

P-Channel Trench Power MOSFET



Lead Free Package and Finish

General Description

The RS30P65D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -5V. This device is suitable for use as a wide variety of applications.

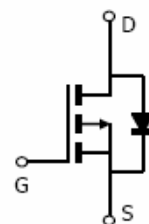
Features

- $V_{DS} = -30V, I_D = -65A$
 $R_{DS(ON)} < 9m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} < 16m\Omega @ V_{GS} = -5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

- DC-DC converter
- Load switch
- Power management

100% UIS TESTED!
100% ΔV_{ds} TESTED!



Schematic Diagram



TO-252 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package
RS30P65D	RS30P65D	TO-252

Table 1. Absolute Maximum Ratings ($T_A = 25^\circ C$)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage ($V_{GS} = 0V$)	-30	V
V_{GS}	Gate-Source Voltage ($V_{DS} = 0V$)	± 25	V
I_D	Drain Current-Continuous ($T_C = 25^\circ C$)	-65	A
	Drain Current-Continuous ($T_C = 100^\circ C$)	-45	A
$I_{DM (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	-260	A
E_{AS}	Avalanche energy (Note 2)	500	mJ
P_D	Maximum Power Dissipation ($T_C = 25^\circ C$)	83	W
	Maximum Power Dissipation ($T_C = 100^\circ C$)	41	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	1.8	$^\circ C/W$

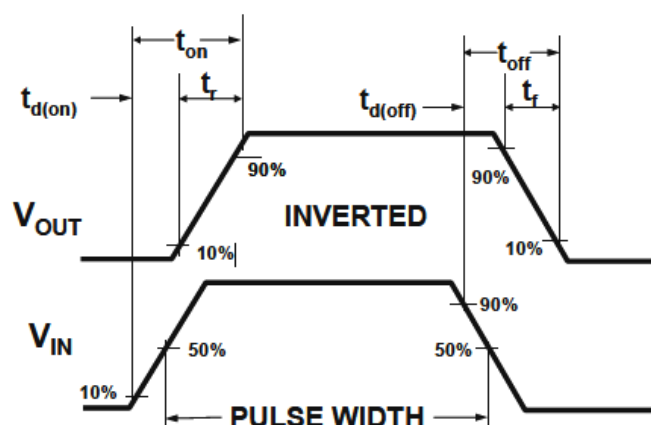
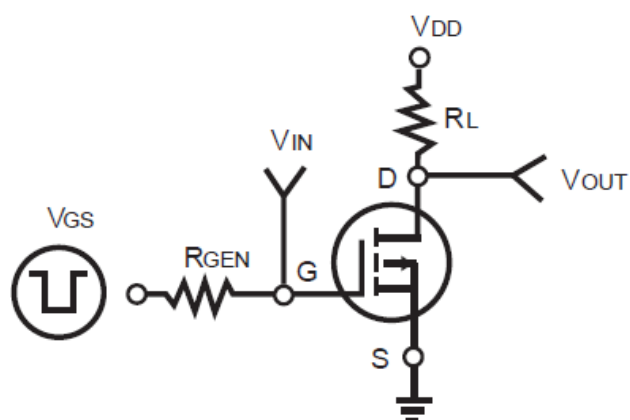
Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±25V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.8	-3	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-10A	20	28		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-20A		7.1	9	mΩ
		V _{GS} =-5V, I _D =-15A		10	16	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1.0MHz		3570		pF
C _{oss}	Output Capacitance			435		pF
C _{rss}	Reverse Transfer Capacitance			175		pF
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-15V, I _D =-1A, R _L =15Ω V _{GS} =-10V, R _G =2.5Ω		16		nS
t _r	Turn-on Rise Time			14		nS
t _{d(off)}	Turn-Off Delay Time			50		nS
t _f	Turn-Off Fall Time			22		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-10A		58		nC
Q _{gs}	Gate-Source Charge			9		nC
Q _{gd}	Gate-Drain Charge			14		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)				-50	A
V _{SD}	Forward on Voltage	V _{GS} =0V, I _S =-10A			-1.2	V

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 2.EAS condition: T_J=25°C, V_{DD}=30V, V_G=-10V, R_G=25Ω

