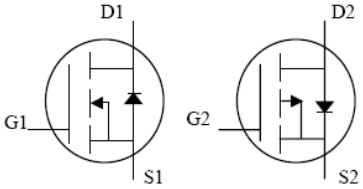
Features

- N+P Channel
- Enhancement mode
- Low on-resistance $R_{DS(on)}$ @ V_{GS}=±4.5 V
- Fast Switching
- Pb-free lead plating; RoHS compliant

V_{DS}	30	-30	V
$R_{DS(on),TYP}$@ V_{GS}=±10 V	15	23	mΩ
$R_{DS(on),TYP}$@ V_{GS}=±4.5V	23	38	mΩ
I_D	10	-8	A

Pb-Free RoHS HF Halogen-Free

SOP8



N-Channel **P-Channel**

Part ID	Package Type	Marking	Tape and reel information
VSO025C03MC	SOP8	025C03MC	3000pcs/Reel

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

Symbol	Parameter		Rating		Unit
			NMOS	PMOS	
$V_{(BR)DSS}$	Drain-Source breakdown voltage		30	-30	V
I_S	Diode continuous forward current	T_A =25°C	1.6	-1.6	A
I_D	Continuous drain current @VGS=±10V	T_A =25°C	10	-8	A
		T_A =100°C	6	-5	A
I_{DM}	Pulse drain current tested ①	T_A =25°C	40	-32	A
EAS	Avalanche energy, single pulsed ②		14	33	mJ
P_D	Maximum power dissipation	T_A =25°C	2	2	W
VGS	Gate-Source voltage		±20	±20	V
MSL			Level 3		
T_{STG} T_J	Storage and operating temperature range		-55 to 150	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JL}$	Thermal Resistance-Junction to Lead	40	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	°C/W

N-Channel 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	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(T_A=25℃)	V_{DS}=30V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_A=125℃)	V_{DS}=30V,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	1.3	1.9	2.4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ③	V_{GS}=10V, I_D=8A	--	15	19	mΩ
		V_{GS}=4.5V, I_D=4A	--	23	29	mΩ
Dynamic Electrical Characteristics @ T_J= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1MHz	350	460	550	pF
C_{oss}	Output Capacitance			75	130	pF
C_{rss}	Reverse Transfer Capacitance			60	110	pF
R_g	Gate Resistance	f=1MHz	--	4.8	--	Ω
Q_g	Total Gate Charge	V_{DS}=15V,I_D=8A, V_{GS}=10V	--	11.3	--	nC
Q_{gs}	Gate Source Charge		--	3	--	nC
Q_{gd}	Gate Drain Charge		--	4.3	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn on Delay Time	V_{DD}=15V, I_D=8A, R_G=3Ω, V_{GS}=10V	--	7	--	nS
t_r	Turn on Rise Time		--	10	--	nS
$t_{d(off)}$	Turn Off Delay Time		-	22	--	nS
t_f	Turn Off Fall Time		--	7	--	nS
Source Drain Diode Characteristics						
V_{SD}	Forward on voltage	I_{SD}=8A,V_{GS}=0V	--	0.9	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=8A, V_{GS}=0V di/dt=500A/μs	--	9.5	--	nS
Q_{rr}	Reverse Recovery Charge		--	11.8	--	nC

NOTE:

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

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH,R_G = 25Ω, I_{AS} = 6A, V_{GS} =10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycle≤ 2%.

