Description

The VSM35P03 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge . This device is suitable for use as a load switch or in PWM applications.

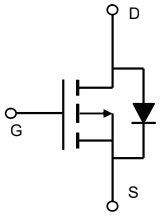
Application

- PWM applications
- Load switch
- Power management

General Features

- V_{DS} = -30V,I_D = -35A
  $R_{DS(ON)}$ =7.0mΩ(Typ) @ V_{GS}= -10V
  $R_{DS(ON)}$ =9.5mΩ(Typ) @ V_{GS}= -4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package
- 150 °C operating temperature
- Pb-free lead plating

DFN3x3



Schematic

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
VSM35P03	VSM35P03-D33	DFN3x3	Ø330mm	12mm	5000 units

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-35	A
Drain Current-Pulsed	I_{DM}	-140	A
Maximum Power Dissipation	P_D	31	W
Single pulse avalanche energy (Note 1)	E_{AS}	108	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	4	℃/W
Thermal Resistance,Junction-to-Ambient (Note 4)	$R_{\theta JA}$	60	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.0	-1.6	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	7.0	8.0	mΩ
		V_{GS}=-4.5V, I_D=-15A	-	9.5	13.0	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-20A	-	25	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	2105	-	pF
Output Capacitance	C_{oss}		-	248	-	pF
Reverse Transfer Capacitance	C_{rss}		-	175	-	pF
Switching Characteristics (Note 2)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, I_D=-20A, V_{GS}=-10V,R_{GEN}=3Ω	-	13	-	nS
Turn-on Rise Time	t_r		-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-20A,V_{GS}=-10V	-	41	-	nC
Gate-Source Charge	Q_{gs}		-	4.8	-	nC
Gate-Drain Charge	Q_{gd}		-	8.6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=-20A	-	-	-1.2	V

Notes:

1. EAS condition : Tj=25℃,V_{DD}=-15V,V_G=-10V,L=0.5mH,Rg=25Ω
2. Guaranteed by design, not subject to production
3. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