Switch Time Test Circuit and Switching Waveforms:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

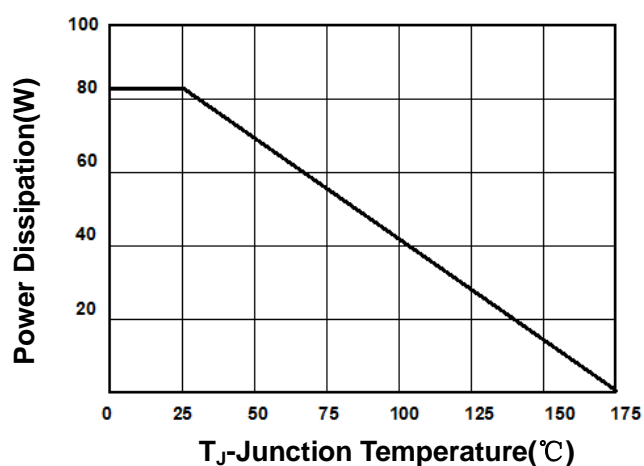


Figure2. Drain Current

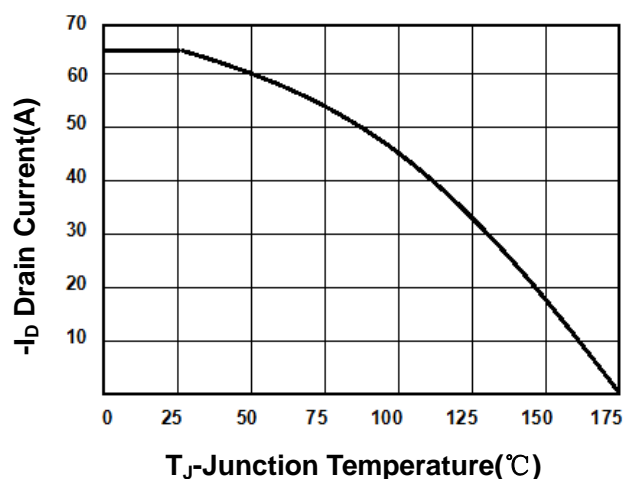


Figure3. Output Characteristics

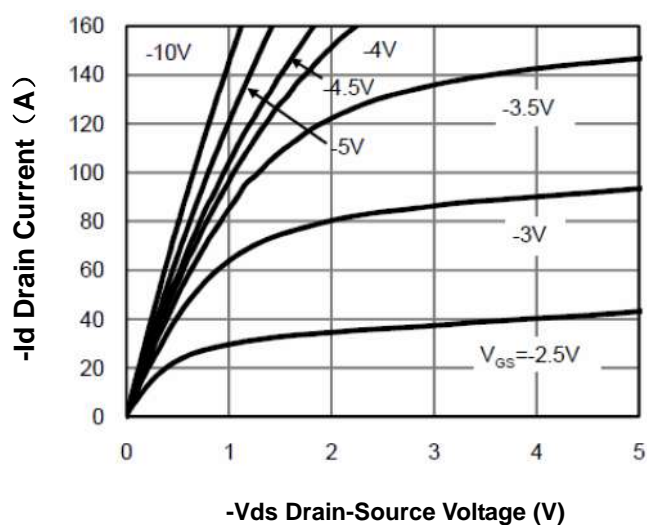


Figure4. Transfer Characteristics

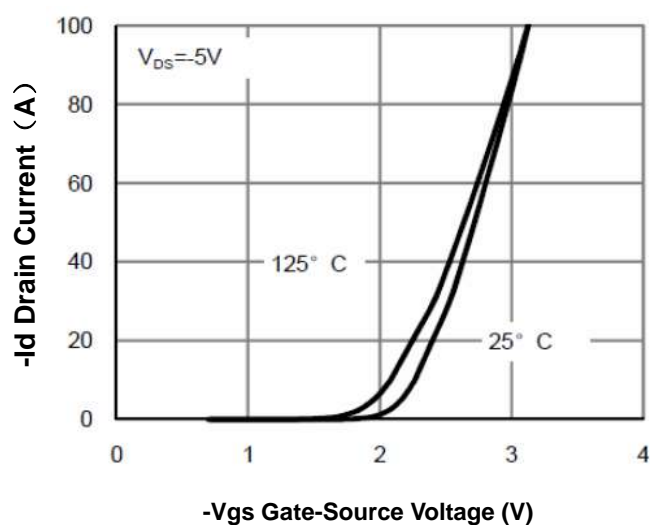


