

SHINDENGEN

VR Series Power MOSFET

N-Channel Enhancement type

F05B23VR

230V 0.5A

FEATURES

- Applicable to 4V drive.
- The static $R_{ds(on)}$ is small.
- Built-in ZD for Gate Protection.

APPLICATION

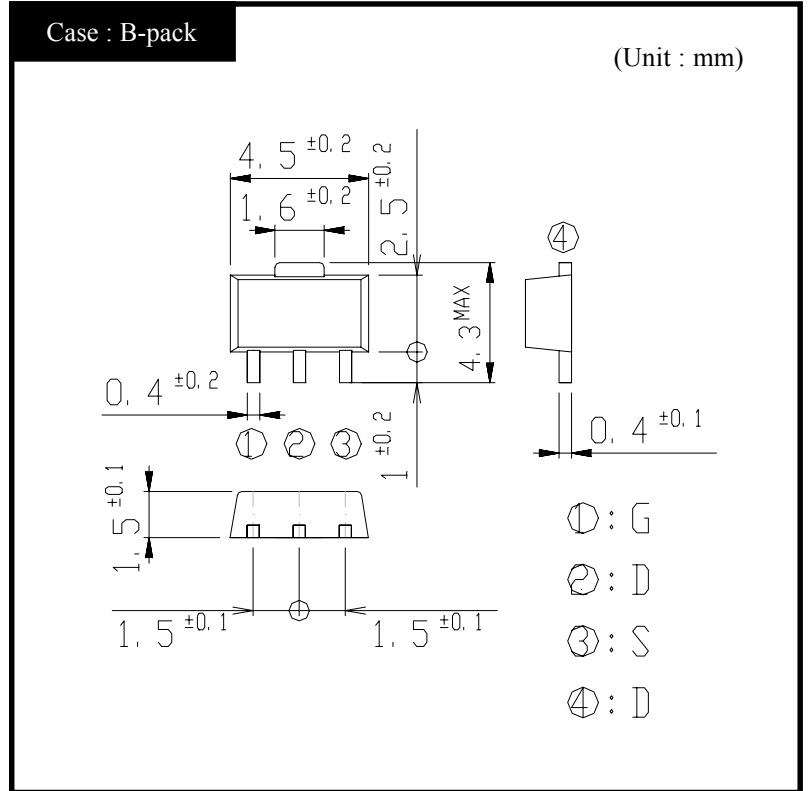
- DC/DC converters
- Power supplies of DC 12-24V input
- Product related to Integrated Service Digital Network

RATINGS

- Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$)

Item	Symbol	Conditions	Ratings	Unit
Storage Temperature	T_{stg}		-55~150	$^\circ\text{C}$
Channel Temperature	T_{ch}		150	
Drain-Source Voltage	V_{DSS}		230	V
Gate-Source Voltage	V_{GSS}		± 20	
Continuous Drain Current (DC)	I_D		0.5	A
Continuous Drain Current (Peak)	I_{DP}		1	
Continuous Source Current (DC)	I_S		0.5	
Total Power Dissipation	P_T	On alumina substrate, 50.8mm^2 , substrate thickness 0.64t, $T_a = 25^\circ\text{C}$	1.5	W
			3.5	

