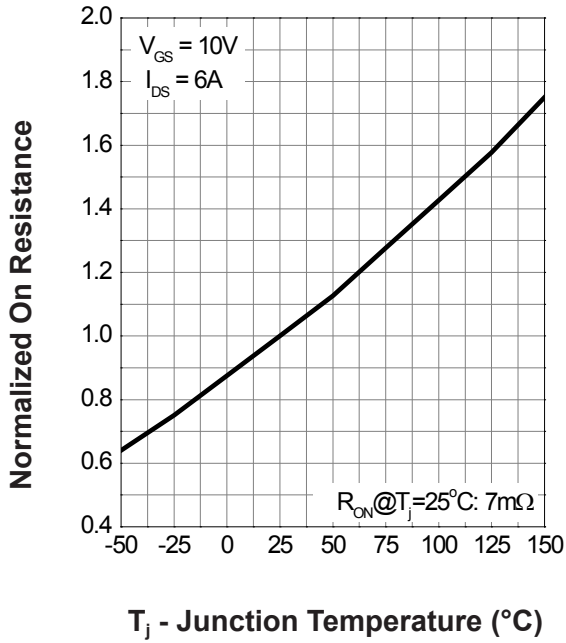
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage

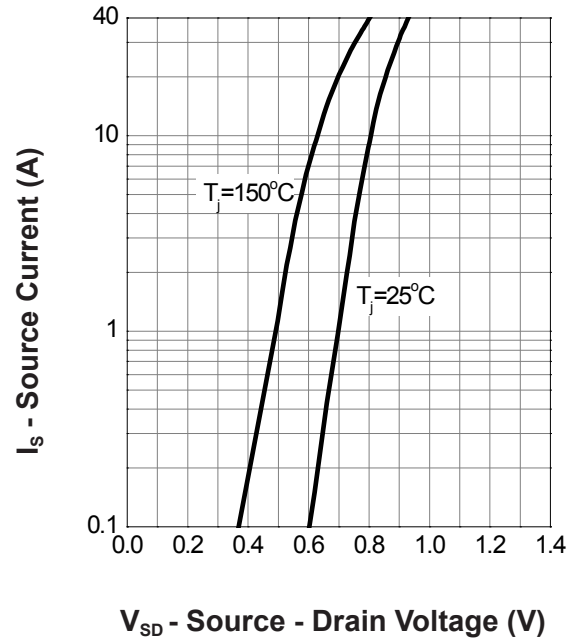


T_j - Junction Temperature ($^{\circ}C$)