Figure5. Capacitance

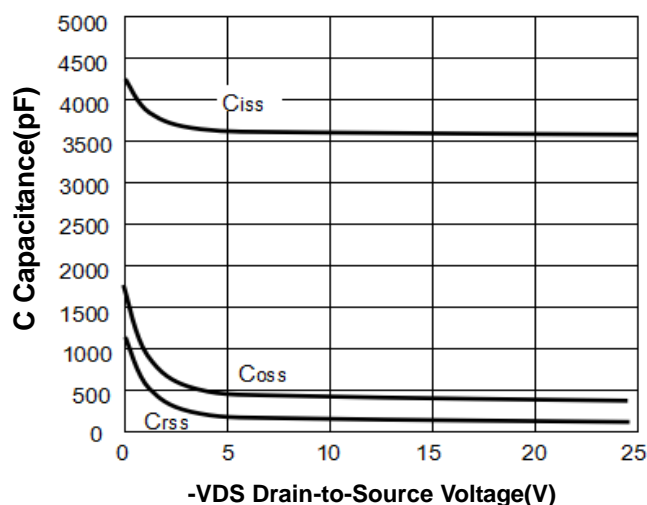


Figure6. $R_{DS(ON)}$ vs Junction Temperature

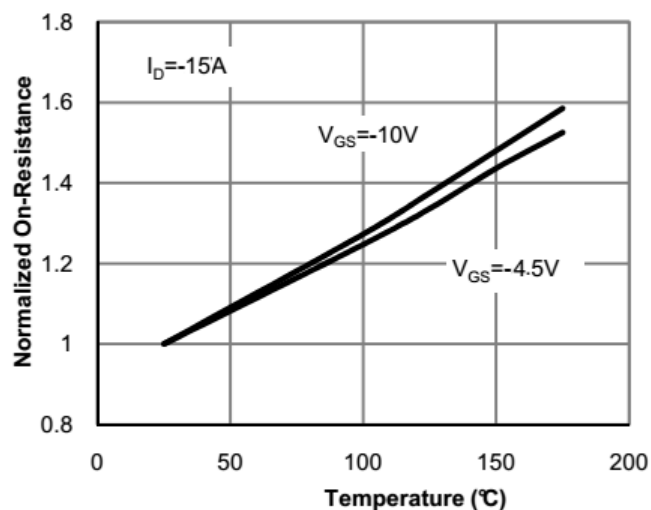


Figure7. Max BV_{DSS} vs Junction Temperature

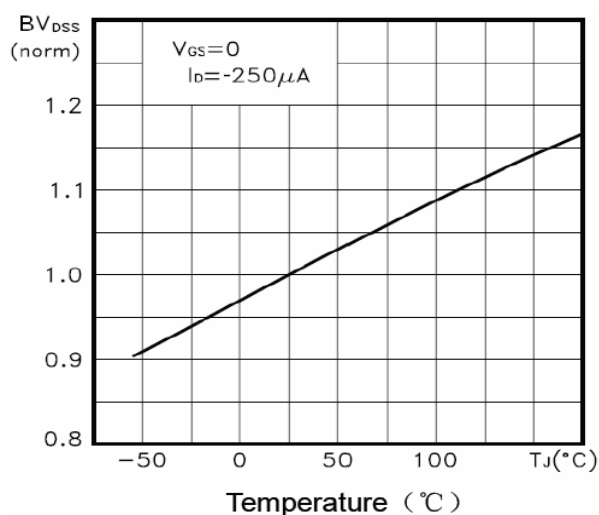


Figure8. $V_{GS(th)}$ vs Junction Temperature

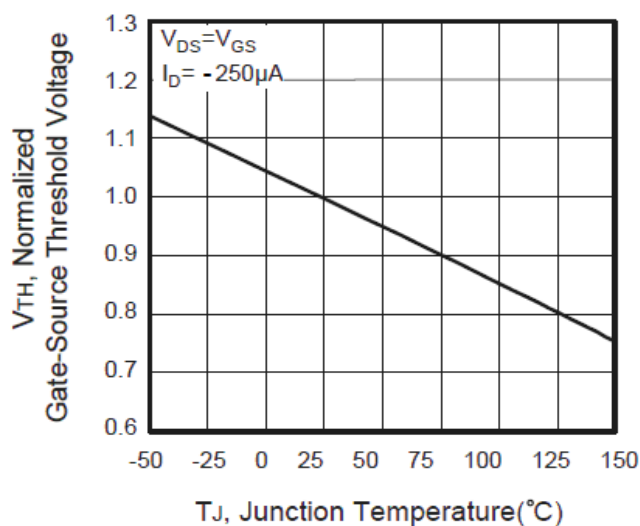


Figure9. Gate Charge Waveforms

