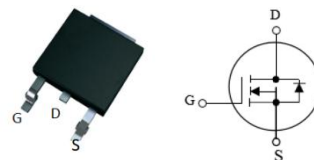


S65R650 MOSFET

•DESCRIPTION:

The S65R650 is a Superjunction MOSFET designed to have better characteristics, such as low on-state resistance, Low gate charge, Ultra fast switching, and High ruggedness. These devices are well suited for high efficiency switched mode power supplies.



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•ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{DS}	Drain-Source Voltage		650	V
V_{GS}	Gate-Source Voltage		± 30	V
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$	8	A
		$T_c=100^\circ\text{C}$	6	A
I_{DM}	Pulsed Drain Current		30	A
P_{tot}	Power Dissipation ($T_c=25^\circ\text{C}$)		93	W
T_j	Junction Temperature		150	$^\circ\text{C}$
T_{stg}	Operation and Storage Temperature		-55 to +150	$^\circ\text{C}$
E_{AS}	Avalanche Energy		74	mJ

•ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameter	Test Condition	Value			Unit
			Min	Type	Max	
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	650			V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V, V_{GS}=0V$			1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 30V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.5		4.5	V
$R_{DS(on)}$	Static Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 4A$		503	650	m Ω

Symbol	Parameter	Test Condition	Value			Unit
			Min	Type	Max	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, f= 1MHz		418		pF
C _{oss}	Output Capacitance			15.2		
C _{rss}	Reverse Transfer Capacitance			4.43		
Q _g	Total Gate Charge	V _{DS} = 520V V _{GS} = 10V I _D = 8A (note 4, 5)		12.5		nC
Q _{gs}	Gate-Source Charge			2.4		
Q _{gd}	Gate-Drain Charge			7.1		
T _{d(on)}	Turn-On Delay Time	V _{DD} =400V, V _{GS} =10V, I _D =8A, R _G =25Ω (note 4, 5)		9.5		nS
T _r	Turn-On Rise Time			36		
T _{d(off)}	Turn-Off Delay Time			32		
T _f	Turn-Off Fall Time			48		
I _{SD}	Maximum Continuous Drain-Source Diode Forward Current				8	A
I _{SM}	Maximum Pulsed Drain-Source Diode, Forward Current				30	A
V _{SD}	Drain-Source Diode Forward Voltage	I _{SD} =8A, V _{GS} =0V		0.8	1.2	V
t _{rr}	Reverse Recovery Time	V _r =400V, I _s =I _F , dI _F /dt=100A/ μ s (note 4)		156		nS
Q _{rr}	Reverse Recovery Charge			2.2		uC

Notes:

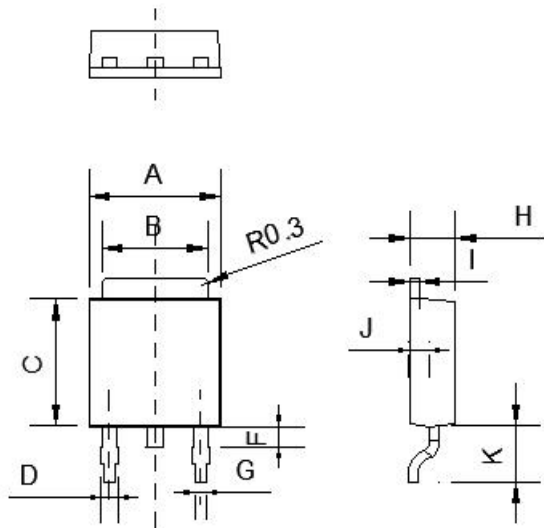
- 1: Pulse width limited by maximum junction temperature
- 2: I_{AS}=1.8A, V_{DD}=50V, R_G=25 Ω, Starting T_J=25℃
- 3: I_{SD}≤11A, di/dt≤300A/ μ s, V_{DD}≤B_{VDSS}, Starting T_J=25℃
- 4: Pulse Test: Pulse Width ≤300 μ s, Duty Cycle≤2%
- 5: Essentially independent of operating temperature

● THERMAL CHARACTERISTIC

Symbol	Parameter	Value		Unit
R _{thjc}	Thermal Resistance, Junction to Case	MAX	1.35	℃/W

●PACKAGE MECHANICAL DATA

TO-252



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	6.5	6.7	0.256	0.264
B	5.21	5.46	0.205	0.215
C	6	6.2	0.236	0.244
D	0.71	1.04	0.028	0.041
F	0.62	0.92	0.024	0.036
G	0.64	0.88	0.025	0.035
H	2.2	2.4	0.087	0.094
I	0.45	0.58	0.018	0.023
J	0.97	1.17	0.038	0.046
K	2.7	3.2	0.106	0.126

● ELECTRICAL CHARACTERISTICS (CURVES)