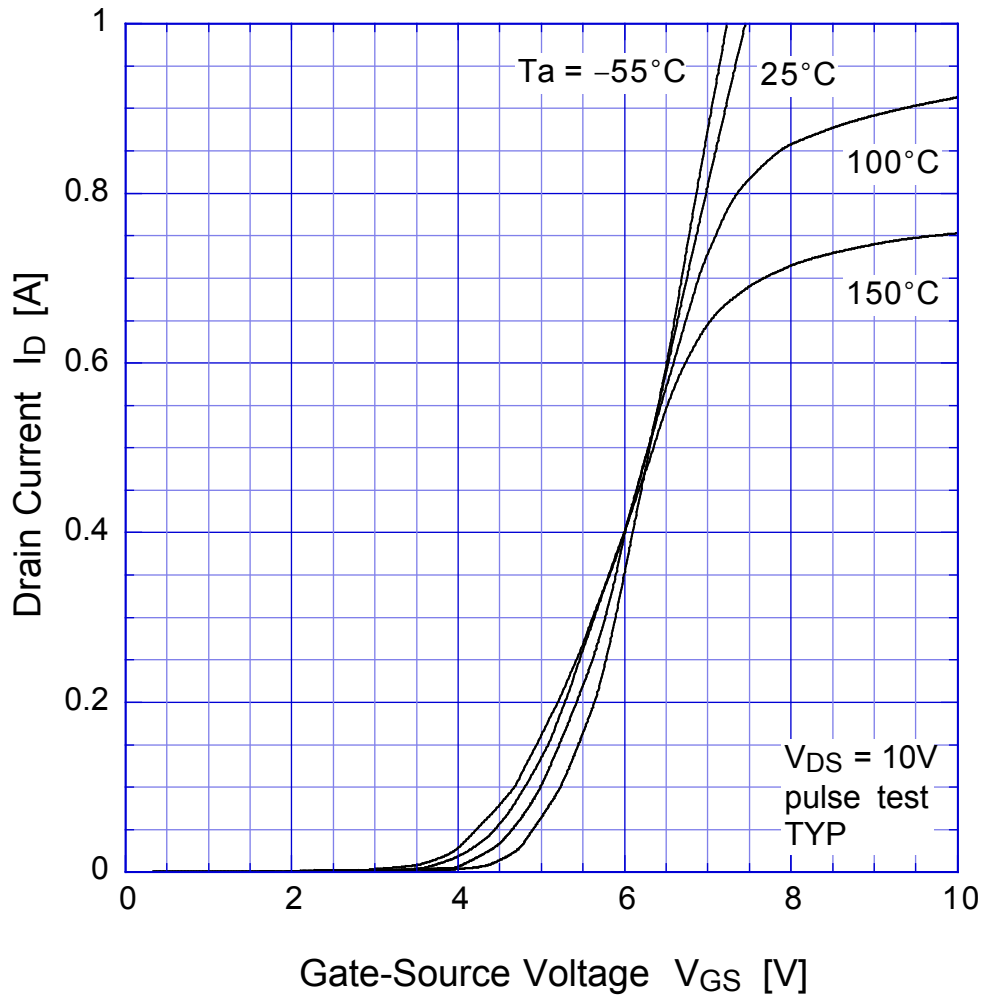
OUTLINE DIMENSIONS



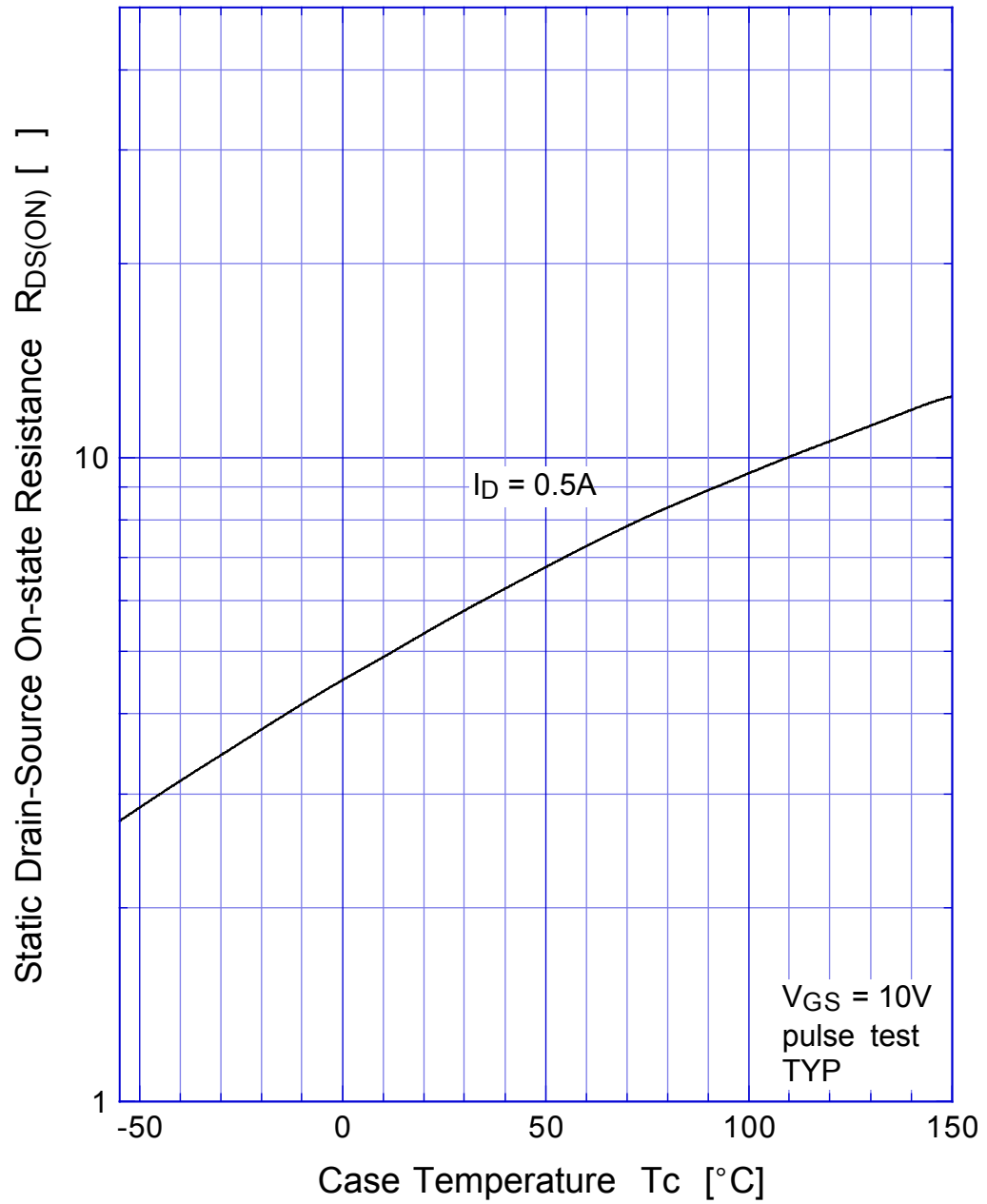
●Electrical Characteristics $T_c = 25^\circ\text{C}$

