

CSD17303Q5-VB Datasheet

N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^{a, e}	Q_g (Typ.)
30	0.0018 at $V_{GS} = 10$ V	160	82 nC
	0.0025 at $V_{GS} = 4.5$ V	130	

FEATURES

- Trench Power MOSFET
- 100 % R_g and UIS Tested

APPLICATIONS

- OR-ing
- Server



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed Drain Current	I_{DM}	300	mJ
Avalanche Current Pulse	I_{AS}	36	
Single Pulse Avalanche Energy	E_{AS}	64.8	
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	A
		$T_A = 25$ °C	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R_{thJA}	32	40	°C/W
Maximum Junction-to-Case	R_{thJC}	0.5	0.6	

Notes:

a. Based on $T_C = 25$ °C.

b. Surface mounted on 1" x 1" FR4 board.

c. $t = 10$ s.

d. Maximum under steady state conditions is 90 °C/W.

e. Calculated based on maximum junction temperature. Package limitation current is 90 A.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		35		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 7.5		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.5		2.5	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	90			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 32 A		0.0018		Ω
		V _{GS} = 4.5 V, I _D = 29 A		0.0025		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 32 A		160		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 12.5 V, V _{GS} = 0 V, f = 1 MHz			9900	pF
Output Capacitance	C _{oss}				1725	
Reverse Transfer Capacitance	C _{rss}				970	
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 32 A			83	nC
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 29 A			82	
Gate-Source Charge	Q _{gs}				34	
Gate-Drain Charge	Q _{gd}				29	
Gate Resistance	R _g	f = 1 MHz		1.4	2.1	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 0.555 Ω I _D ≅ 27 A, V _{GEN} = 10 V, R _g = 1 Ω		18	27	ns
Rise Time	t _r			11	17	
Turn-Off Delay Time	t _{d(off)}			70	105	
Fall Time	t _f			10	15	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 0.625 Ω I _D ≅ 24 A, V _{GEN} = 4.5 V, R _g = 1 Ω		55	83	
Rise Time	t _r			180	270	
Turn-Off Delay Time	t _{d(off)}			55	83	
Fall Time	t _f			12	18	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			100	A
Pulse Diode Forward Current ^a	I _{SM}				200	
Body Diode Voltage	V _{SD}	I _S = 22 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs, T _J = 25 °C		52	78	ns
Body Diode Reverse Recovery Charge	Q _{rr}			70.2	105	nC
Reverse Recovery Fall Time	t _a			27		ns
Reverse Recovery Rise Time	t _b			25		