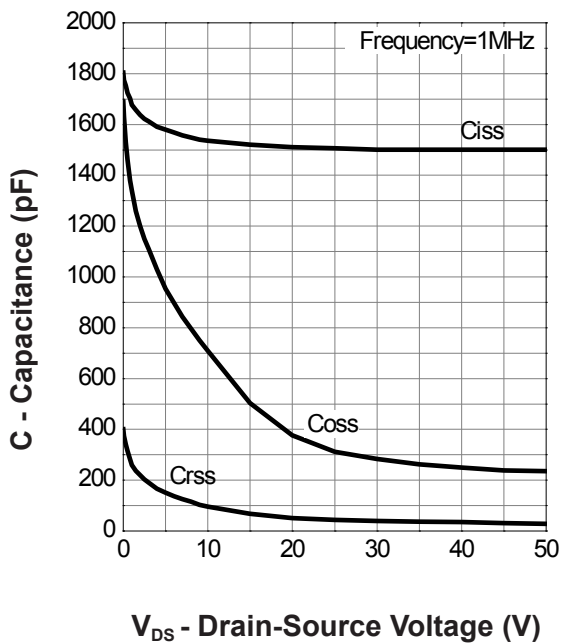
Drain-Source On Resistance



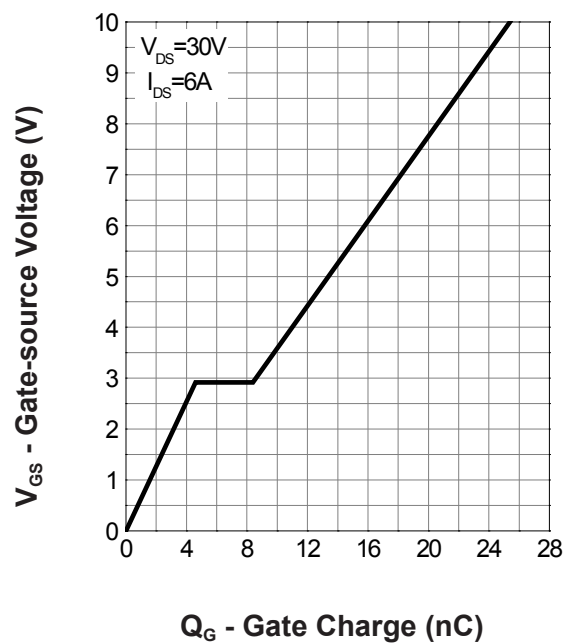
Source-Drain Diode Forward



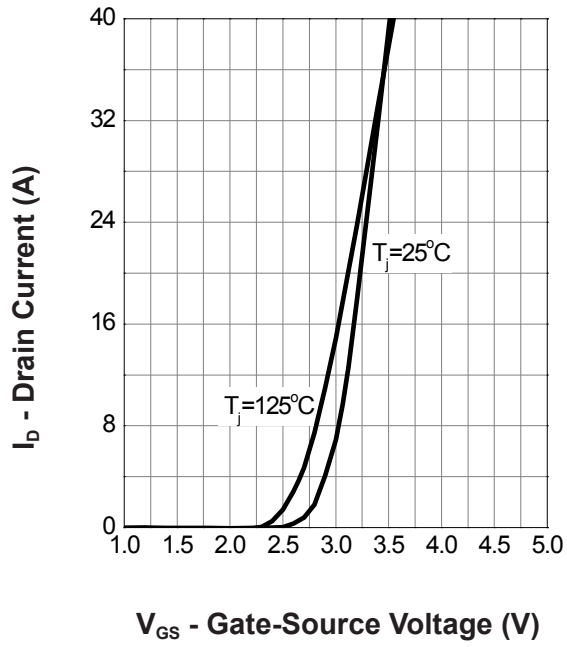
Capacitance



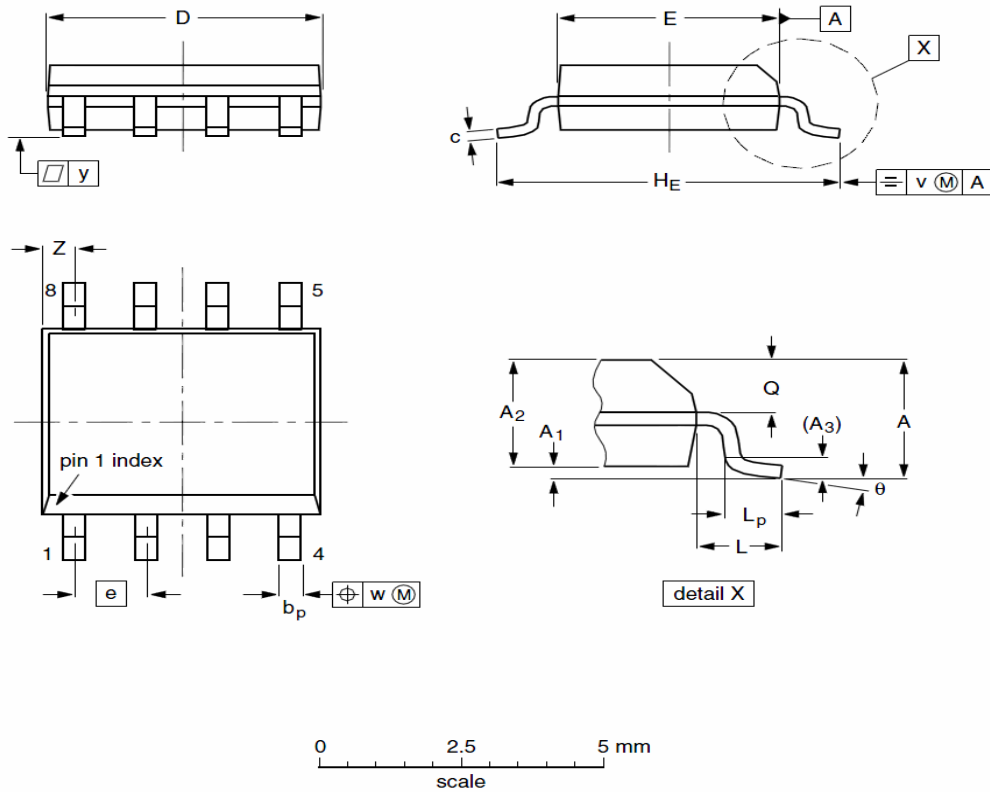
Gate Charge



Transfer Characteristics



SOP8 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	--	1.75	--	A ₁	0.10	0.18	0.25
A ₂	1.25	1.35	1.45	A ₃	--	0.25	--
b _p	0.36	0.42	0.49	c	0.19	0.22	0.25
D	4.80	4.92	5.00	E	3.80	3.90	4.00
e	--	1.27	--	H _E	5.80	5.98	6.20
L	--	1.05	--	L _p	0.40	0.68	1.00
Q	0.60	0.65	0.70	v	--	0.25	--
w	--	0.25	--	y	--	0.10	--
Z	0.30	0.50	0.70	θ	0°		8°



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