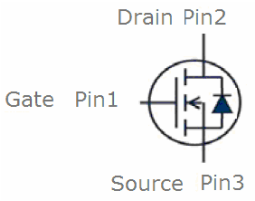
Features

- N-Channel，5V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=4.5 V
- Fast Switching
- High conversion efficiency
- Pb-free lead plating; RoHS compliant

V_{DS}	60	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	30	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5 V	38	mΩ
I_D	6	A

SOT89



Pb-Free RoHS HF Halogen-Free

Part ID	Package Type	Marking	Tape and reel information
VSR050N06MS	SOT89	050N06	3000pcs/reel

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		60	V
I_S	Diode continuous forward current	T_C=25°C	6	A
I_D	Continuous drain current@V_{GS}=10V	T_C=25°C	6	A
		T_C=100°C	3.6	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	24	A
P_D	Maximum power dissipation	T_C=25°C	1.25	W
V_{GS}	Gate-Source voltage		±20	V
T_{STG}	Storage temperature range		-55 to 175	°C
T_J	Maximum Junction Temperature		150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	20	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	100	°C/W

Typicle Electrical Characteristics

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	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=60V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=60V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	2.0	3.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=6A	--	30	50	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=3A	--	38	55	mΩ
Dynamic Electrical Characteristics @ T_J= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz	--	485	--	pF
C_{oss}	Output Capacitance		--	85	--	pF
C_{rss}	Reverse Transfer Capacitance		--	35	--	pF
Q_g	Total Gate Charge	V_{DS}=30V,I_D=3A, V_{GS}=10V	--	30	--	nC
Q_{gs}	Gate-Source Charge		--	7	--	nC
Q_{gd}	Gate-Drain Charge		--	5	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, I_D=1A, R_G=6.8Ω, V_{GS}=10V	--	8	--	nS
t_r	Turn-on Rise Time		--	3	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	20	--	nS
t_f	Turn-Off Fall Time		--	11	--	nS
Source- Drain Diode Characteristics@ T_J= 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=6A,V_{GS}=0V	--	0.83	1.3	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=5A, V_{GS}=0V di/dt=100A/μs	--	40	--	nS
Q_{rr}	Reverse Recovery Charge			36		nC

NOTE:

①Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

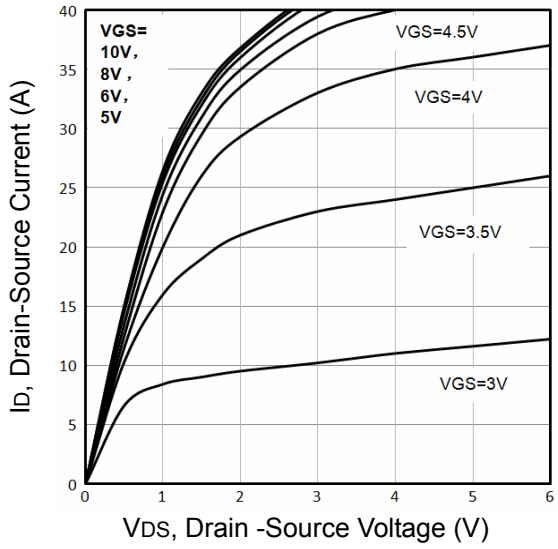


Fig1. Typical Output Characteristics

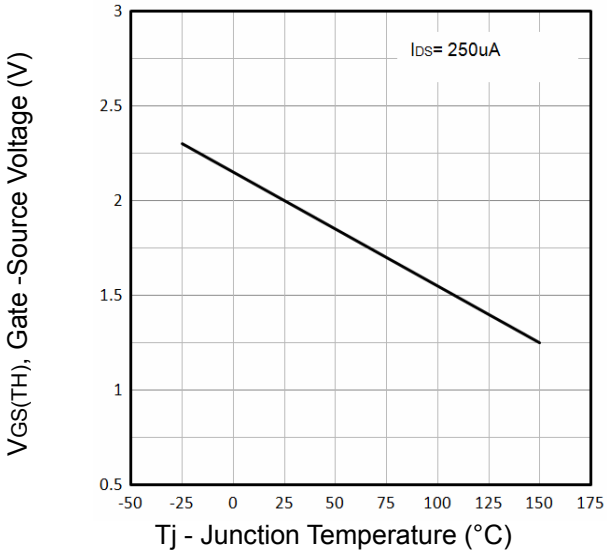


Fig2. Threshold Voltage Vs. Temperature

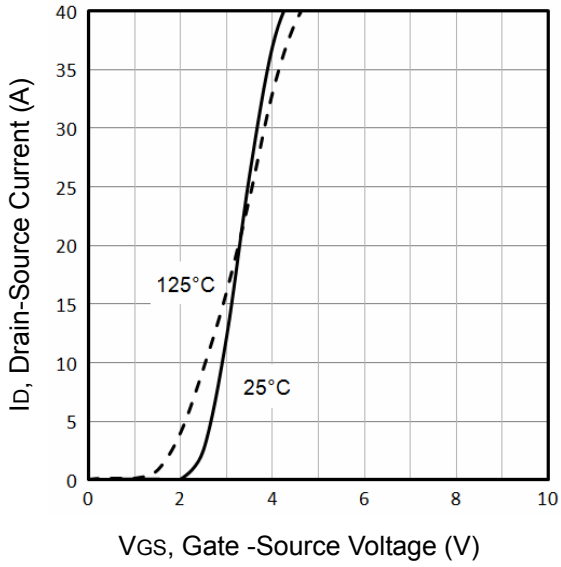


Fig3. Typical Transfer Characteristics

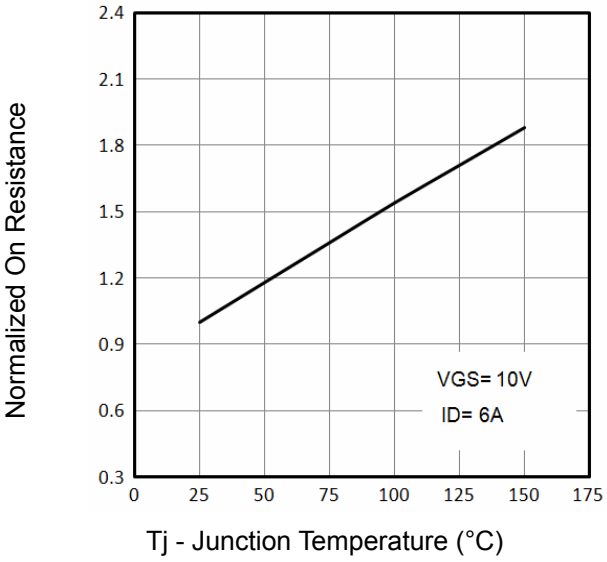


Fig4. Normalized On-Resistance Vs. Temperature

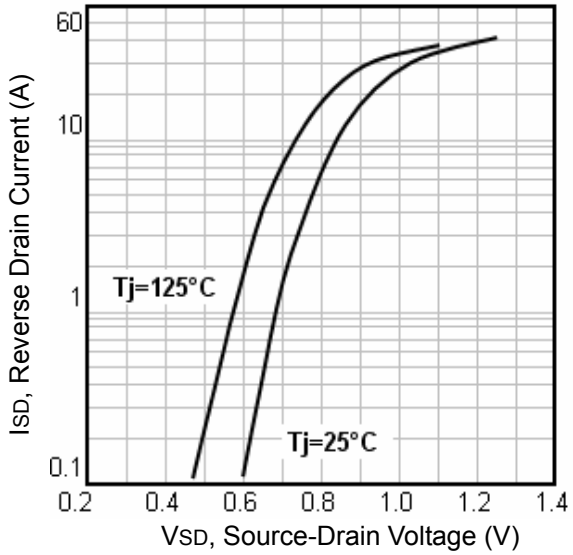


Fig5. Typical Source-Drain Diode Forward Voltage

