

2SJ505S-VB Datasheet

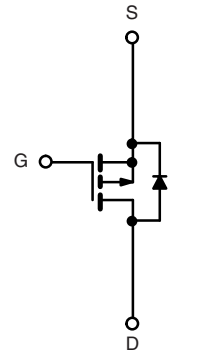
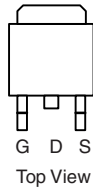
P-Channel 60-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^d
- 60	0.0065 at $V_{GS} = - 10$ V	- 110
	0.0085 at $V_{GS} = - 4.5$ V	

FEATURES

- Trench Power MOSFET
- Package with Low Thermal Resistance
- 100 % R_g Tested


 Available
RoHS*
 COMPLIANT
TO-263

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^d ($T_J = 175\text{ }^\circ\text{C}$)	$T_C = 25\text{ }^\circ\text{C}$	I_D	- 110	A
	$T_C = 125\text{ }^\circ\text{C}$		- 75	
Pulsed Drain Current		I_{DM}	- 200	
Avalanche Current		I_{AS}	- 85	
Single Pulse Avalanche Energy ^d		E_{AS}	211	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	P_D	272 ^c	W
	$T_A = 25\text{ }^\circ\text{C}^b$		3.75 ^b	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Junction-to-Ambient	PCB Mount ^d	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case		R_{thJC}	0.55	

Notes:

- a. Duty cycle $\leq 1\%$.
 b. When Mounted on 1" square PCB (FR-4 material).
 c. See SOA curve for voltage derating.
 d. Limited by Package.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