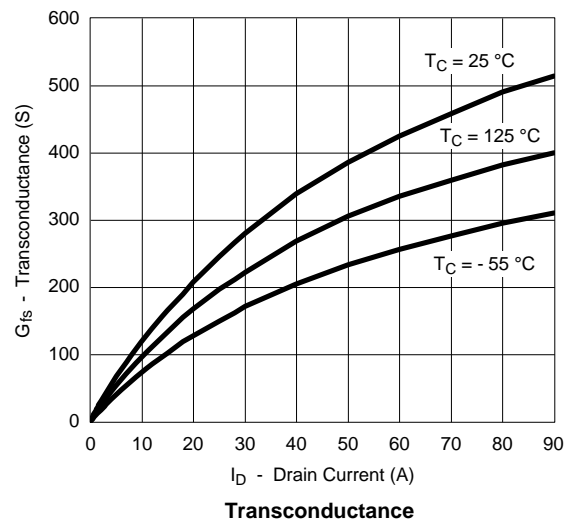
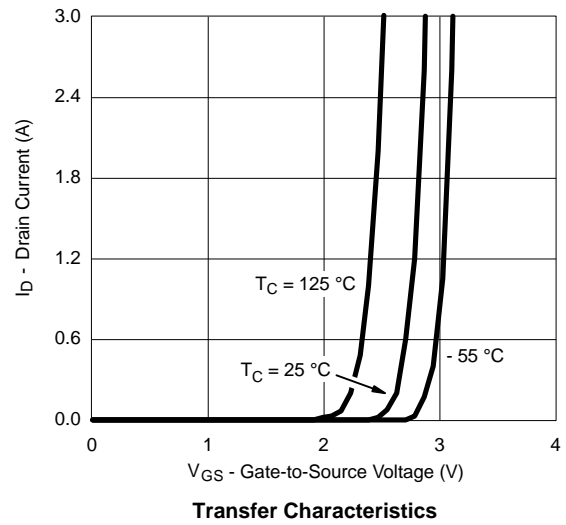
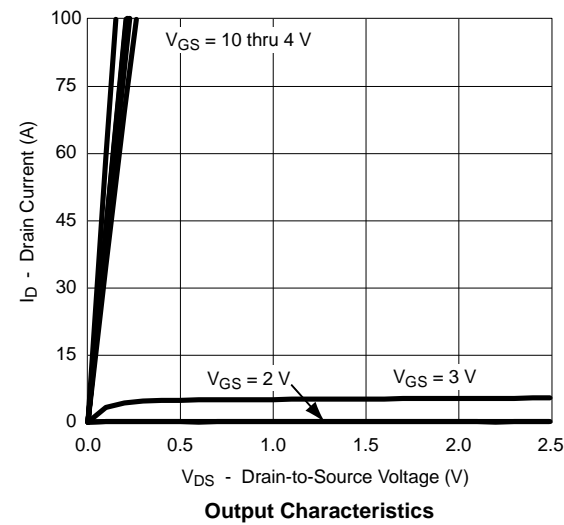
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

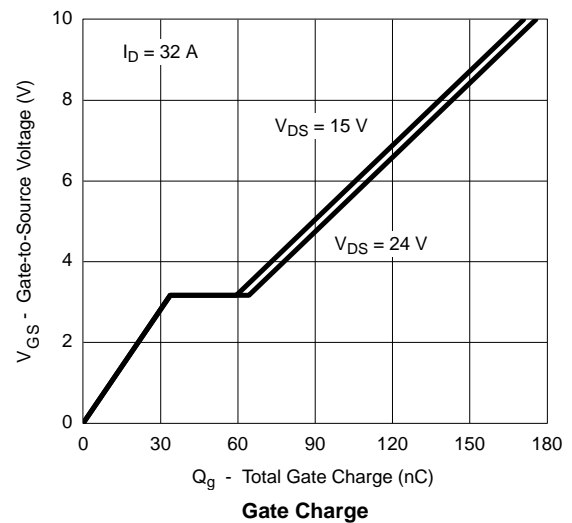
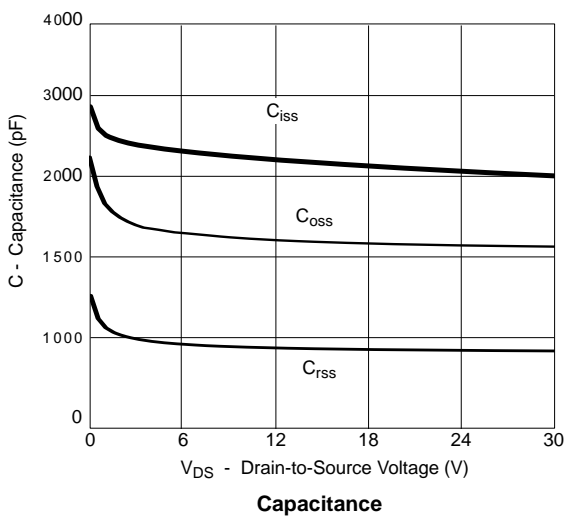
b. Guaranteed by design, not subject to production testing.