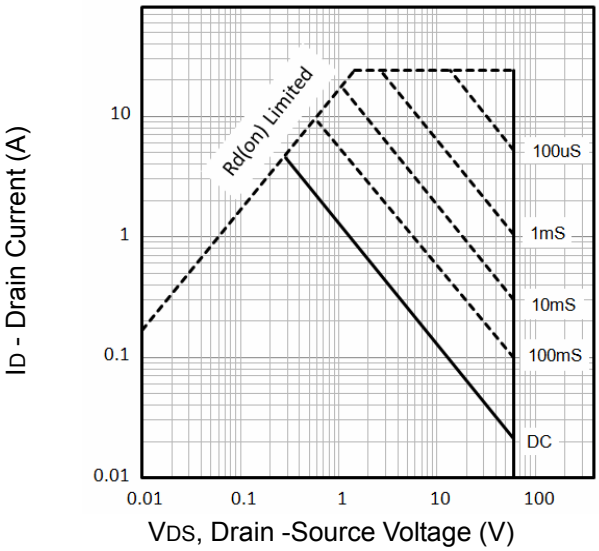


Fig6. Maximum Safe Operating Area

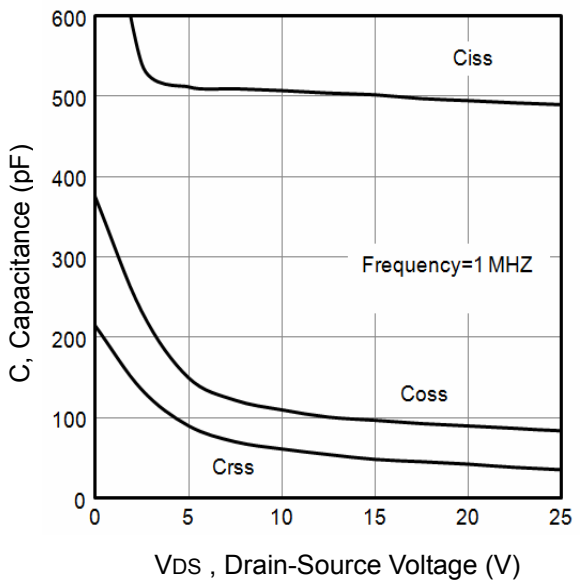


Fig7. Typical Capacitance Vs.Drain-Source Voltage

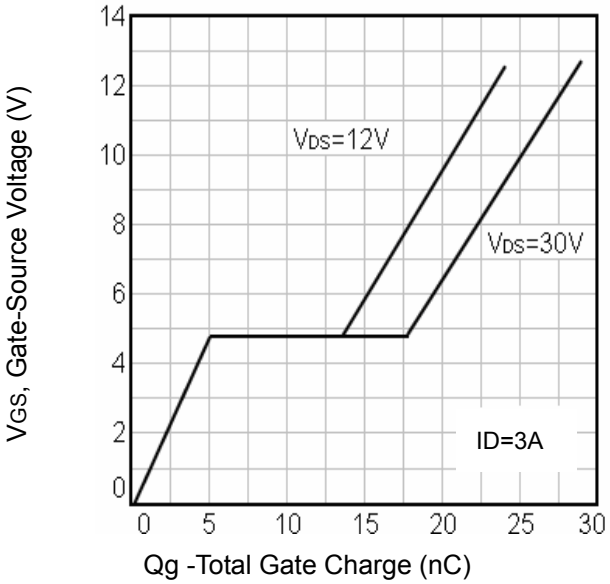


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

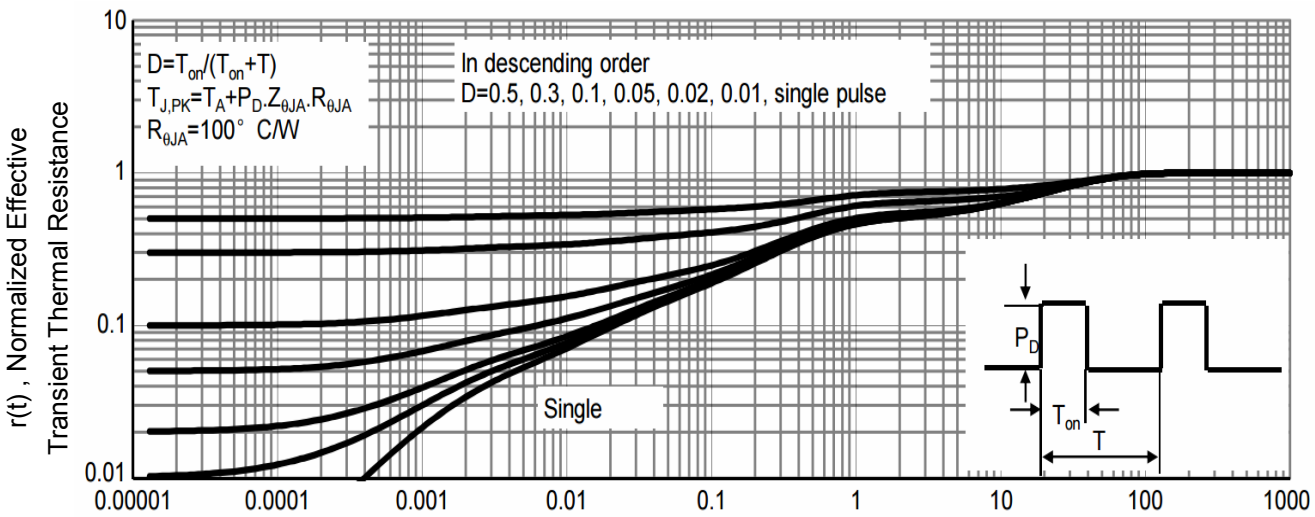


Fig9. Normalized Maximum Transient Thermal Impedance T1, Square

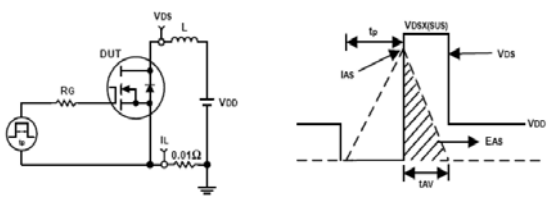


Fig10. Unclamped Inductive Test Circuit and waveforms