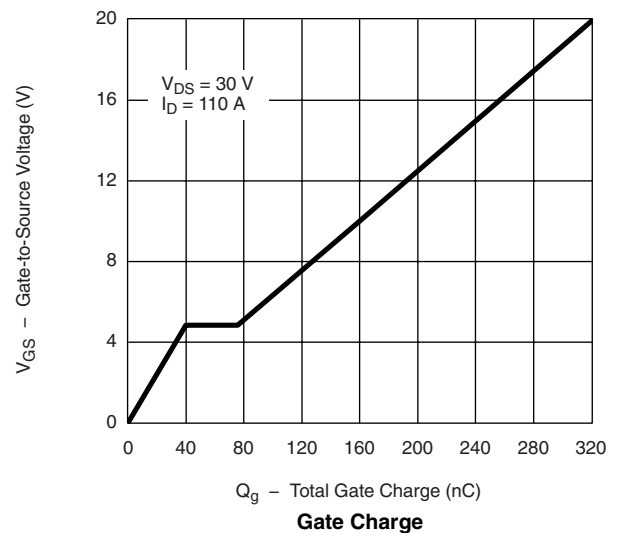
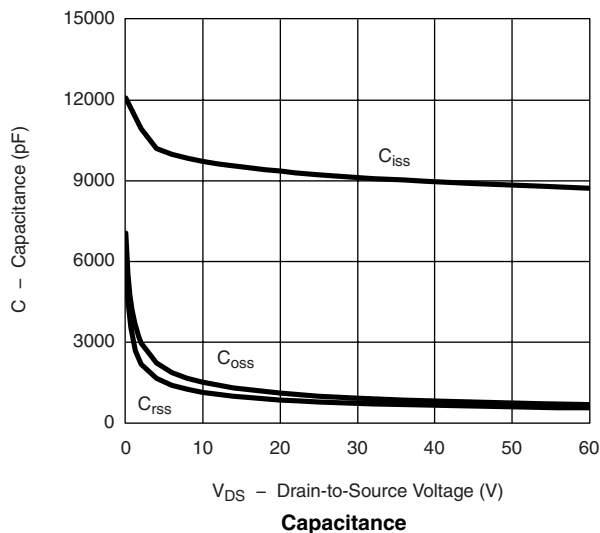
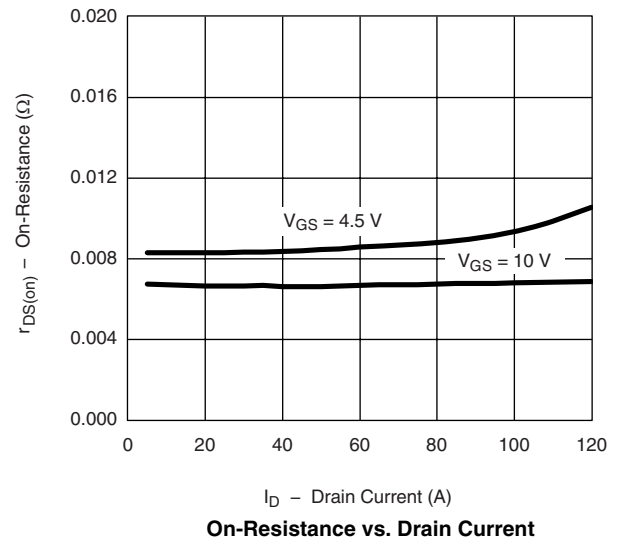
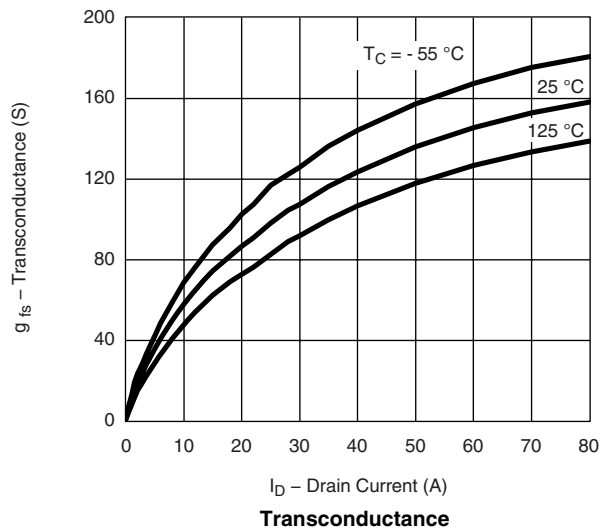
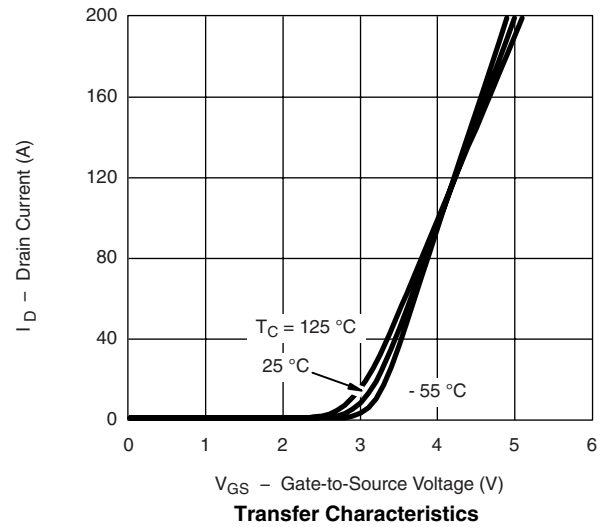
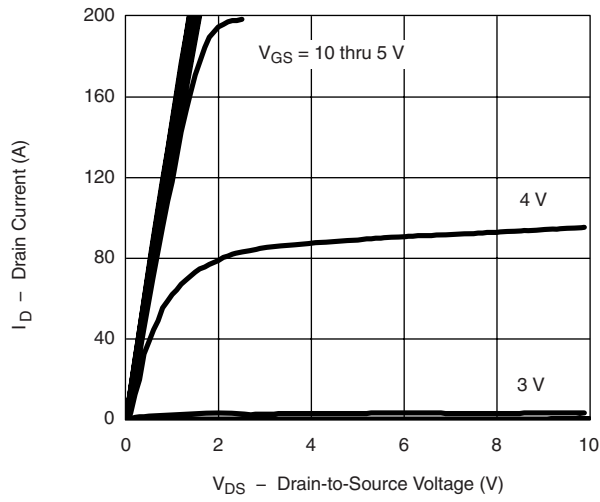
SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = - 250 μA	- 60			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 1		- 3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 60 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 125 °C			- 50	
		V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 175 °C			- 250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = - 5 V, V _{GS} = - 10 V	- 120			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 30 A		0.0065		Ω
		V _{GS} = - 10 V, I _D = - 30 A, T _J = 125 °C		0.0129		
		V _{GS} = - 10 V, I _D = - 30 A, T _J = 175 °C		0.016		
		V _{GS} = - 4.5 V, I _D = - 20 A		0.0085		