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0\text{V}$	230			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 230\text{V}$, $V_{GS} = 0\text{V}$			250	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$			± 0.1	
Forward Transconductance	g_{fs}	$I_D = 0.5\text{A}$, $V_{DS} = 10\text{V}$	0.2	0.4		S
Static Drain-Source On-state Resistance	$R_{DS(ON)}$	$I_D = 0.5\text{A}$, $V_{GS} = 10\text{V}$		5.5	8	Ω
Gate Threshold Voltage	V_{TH}	$I_D = 0.2\text{mA}$, $V_{DS} = 10\text{V}$	2	3	4	V
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 0.5\text{A}$, $V_{GS} = 0\text{V}$			1.5	
Thermal Resistance	θ_{ja}	junction to ambient, on alumina substrate			83.3	$^\circ\text{C}/\text{W}$
	θ_{jc}	junction to case			35.7	
Total Gate Charge	Q_g	$V_{GS} = 10\text{V}$, $I_D = 0.5\text{A}$, $V_{DD} = 200\text{V}$		2.7		nC
Input Capacitance	C_{iss}	$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		45		pF
Reverse Transfer Capacitance	C_{rss}			4.5		
Output Capacitance	C_{oss}			30		
Turn-On Time	t_{on}	$I_D = 0.5\text{A}$, $V_{GS} = 10\text{V}$, $R_L = 200\ \Omega$		30	60	ns
Turn-Off Time	t_{off}			50	100	