P-Channel 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	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(T_A=25℃)	V_{DS}=-30V,V_{GS}=0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(T_A=125℃)	V_{DS}=-30V,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	-1.3	-1.9	-2.4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ③	V_{GS}=-10V, I_D=-8A	--	23	29	mΩ
		V_{GS}=-4.5V, I_D=-4A	--	38	47	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	VDS=-15V,VGS=0V, f=1MHz	760	860	960	pF
C_{oss}	Output Capacitance		60	140	200	pF
C_{rss}	Reverse Transfer Capacitance		30	95	150	pF
R_g	Gate Resistance	f=1MHz	--	10.6	--	Ω
Q_g	Total Gate Charge	VDS=-15V,ID=-8A, VGS=-10V	--	19	--	nC
Q_{gs}	Gate Source Charge		--	4.3	--	nC
Q_{gd}	Gate Drain Charge		--	6.5	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn on Delay Time	VDD=-15V, ID=-8A, RG=3Ω, VGS=-10V	--	6	--	ns
t_r	Turn on Rise Time		--	5	--	ns
$t_{d(off)}$	Turn Off Delay Time		-	25	--	ns
t_f	Turn Off Fall Time		--	7	--	ns
Source Drain Diode Characteristics						
V_{SD}	Forward on voltage	I_{SD}=-8A,V_{GS}=0V	--	-0.9	-1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,Isd=-8A, VGS=0V di/dt=-500A/μs	--	7	--	nS
Q_{rr}	Reverse Recovery Charge		--	6.3	--	nC

NOTE:

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

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = -9A, V_{GS} =-10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycle≤ 2%.

