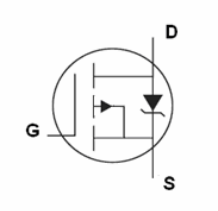
Features

- P-Channel
- Low On-Resistance
- Very low on-resistance RDS(on) @ V_{GS}=-4.5 V
- Fast Switching
- High conversion efficiency
- Pb-free lead plating; RoHS compliant

Pb-Free RoHS HF Halogen-Free

V_{DS}	-30	V
$R_{DS(on),TYP}$@ V_{GS}=-10 V	45	mΩ
$R_{DS(on),TYP}$@ V_{GS}=-4.5V	55	mΩ
I_D	-4.7	A

SOT23



Part ID	Package Type	Marking	Tape and reel information
VSC040P03MS	SOT23	4P03	3000pcs/reel

Maximum ratings, at T_j=25 °C, unless otherwise specified

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±12	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		-30	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	-4.7	A
Mounted on Large Heat Sink				
I_D	Continuous Drain current @V_{GS}=-10V	T_C=25°C	-4.7	A
		T_C=100°C	-3	A
I_{DM}	Pulse Drain Current Tested ①	T_C=25°C	-18	A
P_D	Maximum Power Dissipation	T_C=25°C	1.2	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		100	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		80	°C/W

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=-24V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=-24V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-0.5	-1.0	-1.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=-10V, I_D=-3A	--	45	55	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=-4.5V, I_D=-2A	--	55	65	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=-3.3V, I_D=-1A	--	65	85	mΩ
Dynamic Electrical Characteristics @ T_J= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V, f=1MHz	--	550	--	pF
C_{oss}	Output Capacitance		--	110	--	pF
C_{rss}	Reverse Transfer Capacitance		--	70	--	pF
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-2A, V_{GS}=-4.5V	--	7.2	--	nC
Q_{gs}	Gate-Source Charge		--	1.8	--	nC
Q_{gd}	Gate-Drain Charge		--	2.2	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V, I_D=-1A, R_G=6.8Ω, V_{GS}=-10V	--	9	--	nS
t_r	Turn-on Rise Time		--	7	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	22	--	nS
t_f	Turn-Off Fall Time		--	9	--	nS
Source- Drain Diode Characteristics@ T_J= 25°C (unless otherwise stated)						
I_{SD}	Source-drain current(Body Diode)	T_C=25℃	--	--	-4.7	A
V_{SD}	Forward on voltage	I_{SD}=-3A,V_{GS}=0V	--	-0.85	-1.3	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=-2A, V_{GS}=0V di/dt=-100A/μs	--	13	--	nS
Q_{rr}	Reverse Recovery Charge			6.5		nC

NOTE:

① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

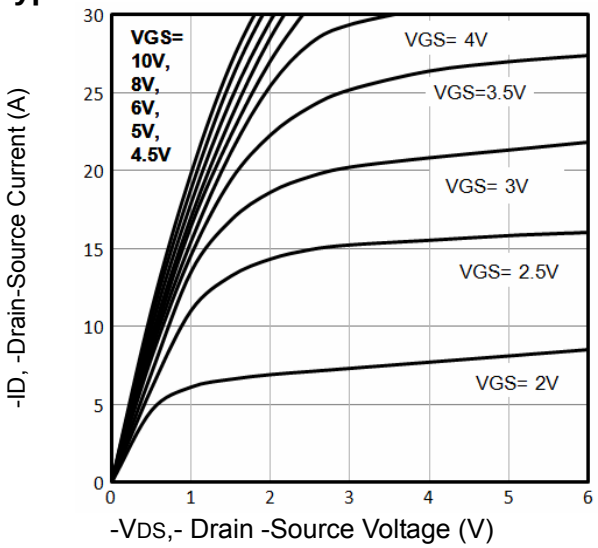


Fig1. Typical Output Characteristics

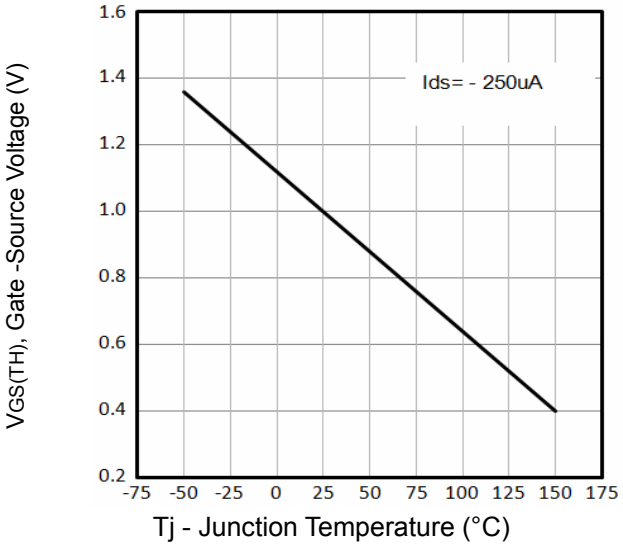


Fig2. Threshold Voltage Vs. Temperature

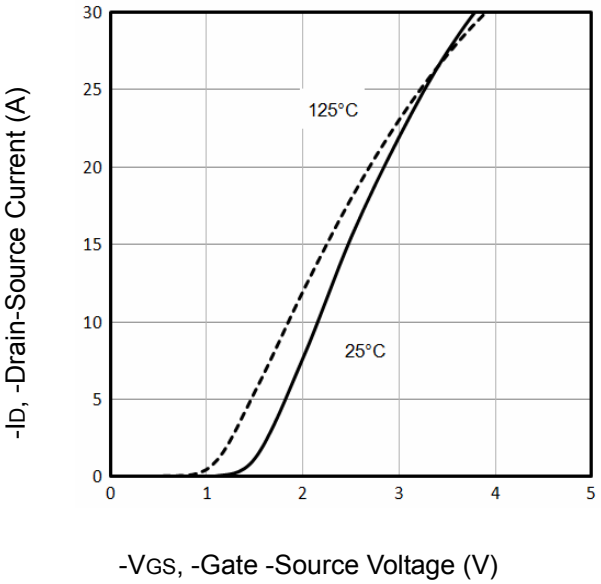


Fig3. Typical Transfer Characteristics

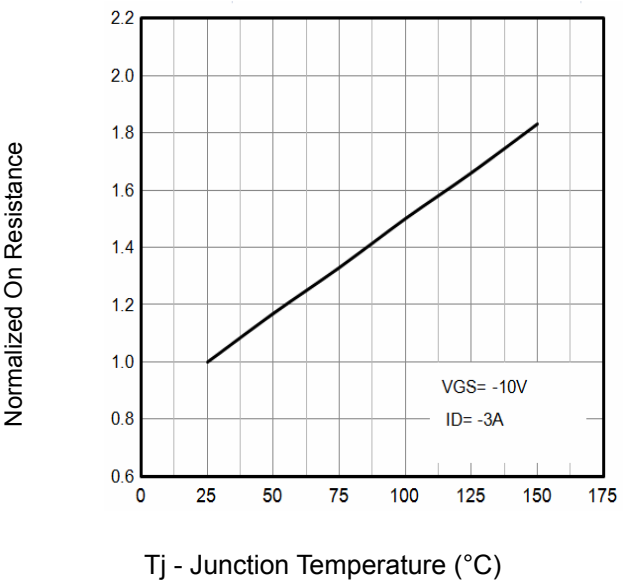


Fig4. Normalized On-Resistance Vs. Temperature

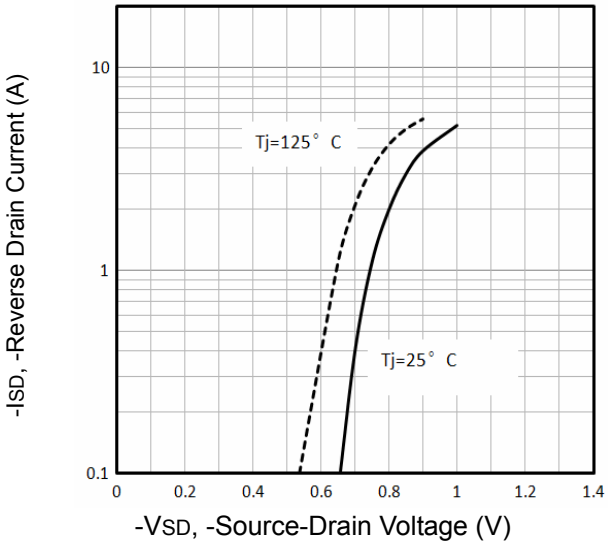


Fig5. Typical Source-Drain Diode Forward Voltage

