

### General Description

The WSP6044 is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent RDSON 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	RDSON	ID
60V	18mΩ	10A

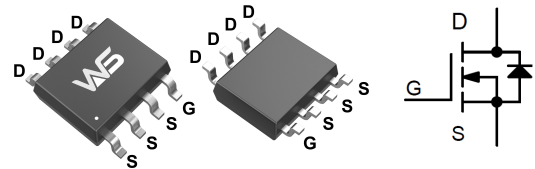
### Applications

SMPS Synchronous Rectification.

DC-DC Conversion.

Load Switch.

### SOP-8 Pin Configuration



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

Symbol	Parameter	Rating	Unit
V <sub>DSS</sub>	Drain-Source Voltage	60	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	
T <sub>J</sub>	Maximum Junction Temperature	150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	
I <sub>S</sub>	Diode Continuous Forward Current	T <sub>A</sub> =25°C 5	A
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> =25°C 10	
		T <sub>A</sub> =70°C 8	
I <sub>DM</sub> <sup>a</sup>	Pulsed Drain Current	T <sub>A</sub> =25°C 38	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>A</sub> =25°C 3.5	W
		T <sub>A</sub> =70°C 2.2	
RJA <sup>c</sup>	Thermal Resistance-Junction to Ambient	t ≤ 10s 35	°C/W
		Steady-State 70	
IAS <sup>b</sup>	Avalanche Current, Single pulse	L=0.1mH 27	A
EAS <sup>b</sup>	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<sub>J</sub>=25°C).

Note c: Surface Mounted on 1in2 pad area.

**Electrical Characteristics** (T= 25°C unless otherwise noted)

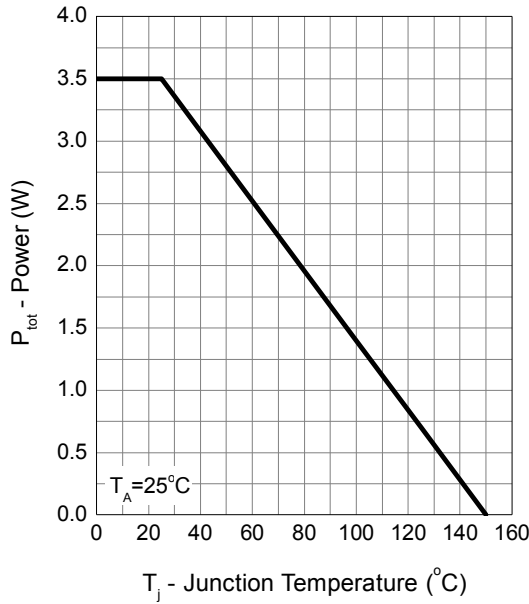
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\text{ A}$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=48V, V_{GS}=0V$	-	-	1	A
		$T_J=85^\circ\text{C}$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\text{ A}$	1.4	-	2.4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$	-	18	25	m $\Omega$
		$V_{GS}=4.5V, I_{DS}=7A$	-	20	30	
$V_{SD}^d$	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
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	2.5	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=30V,$ $F=1.0\text{MHz}$	-	2370	2780	pF
$C_{oss}$	Output Capacitance		-	135	-	
$C_{rss}$	Reverse Transfer Capacitance		-	60	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=30V,$ $R_L=30,$ $I_{DS}=1A,$ $V_{GEN}=10V,$ $R_G=6R$	-	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	
$Q_g$	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 300us, duty cycle  $\leq 2\%$ .