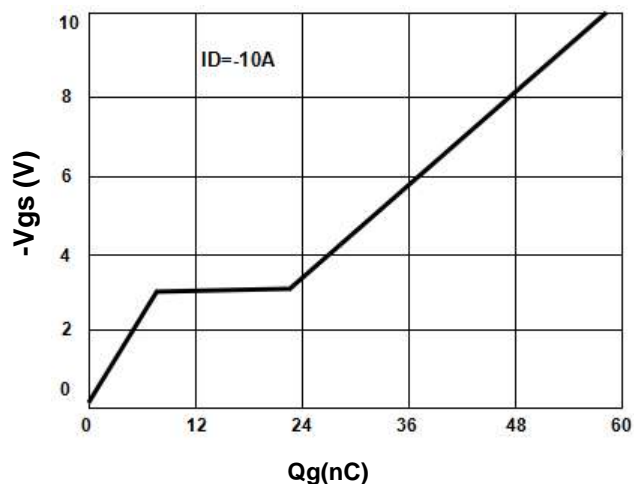


Figure10. Maximum Safe Operating Area

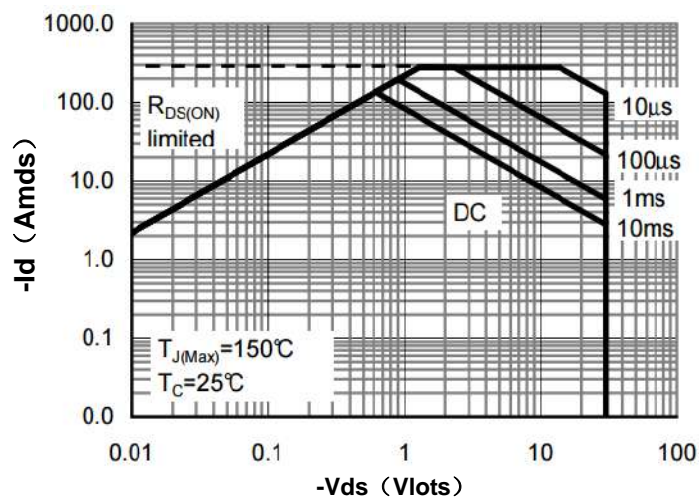
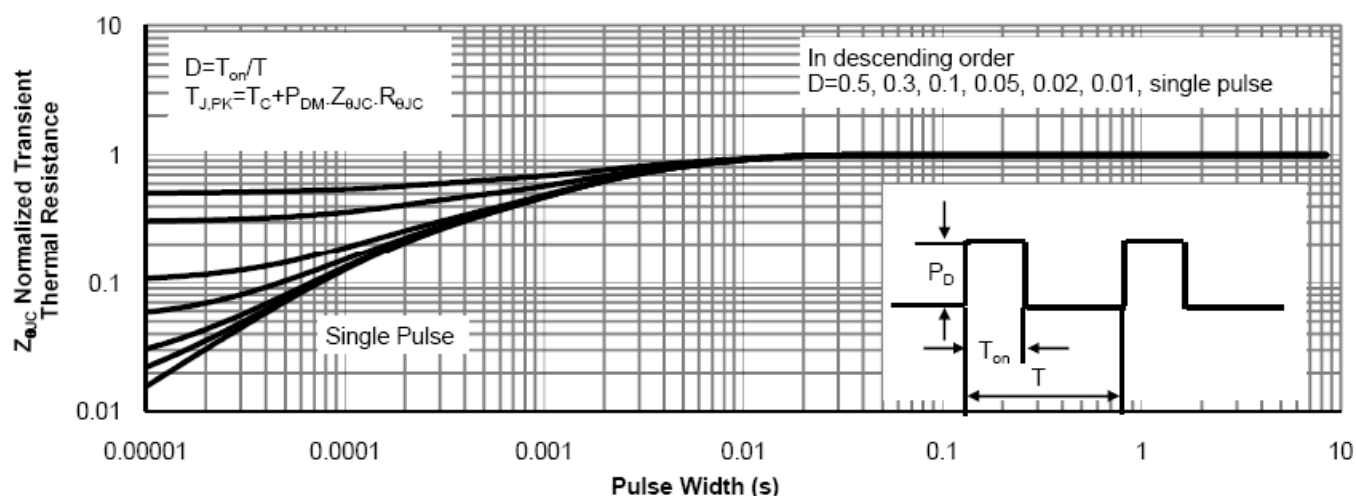
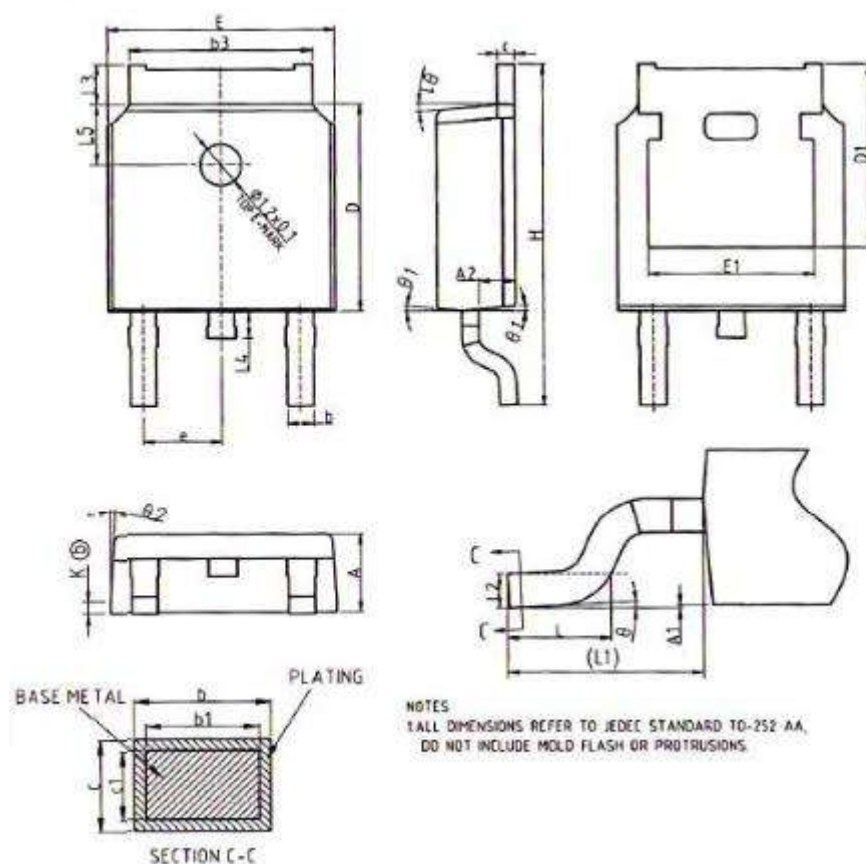


Figure11. Normalized Maximum Transient Thermal Impedance



TO-252 Package Information



NOTES
 1. ALL DIMENSIONS REFER TO JEDEC STANDARD TO-252 AA.
 DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.10
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1	5.30REF		
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e	2.286BSC		
H	9.90	10.10	10.30
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
Ø	0*	-	8*
Ø1	5*	7*	9*
Ø2	5*	7*	9*
K	0.40REF		

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