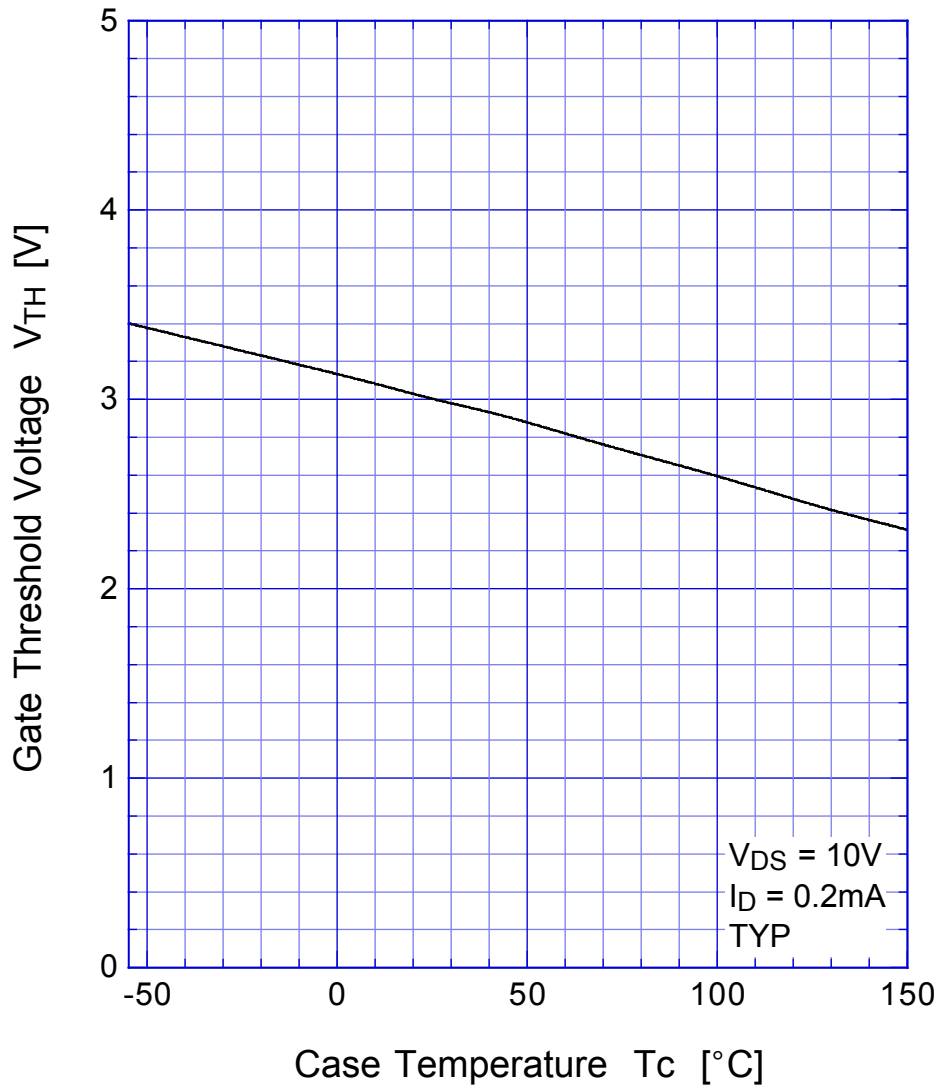
F05B23VR Transfer Characteristics