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)



I_D - Drain Current (A)
 $R_{DS(on)}$ vs. Drain Current



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



On-Resistance vs. Junction Temperature



Forward Diode Voltage vs. Temperature



$R_{DS(on)}$ vs. V_{GS} vs. Temperature



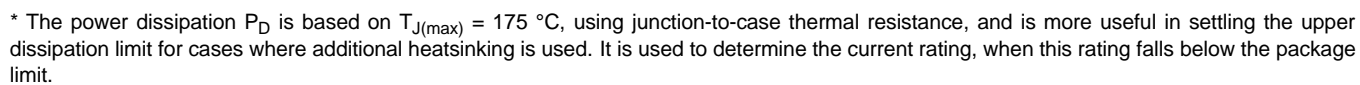
Threshold Voltage



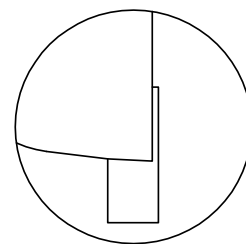
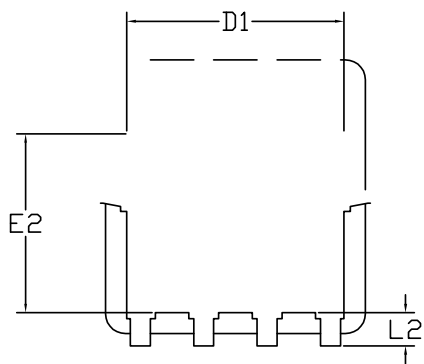
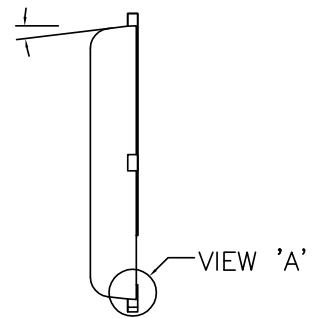
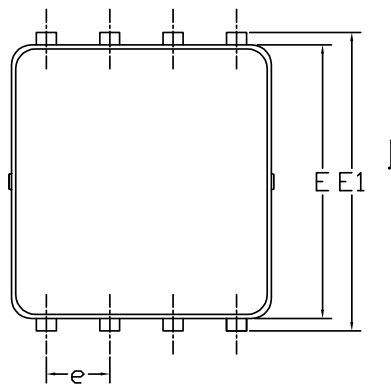
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

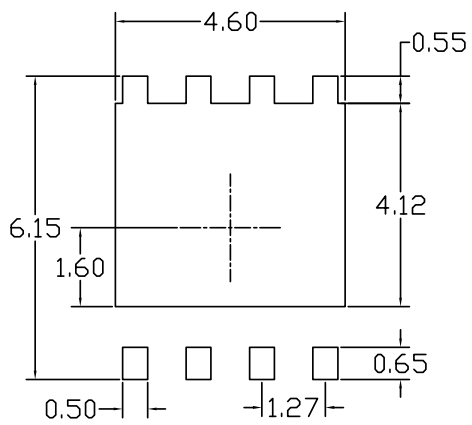
Figure 1 is a Current Derating Graph. The vertical axis represents Drain Current (I_D) in Amperes (A), ranging from 0 to 300. The horizontal axis represents Case Temperature (T_C) in degrees Celsius ($^{\circ}\text{C}$), ranging from 0 to 175. A solid horizontal line at $I_D = 100$ A is labeled "Package Limited". A dashed line starts at $I_D = 290$ A at $T_C = 0$ $^{\circ}\text{C}$ and decreases linearly to $I_D = 100$ A at $T_C = 150$ $^{\circ}\text{C}$. Beyond $T_C = 150$ $^{\circ}\text{C}$, the curve drops sharply to 0 A at $T_C = 175$ $^{\circ}\text{C}$.

[illegible]

Normalized Thermal Transient Impedance, Junction-to-Case



VIEW 'A'
(SCALE 5:1)



D1	4.35	0.171
E2	3.625	0.143
L2	0.68 REF	0.027 REF
		10°

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