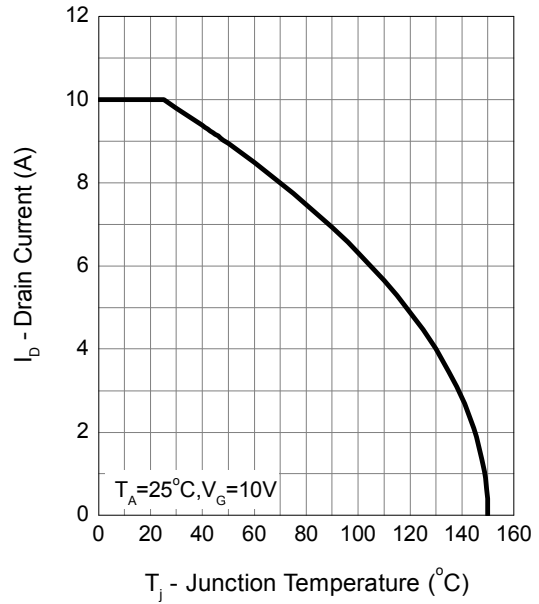
Note e : Guaranteed by design, not subject to production testing.

## Typical Operating Characteristics

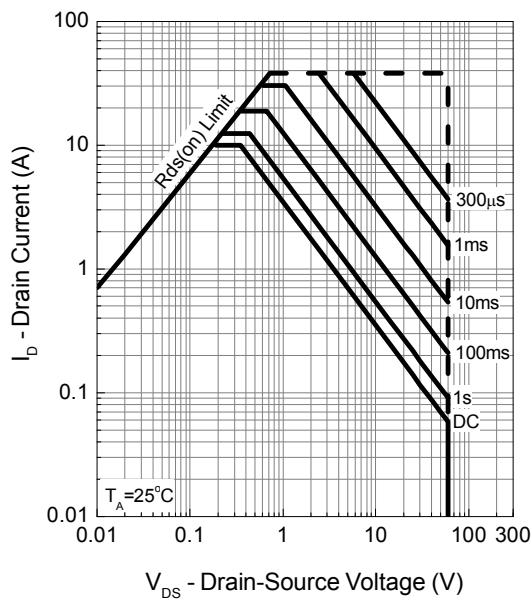
**Power Dissipation**



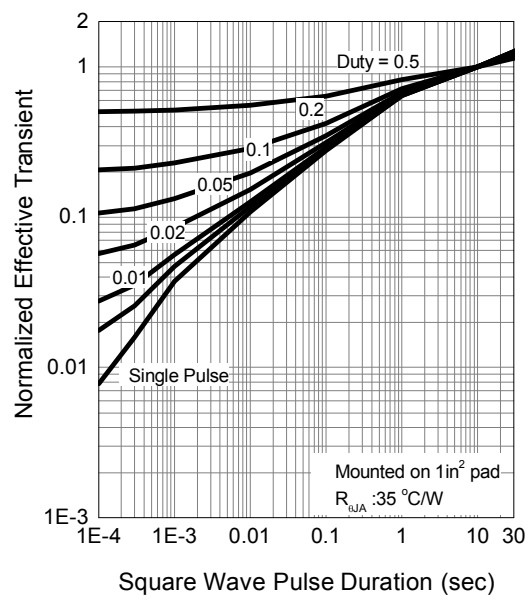
**Drain Current**



**Safe Operation Area**

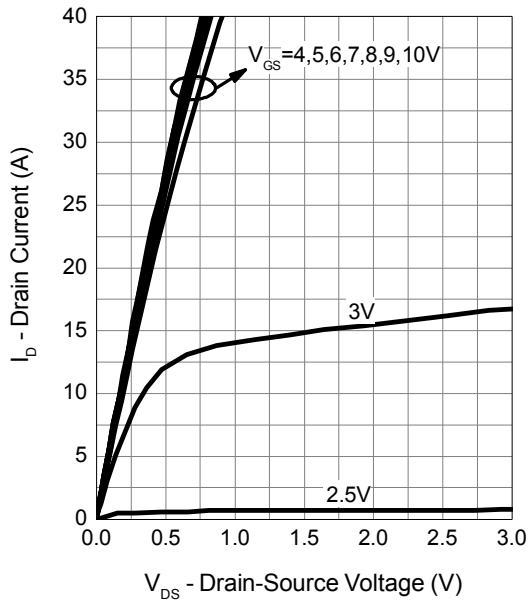