N-Channel Typical Characteristics

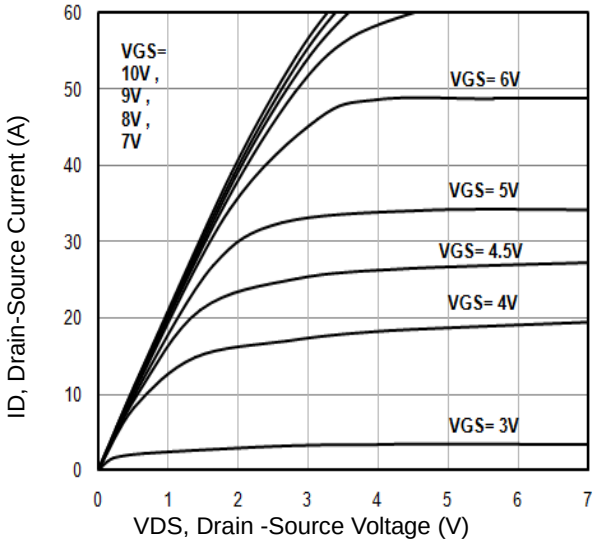


Fig1. Typical Output Characteristics

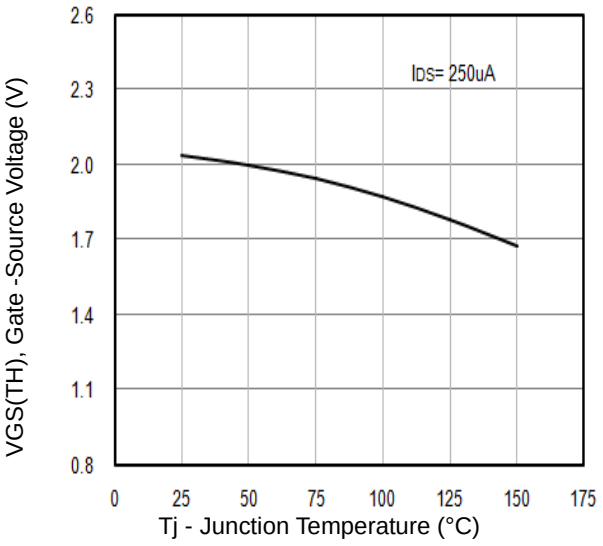


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

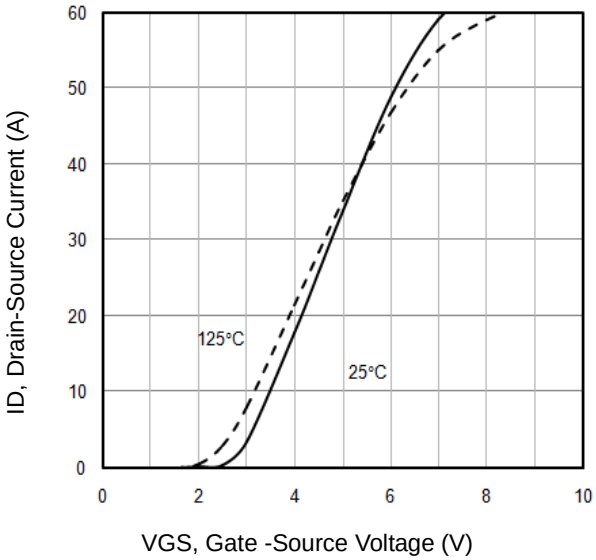


Fig3. Typical Transfer Characteristics

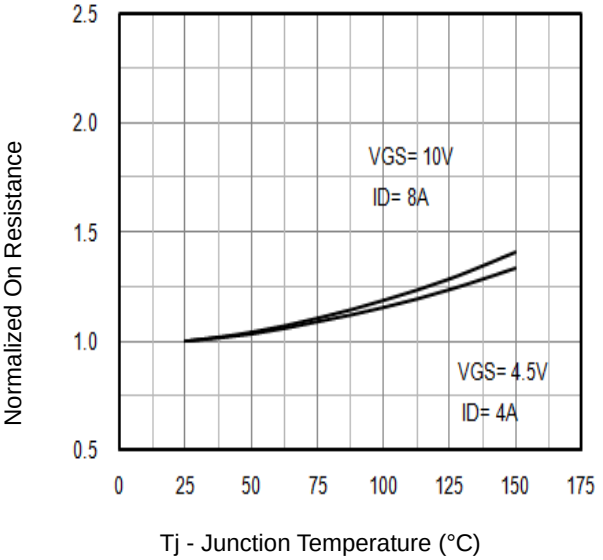


Fig4. Normalized On-Resistance Vs. Tj