Typical Electrical and Thermal Characteristics

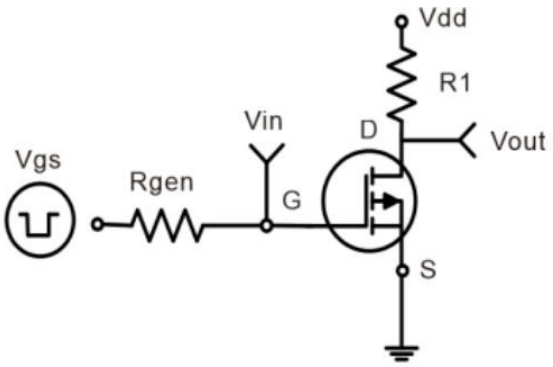


Figure 1:Switching Test Circuit

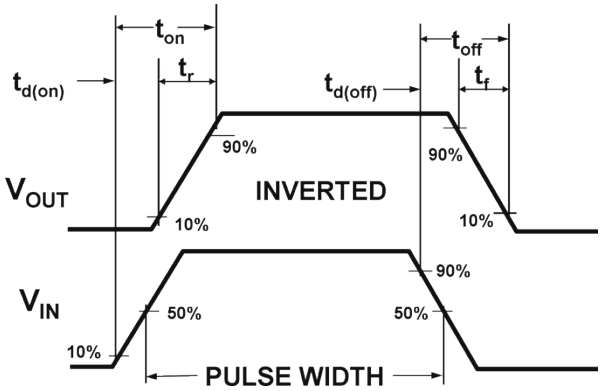


Figure 2:Switching Waveforms

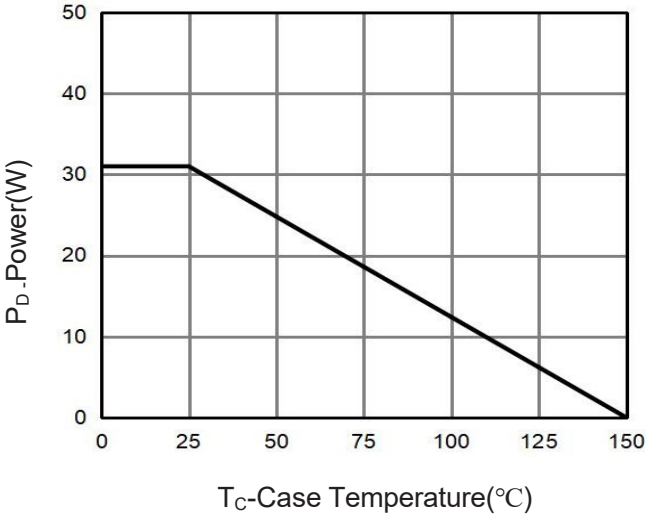


Figure 3 Power Dissipation

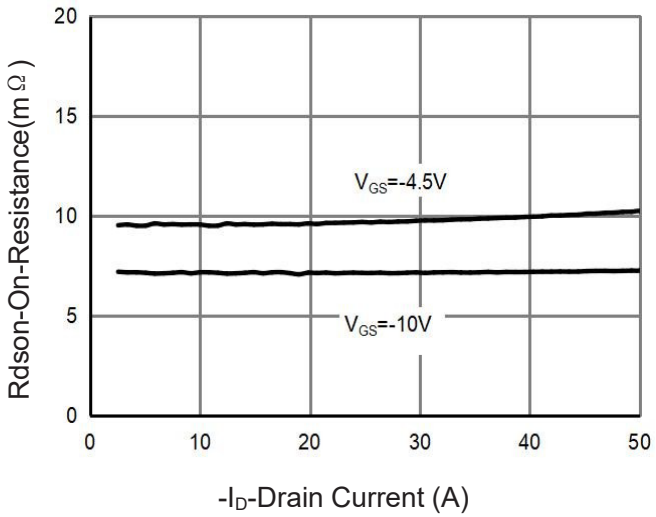


Figure 4 Drain-Source On-Resistance