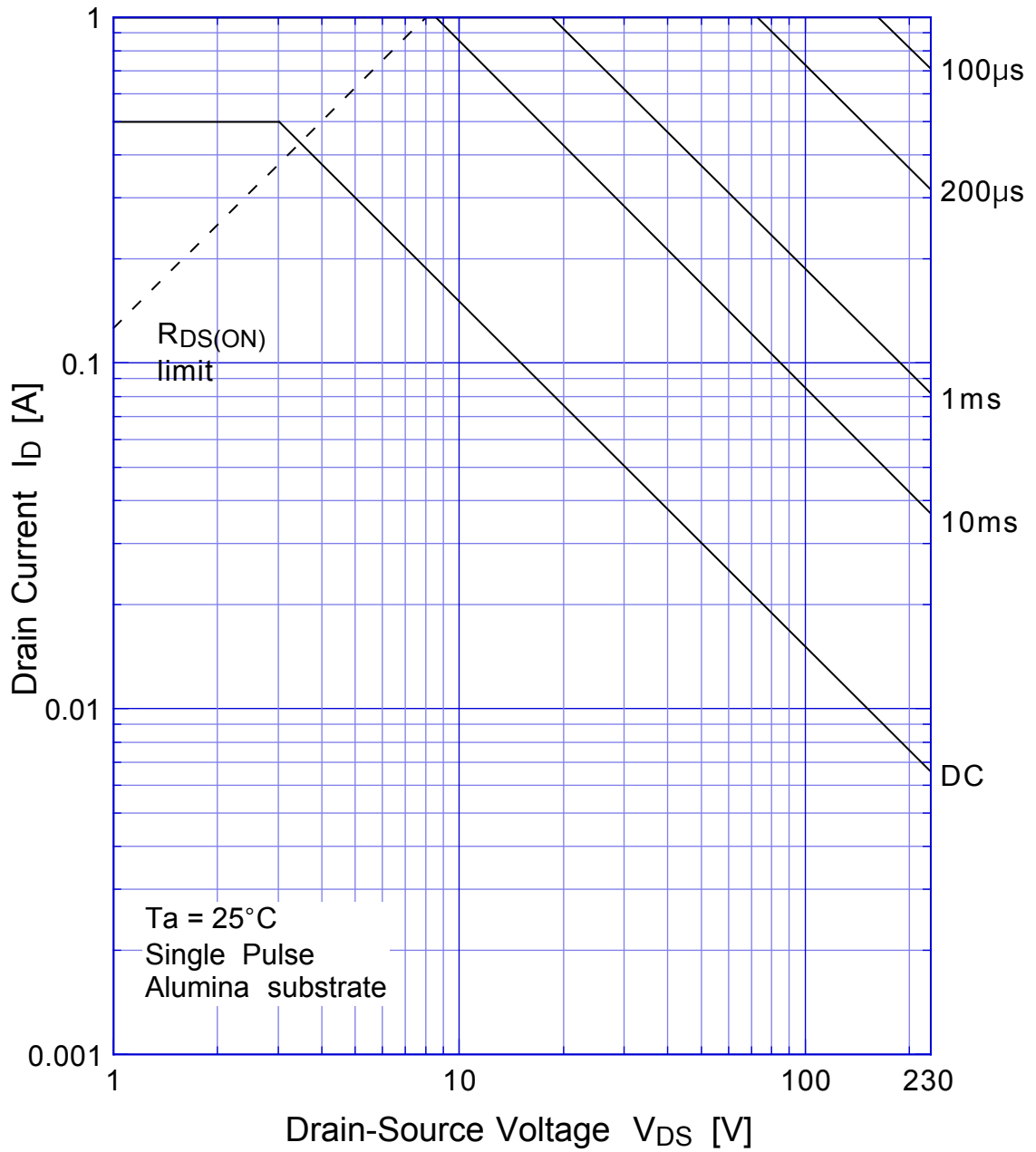
F05B23VR Static Drain-Source On-state Resistance