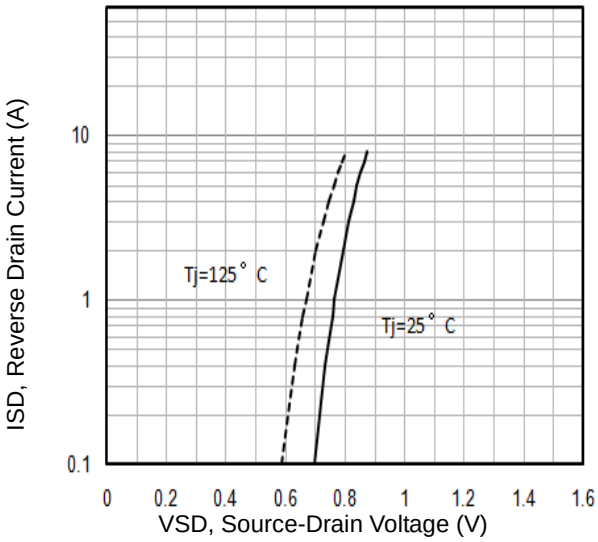


Fig5. Typical Source-Drain Diode Forward Voltage

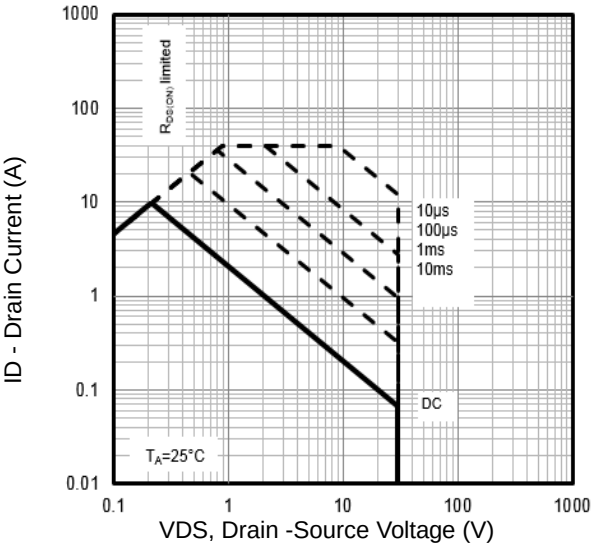


Fig6. Maximum Safe Operating Area

N-Channel Typical Characteristics

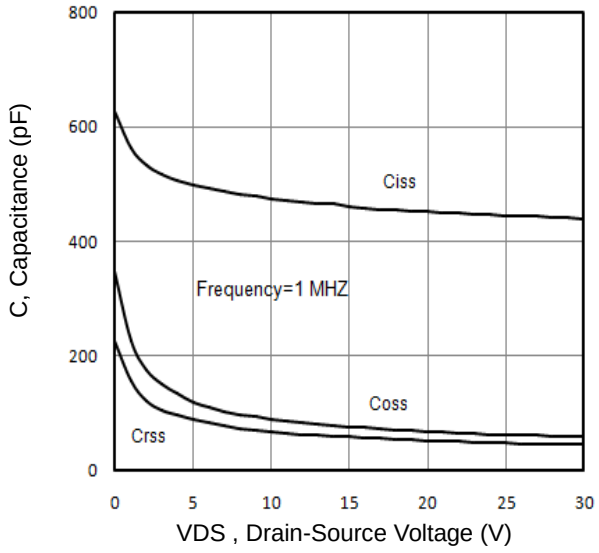


Fig7. Typical Capacitance Vs.Drain-Source Voltage

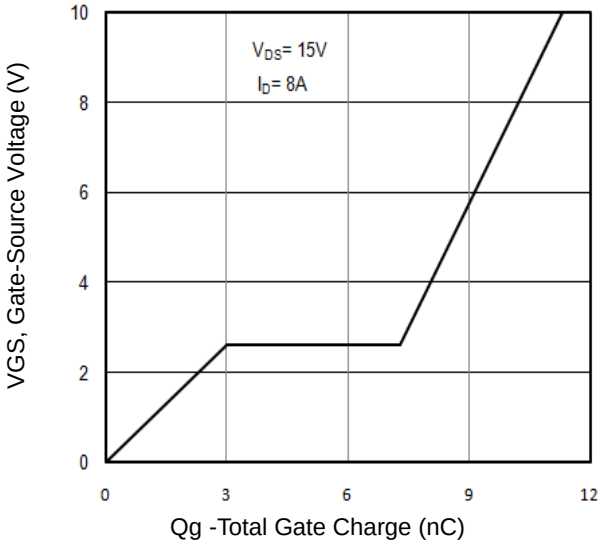


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