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 50 A	20			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = - 25 V, f = 1 MHz		9200		pF
Output Capacitance	C _{oss}			975		
Reverse Transfer Capacitance	C _{rss}			760		
Total Gate Charge ^c	Q _g	V _{DS} = - 30 V, V _{GS} = - 10 V, I _D = - 110 A		160	240	nC
Gate-Source Charge ^c	Q _{gs}			40		
Gate-Drain Charge ^c	Q _{gd}			36		
Gate Resistance	R _g	f = 1 MHz	1.5	3	4.5	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = - 30 V, R _L = 0.27 Ω I _D ≅ - 110 A, V _{GEN} = - 10 V, R _G = 2.5 Ω		20	30	ns
Rise Time ^c	t _r			190	285	
Turn-Off Delay Time ^c	t _{d(off)}			140	210	
Fall Time ^c	t _f			300	450	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				- 110	A
Pulsed Current	I _{SM}				- 200	
Forward Voltage ^a	V _{SD}	I _F = - 50 A, V _{GS} = 0 V		- 1.0	- 1.5	V
Reverse Recovery Time	t _{rr}	I _F = - 50 A, di/dt = 100 A/μs		60	90	ns
Peak Reverse Recovery Charge	I _{RM(REC)}			- 3	- 4.5	A
Reverse Recovery Charge	Q _{rr}				0.09	0.2