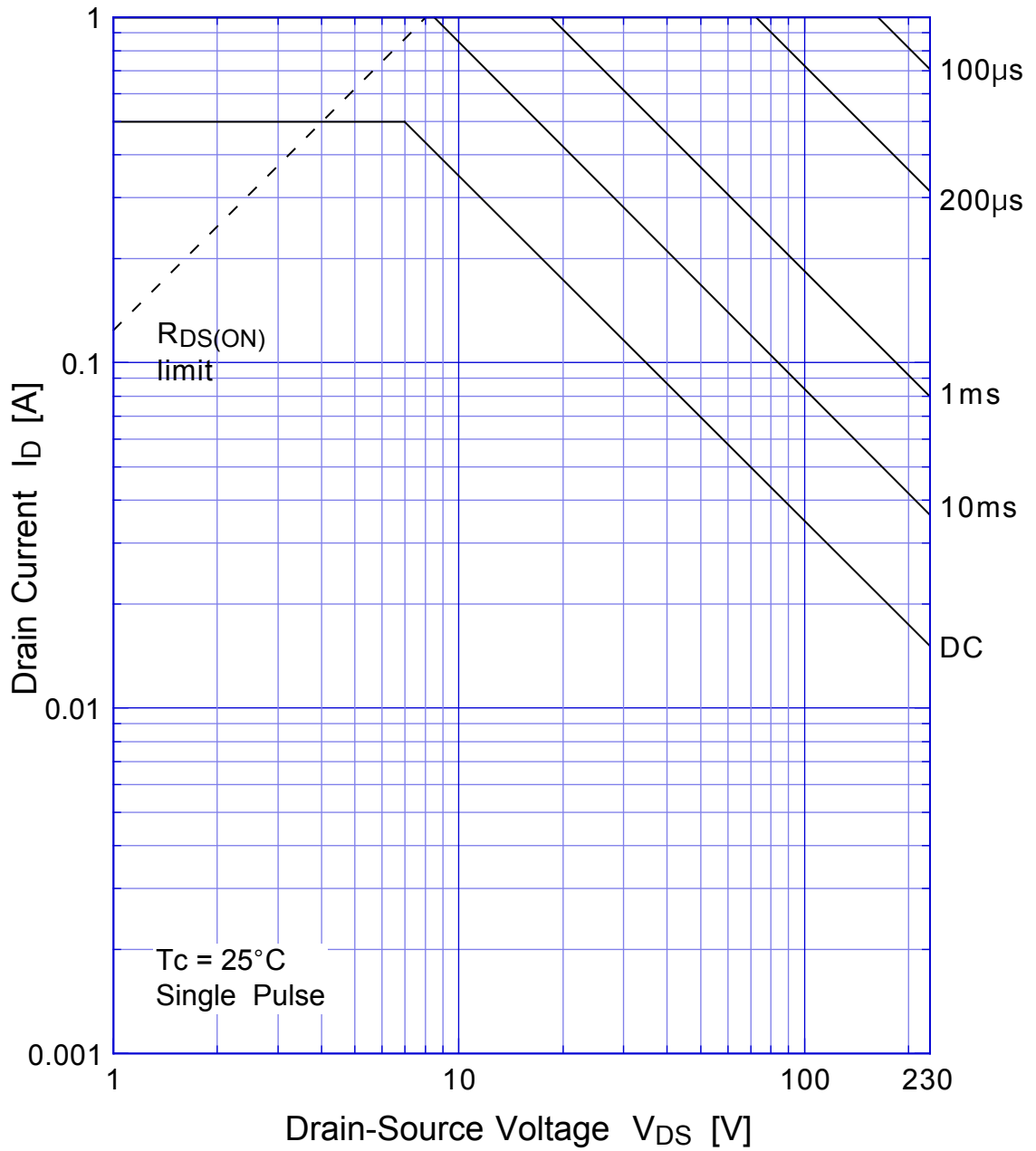
F05B23VR Gate Threshold Voltage



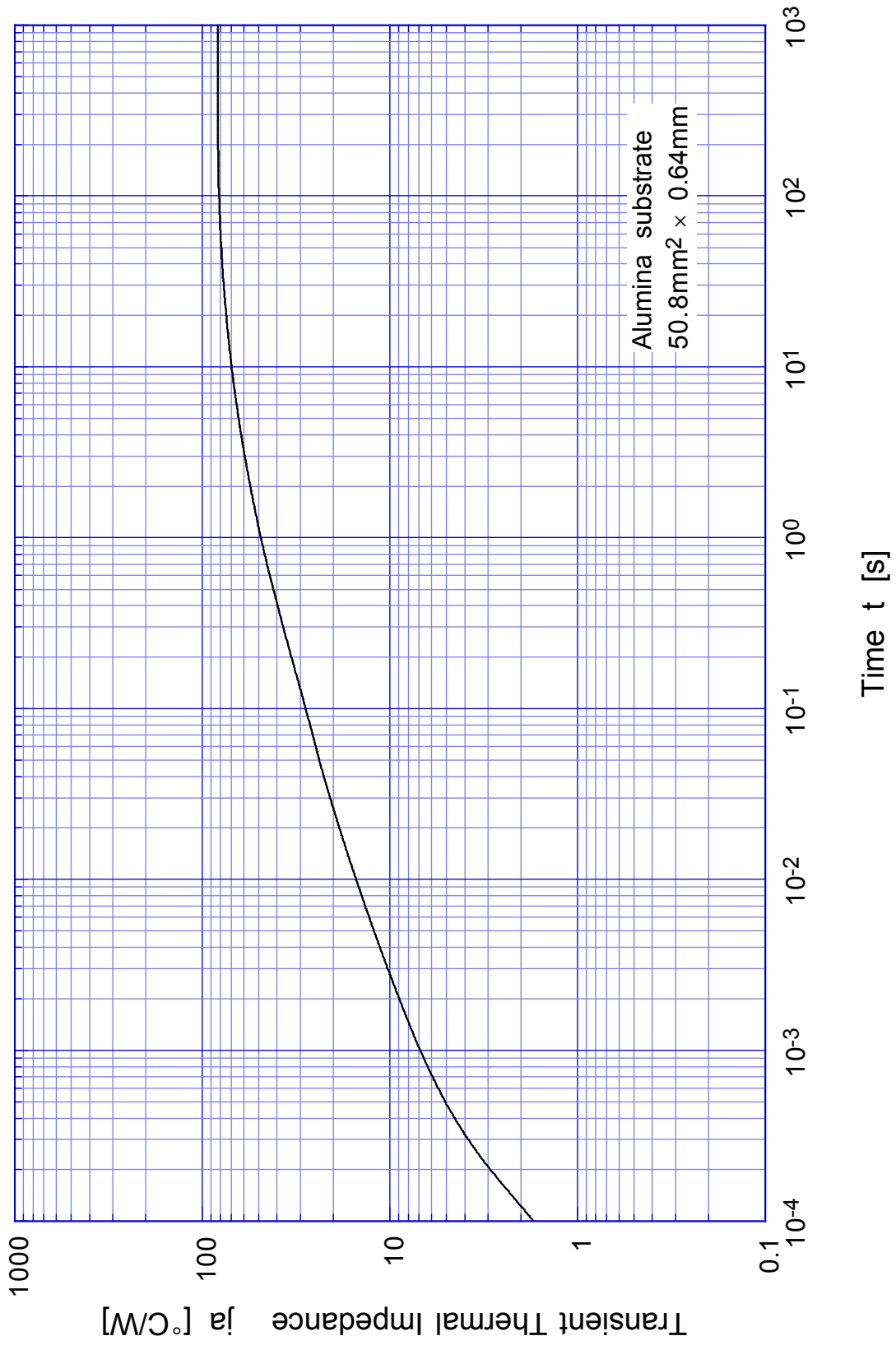
F05B23VR Safe Operating Area