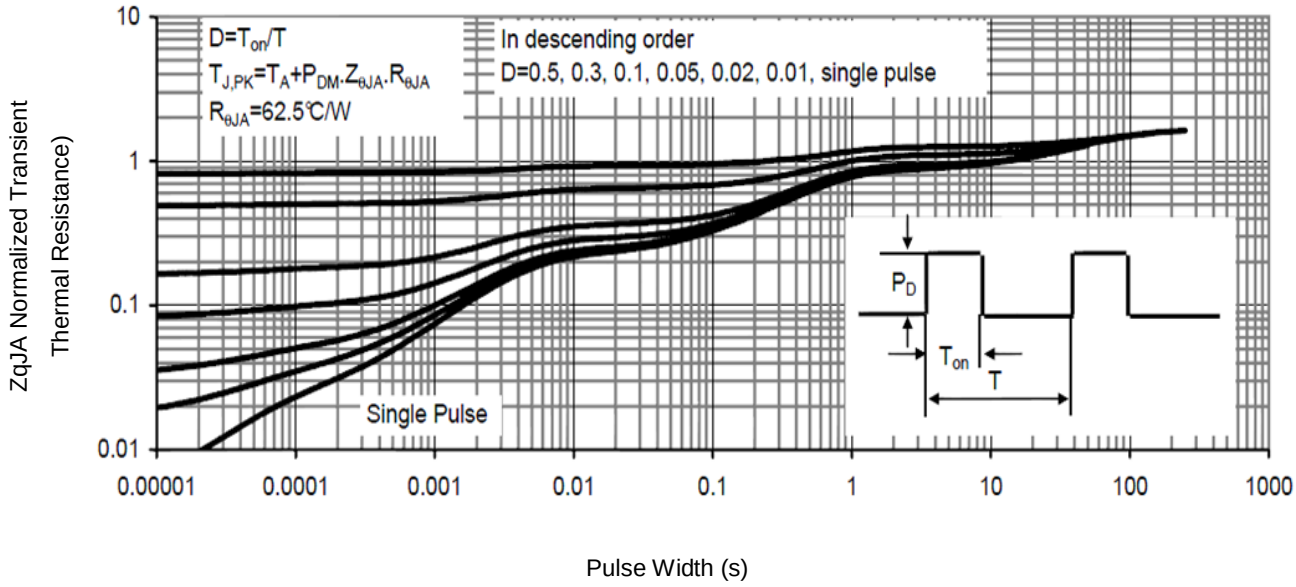


Fig 9 .Normalized Maximum Transient Thermal Impedance

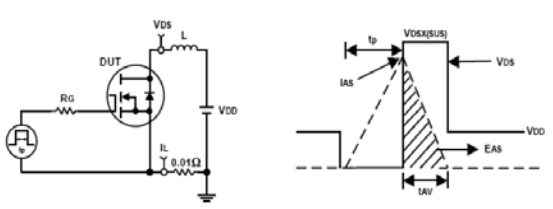


Fig10. Unclamped Inductive Test Circuit and waveforms

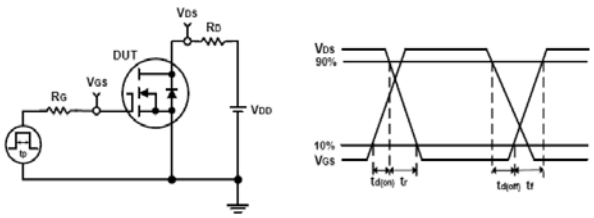


Fig11. Switching Time Test Circuit and waveforms

P-Channel Typical Characteristics

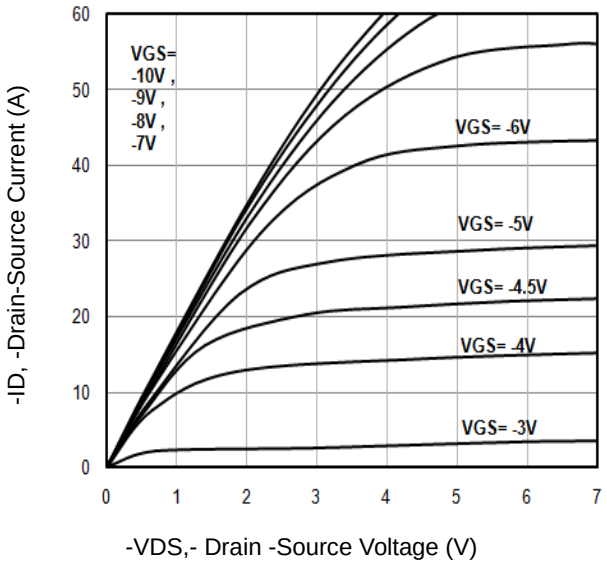