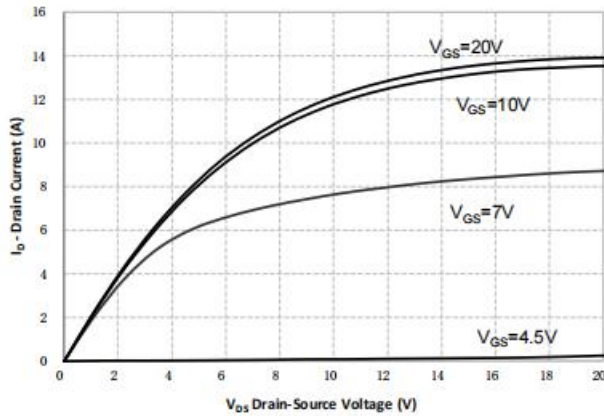


Figure 1. On-Region Characteristics

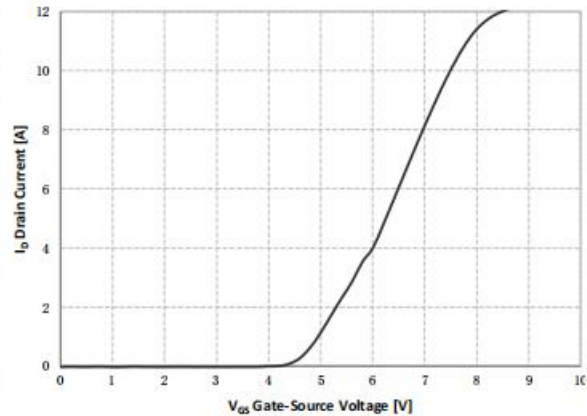


Figure 2. Transfer Characteristics

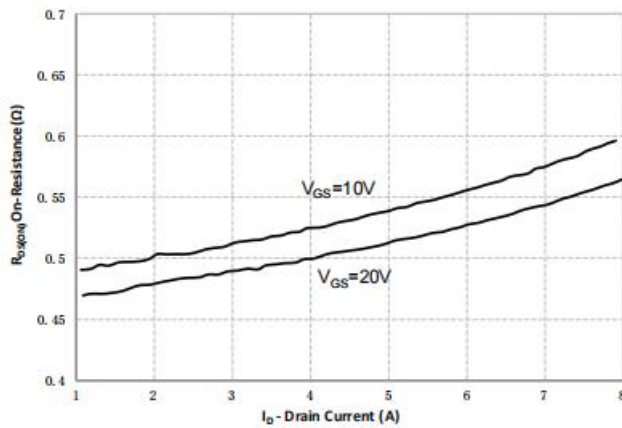


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

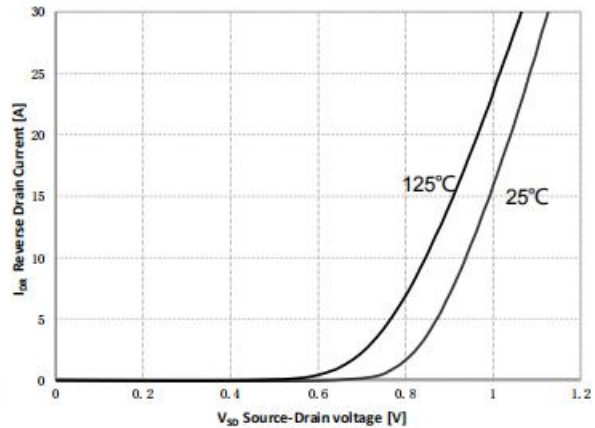


Figure 4. Body Diode Forward Voltage Variation with Current

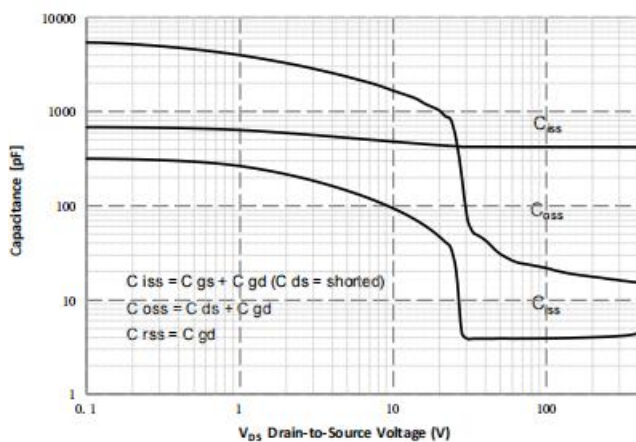


Figure 5. Capacitance Characteristics

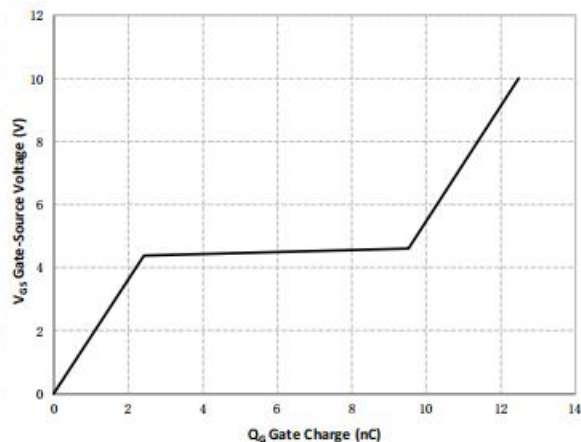