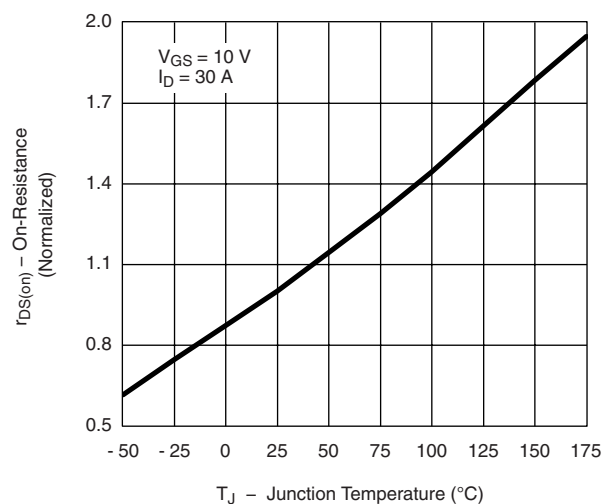
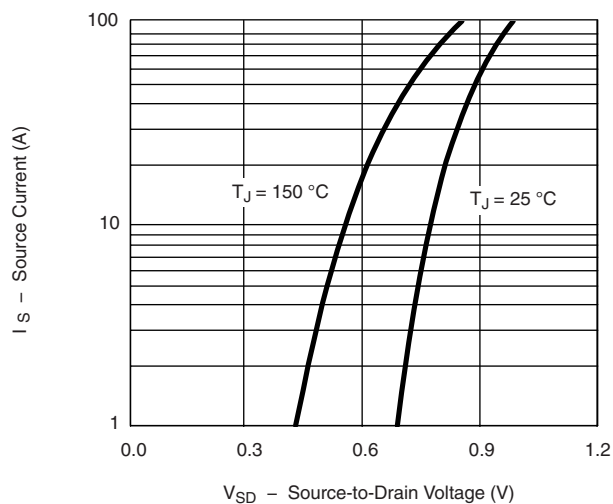
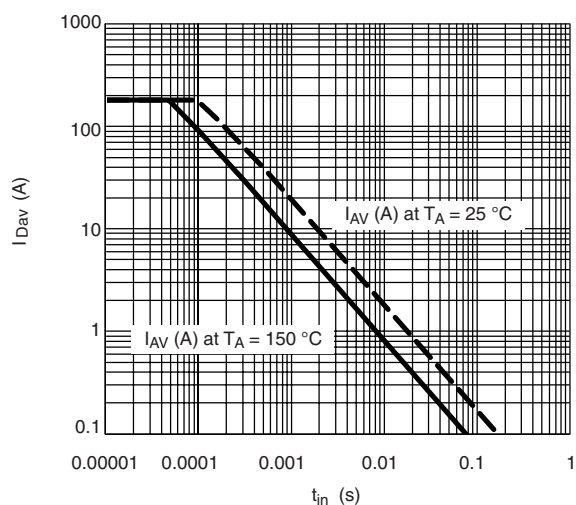
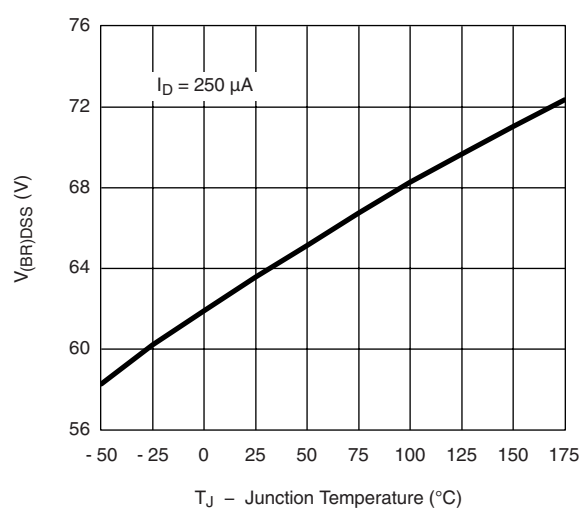
Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.
 c. Independent of operating temperature.