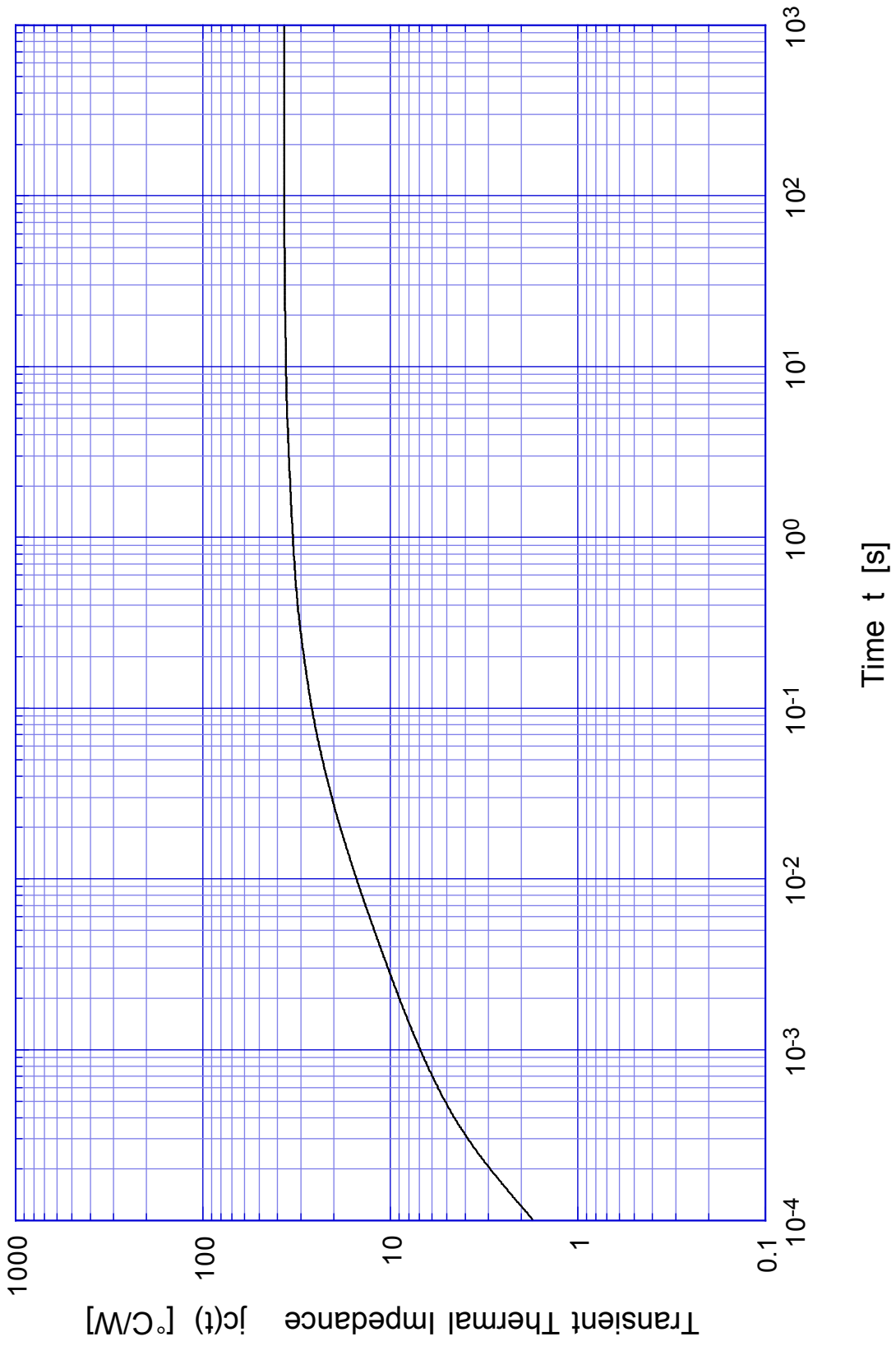
F05B23VR Safe Operating Area



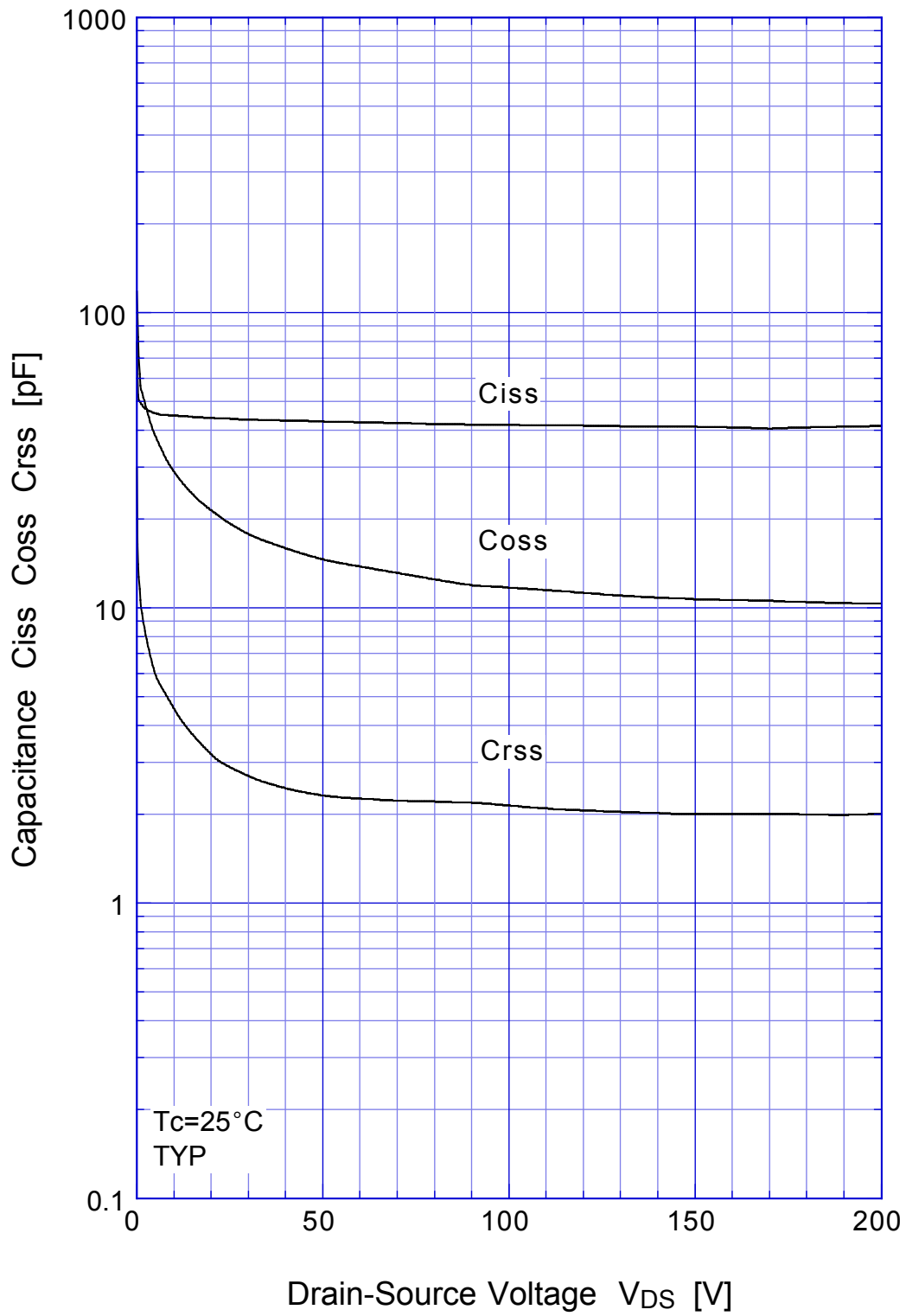
F05B23VR Transient Thermal Impedance



F05B23VR Transient Thermal Impedance



F05B23VR Capacitance



F05B23VR

Power Derating



F05B23VR Gate Charge Characteristics