Figure 6. Gate Charge Characteristics

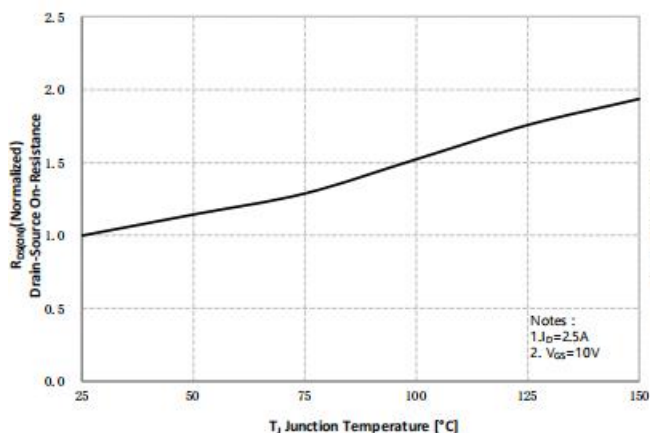


Figure 7. On-Resistance Variation vs Temperature

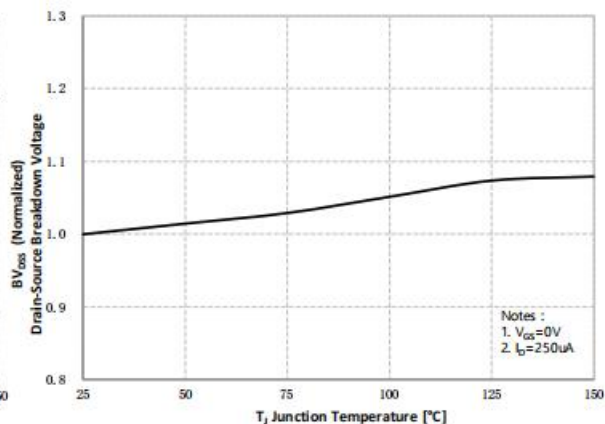


Figure 8. Breakdown Voltage Variation vs Temperature

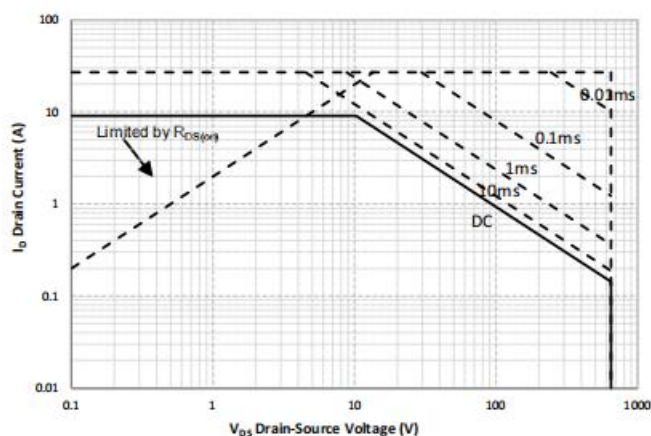


Figure 9. Maximum Safe Operating Area³⁾

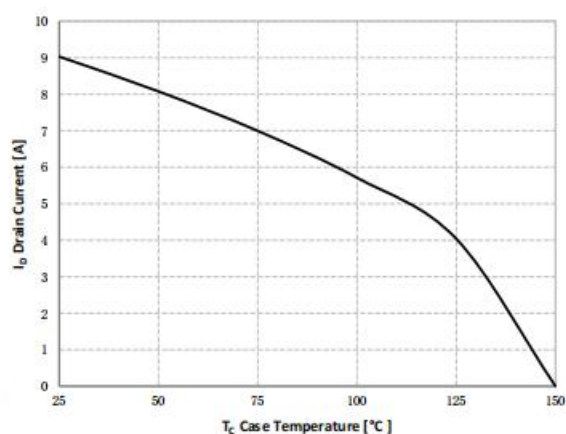


Figure 10. Maximum Continuous Drain Current vs Case Temperature

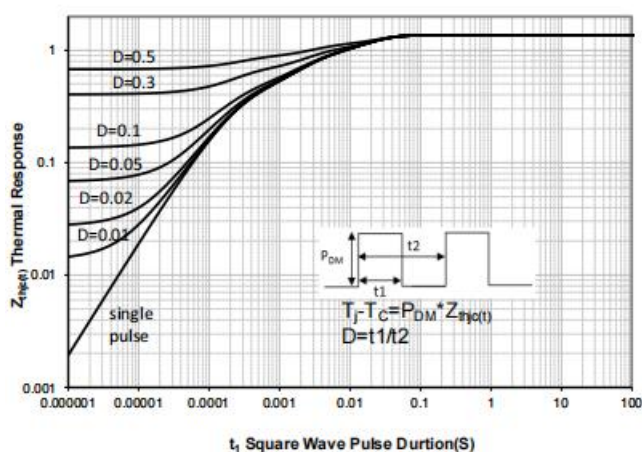


Figure 11. Transient Thermal Response Curve