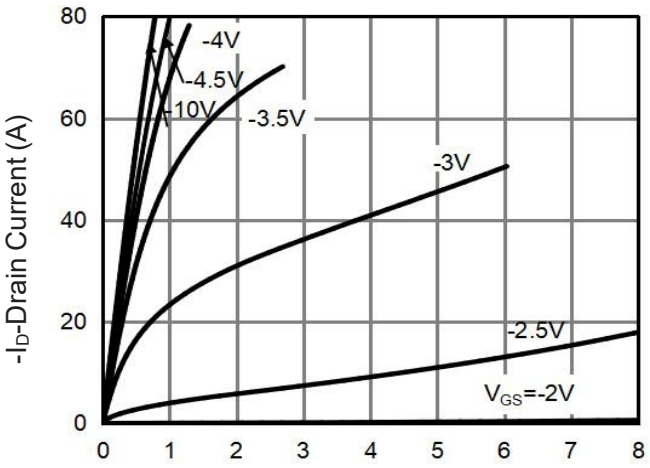


Figure 5 Output Characteristics

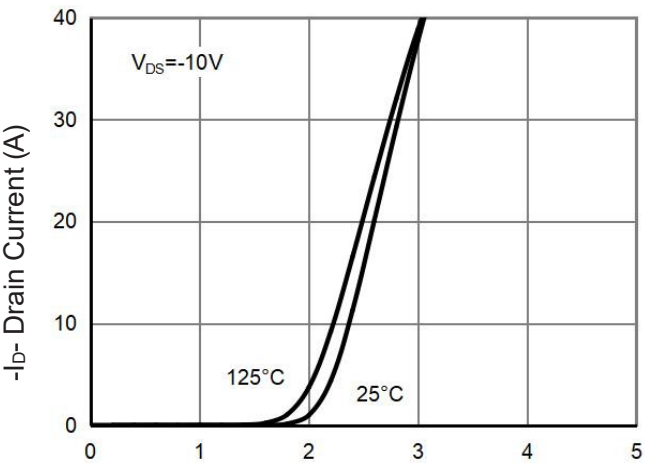


Figure 6 Transfer Characteristics

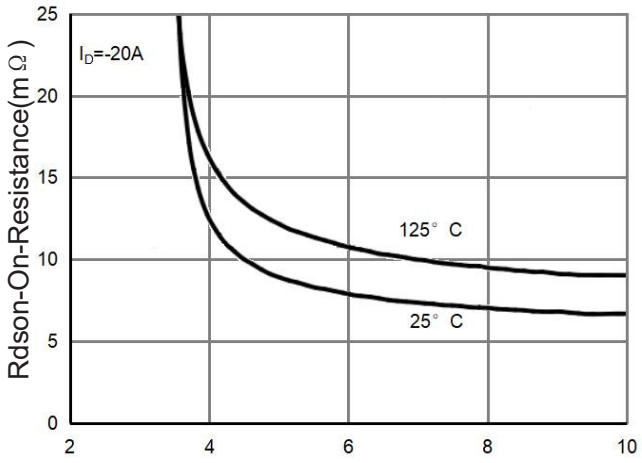


Figure 7 Rdson vs Vgs

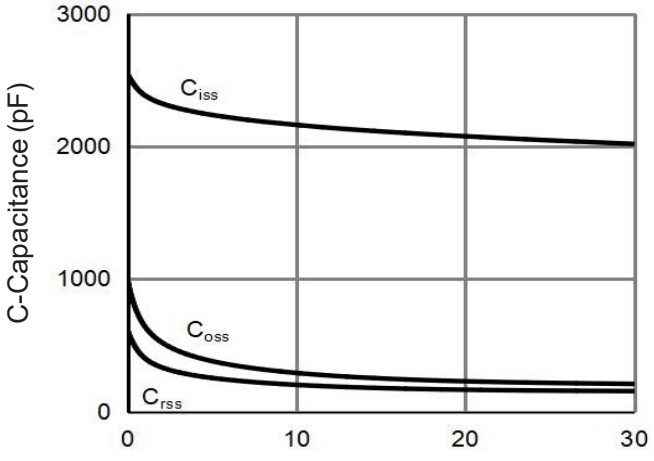


Figure 8 Capacitance vs Vds

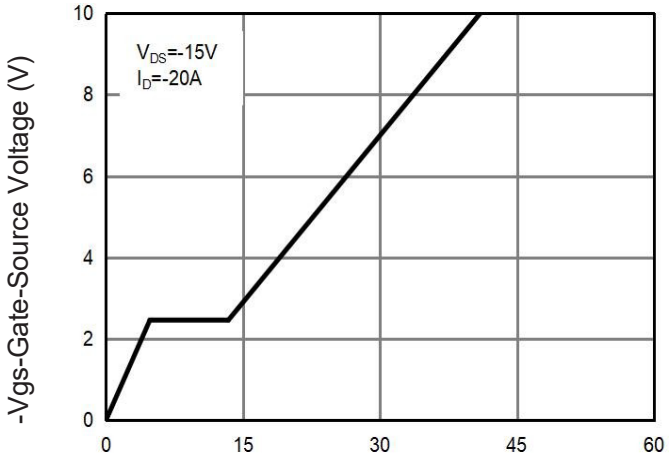