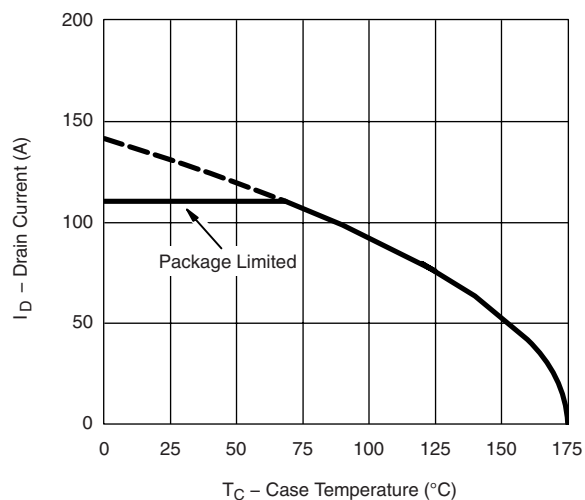
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

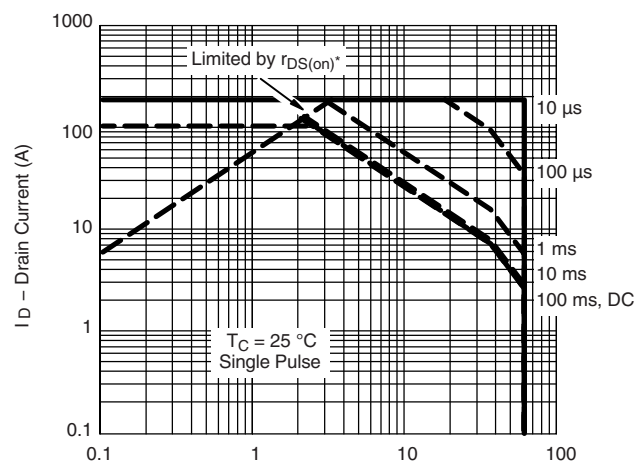


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage

Avalanche Current vs. Time

Drain Source Breakdown vs. Junction Temperature

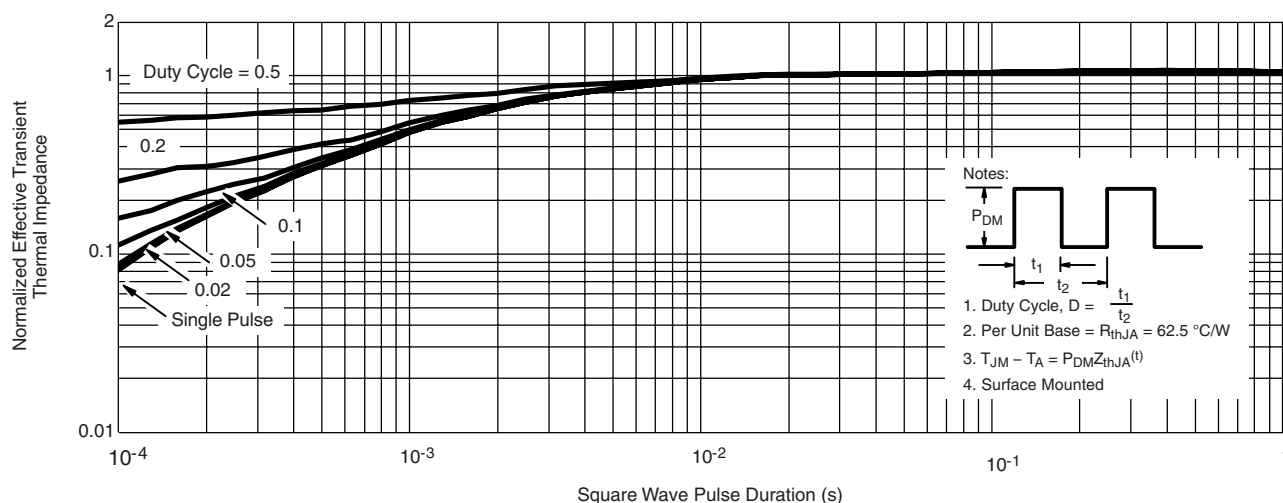
THERMAL RATINGS



**Maximum Avalanche and Drain Current
vs. Case Temperature**

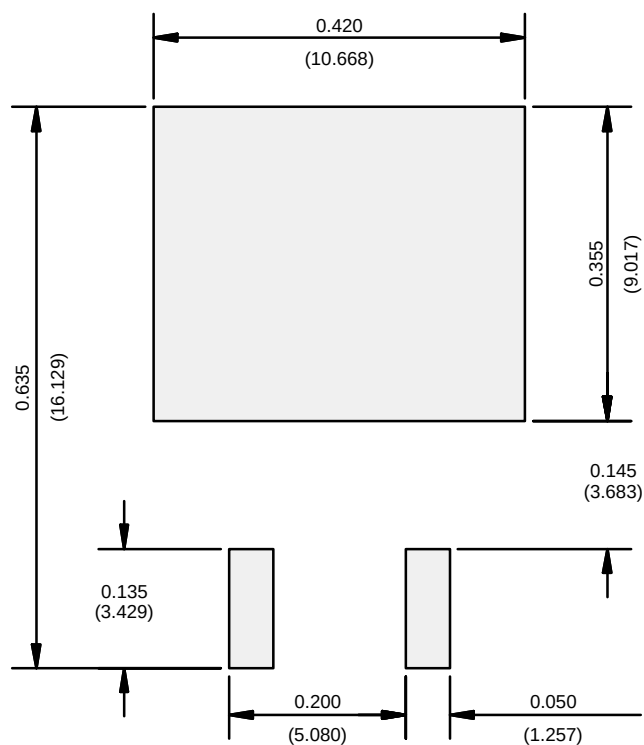


Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Case

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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