**Thermal Transient Impedance**

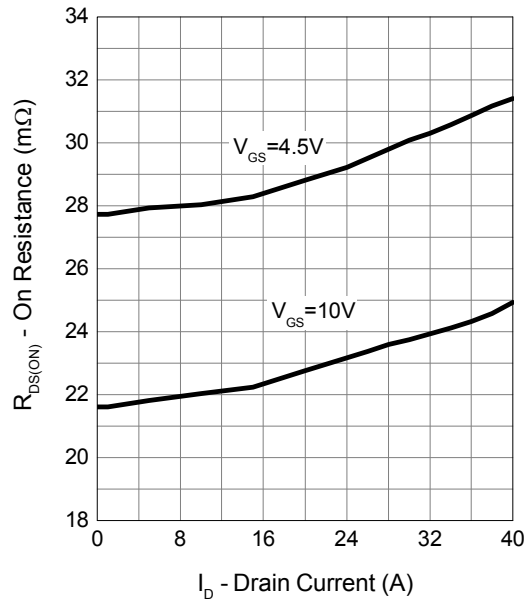


### Typical Operating Characteristics (Cont.)

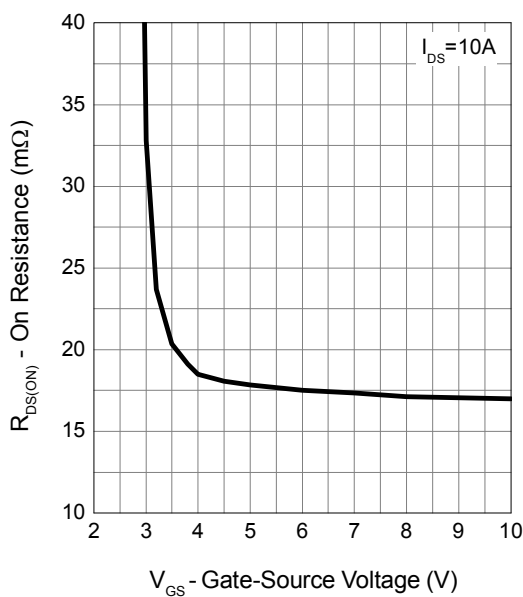
**Output Characteristics**



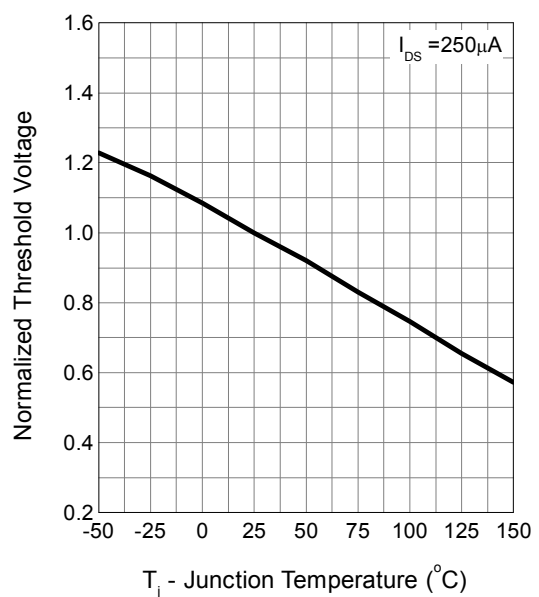
**Drain-Source On Resistance**



**Gate-Source On Resistance**

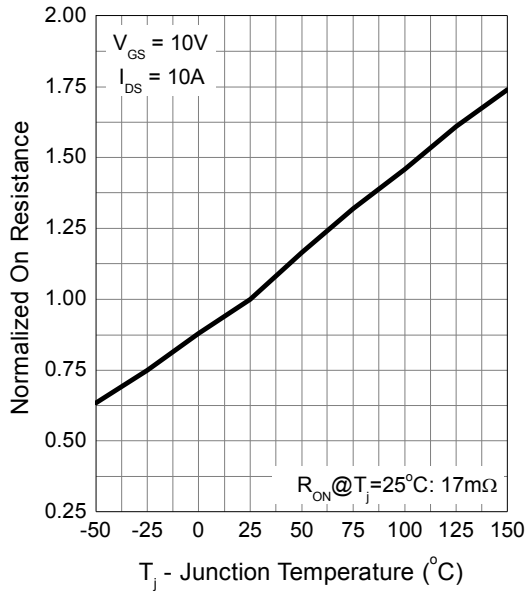