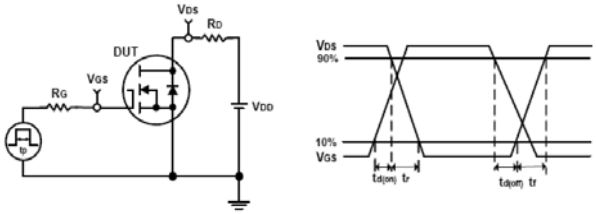
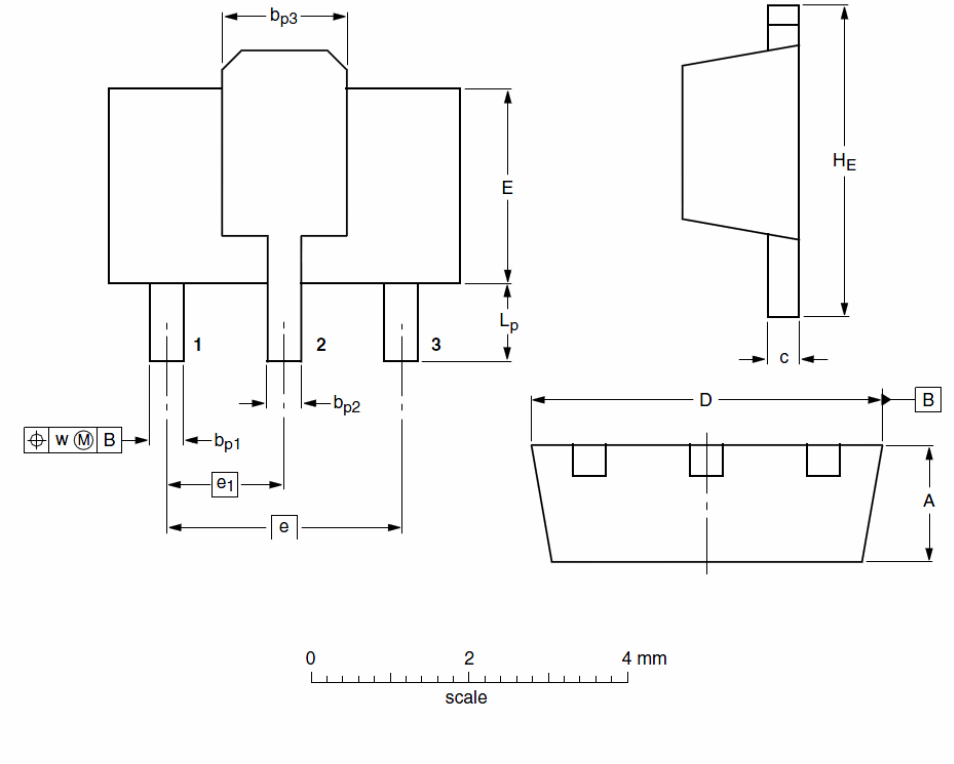


Fig11. Switching Time Test Circuit and waveforms

SOT89 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	1.40	1.50	1.60	**b_{p1}**	0.35	0.43	0.48
b_{p2}	0.40	0.47	0.53	**b_{p3}**	1.40	1.68	1.80
c	0.23	0.35	0.44	**D**	4.40	4.48	4.60
E	2.40	2.51	2.60	**e**	--	3.00	--
e_1	--	1.50	--	**H_e**	3.75	4.08	4.25
L_p	0.80	0.90	1.20	**w**	--	0.13	--

Customer Service

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