Figure 9 Gate Charge

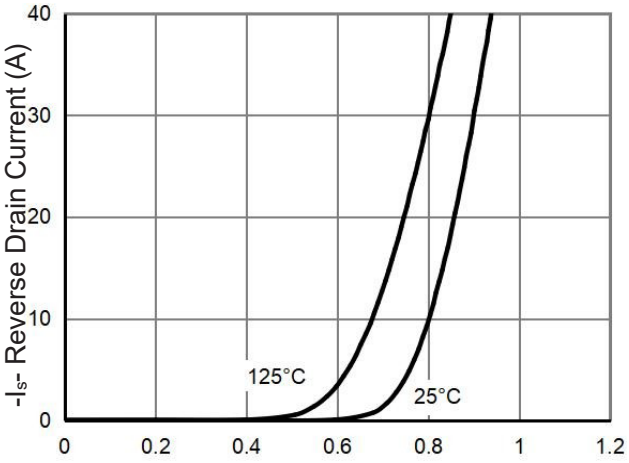


Figure 10 Source- Drain Diode Forwa

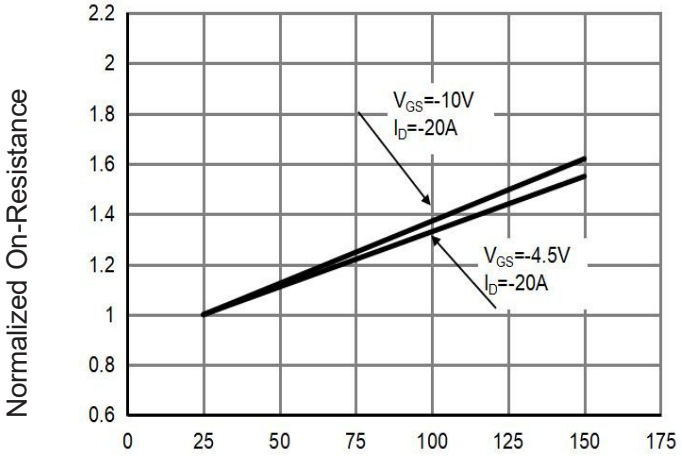


Figure 11 Drain-Source On-Resistance

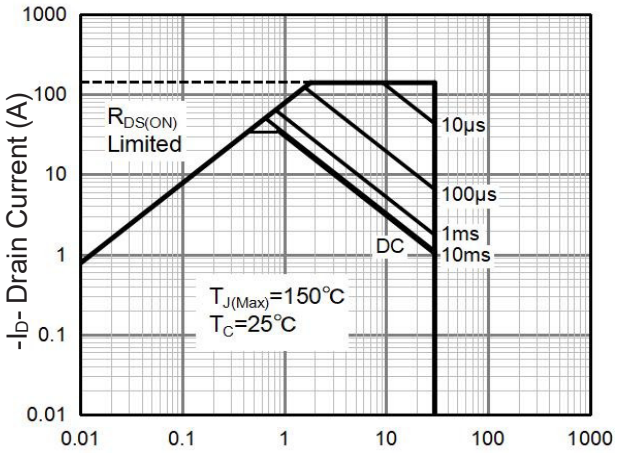


Figure 12 Safe Operation Area

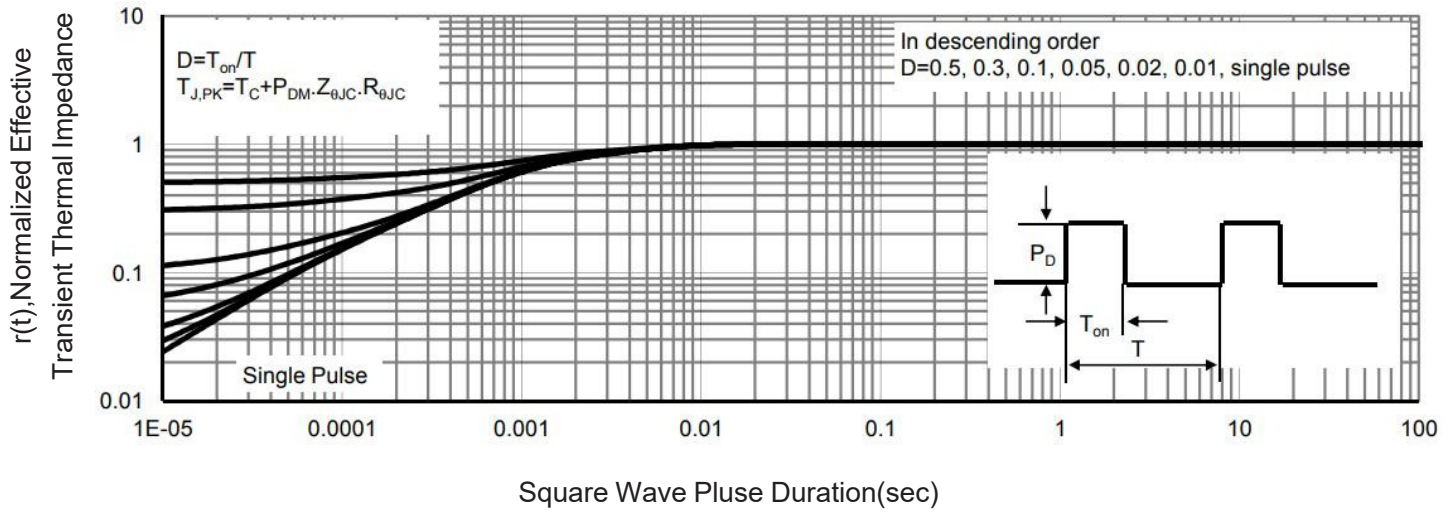


Figure 13 Normalized Maximum Transient Thermal Impedance