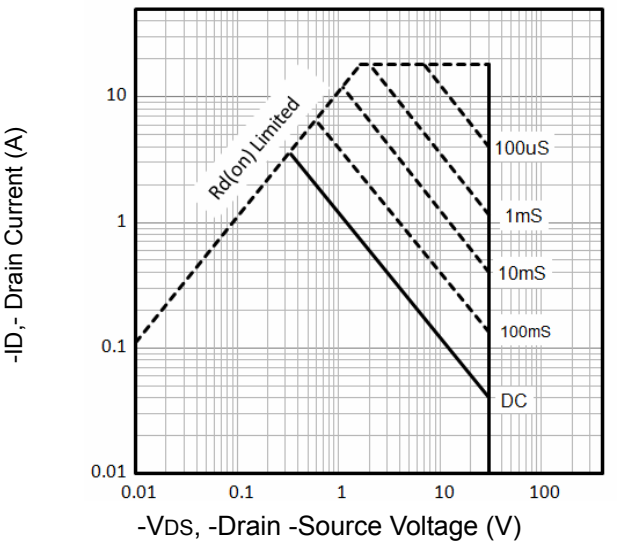


Fig6. Maximum Safe Operating Area

Typical Characteristics

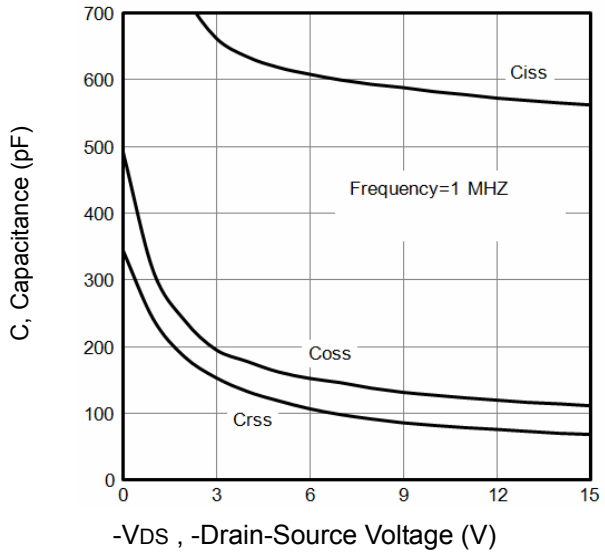


Fig7. Typical Capacitance Vs.Drain-Source Voltage

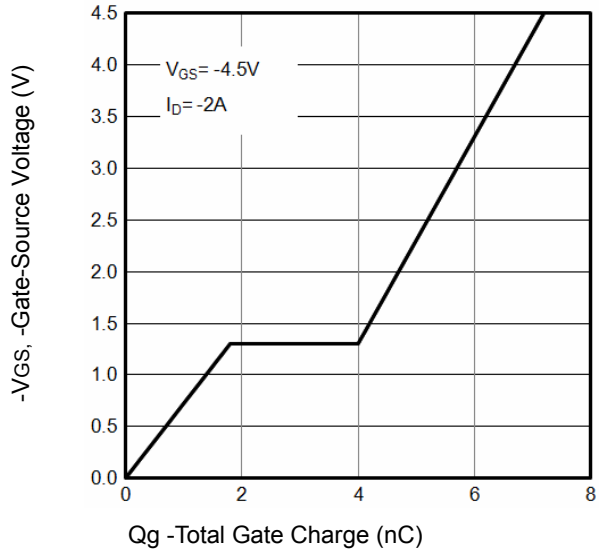


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

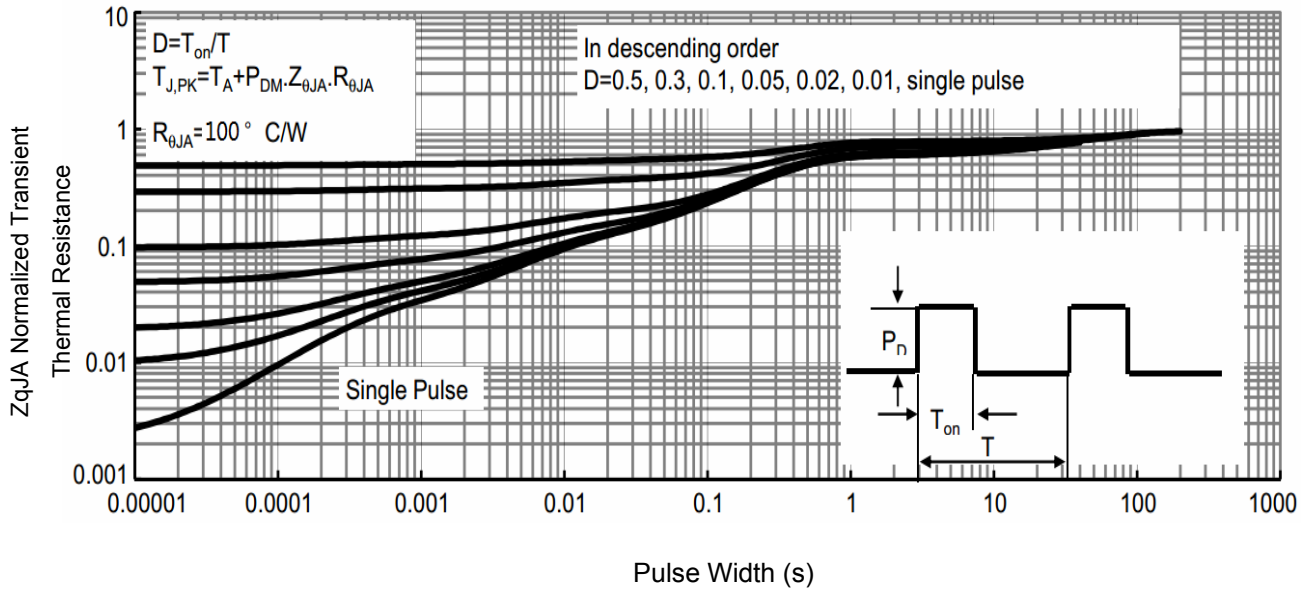


Figure 9: Normalized Maximum Transient Thermal

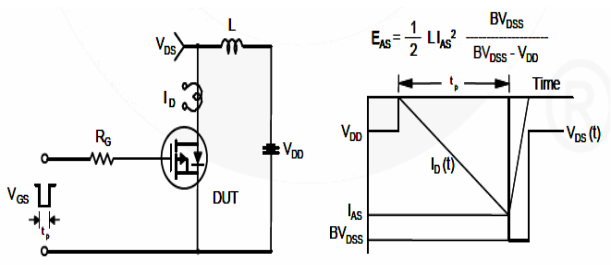


Fig10. Unclamped Inductive Test Circuit and Waveforms