**Gate Threshold Voltage**

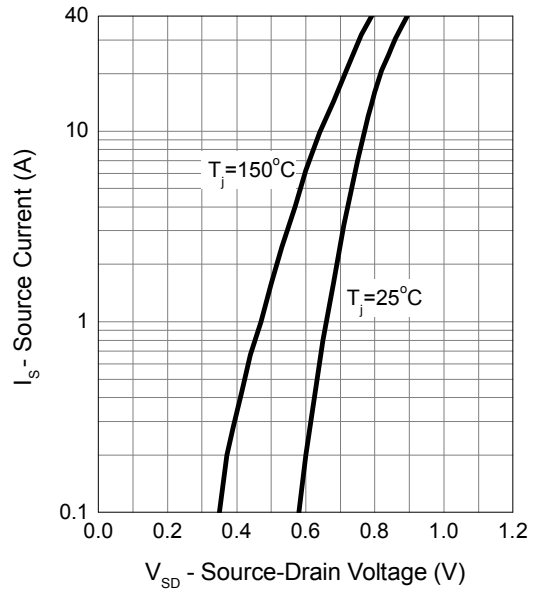


**Typical Operating Characteristics (Cont.)**

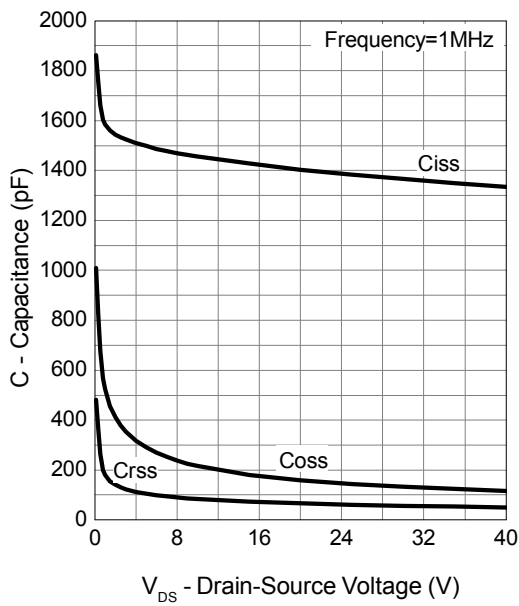
**Drain-Source On Resistance**



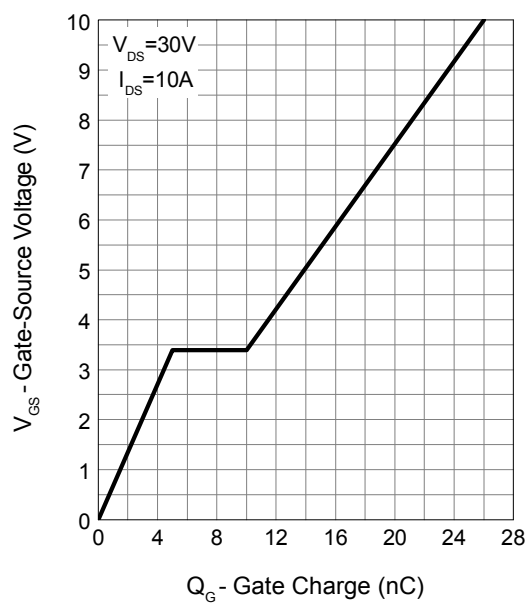
**Source-Drain Diode Forward**



**Capacitance**



**Gate Charge**





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