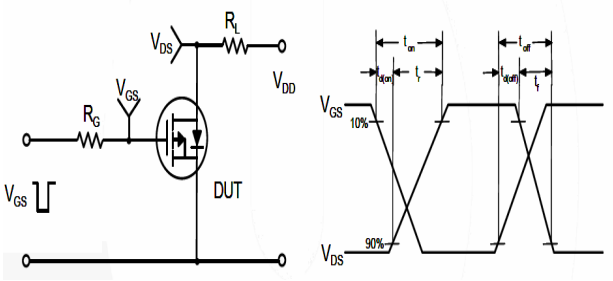
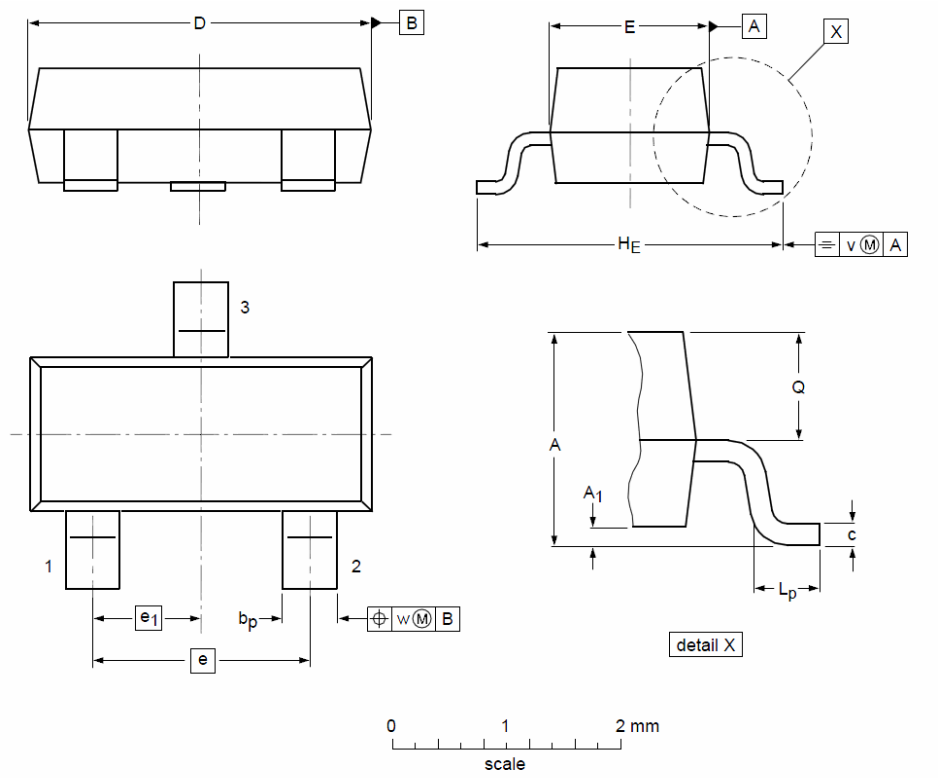


Fig11. Switching Time Test Circuit and waveforms

SOT23 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.03	1.10	**A_1**	0.01	0.05	0.10
b_p	0.38	0.42	0.48	**c**	0.09	0.13	0.15
D	2.80	2.92	3.00	**E**	1.20	1.33	1.40
e	--	1.90	--	**e_1**	--	0.95	--
H_E	2.10	2.40	2.50	**L_p**	0.15	0.23	0.45
Q	0.45	0.49	0.55	**v**	--	0.20	--
w	--	0.10	--				

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