Fig1. Typical Output Characteristics

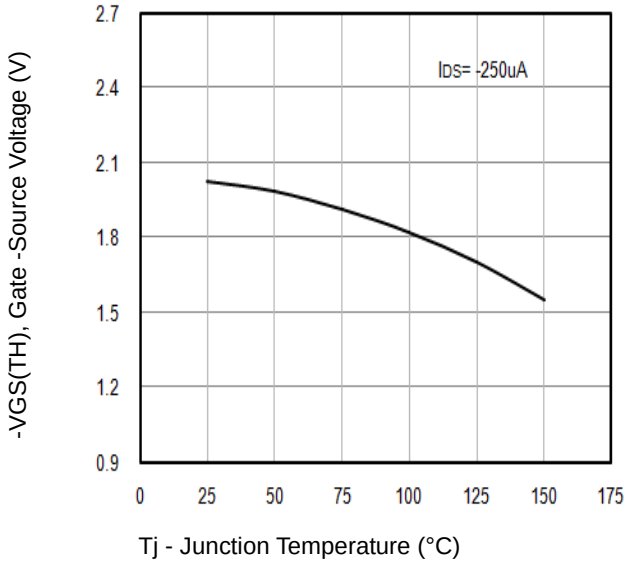


Fig2. $-V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

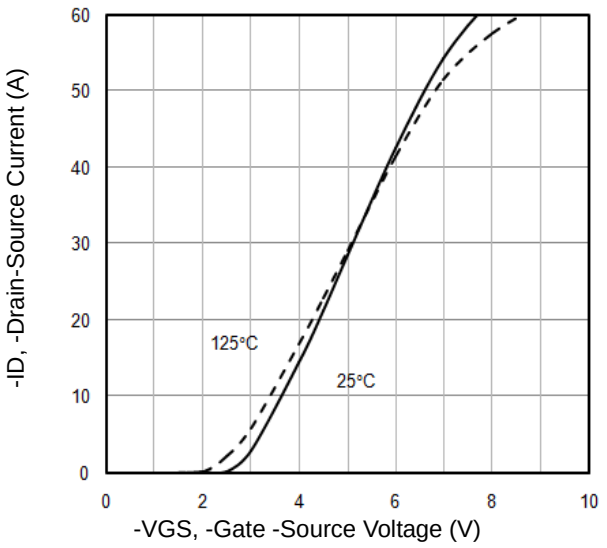


Fig3. Typical Transfer Characteristics

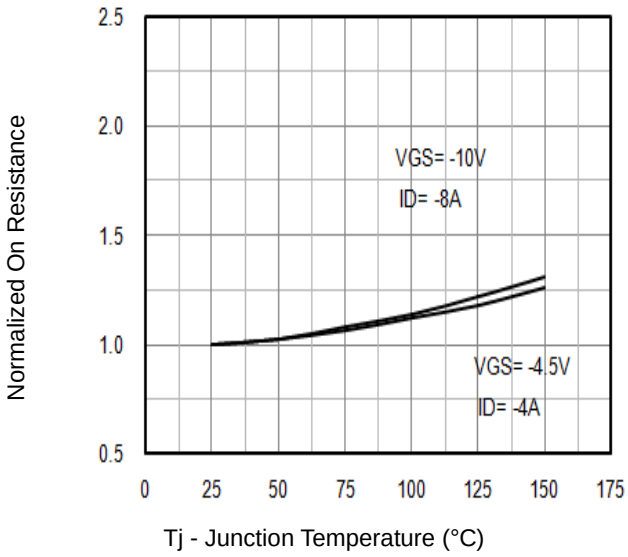


Fig4. Normalized On-Resistance Vs. Tj

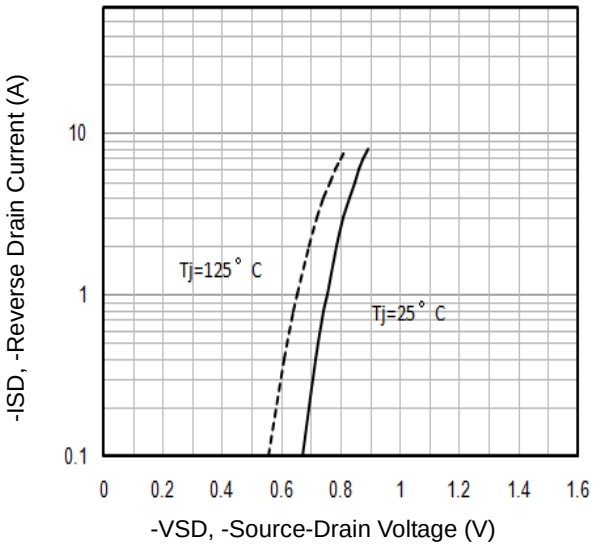


Fig5. Typical Source-Drain Diode Forward Voltage

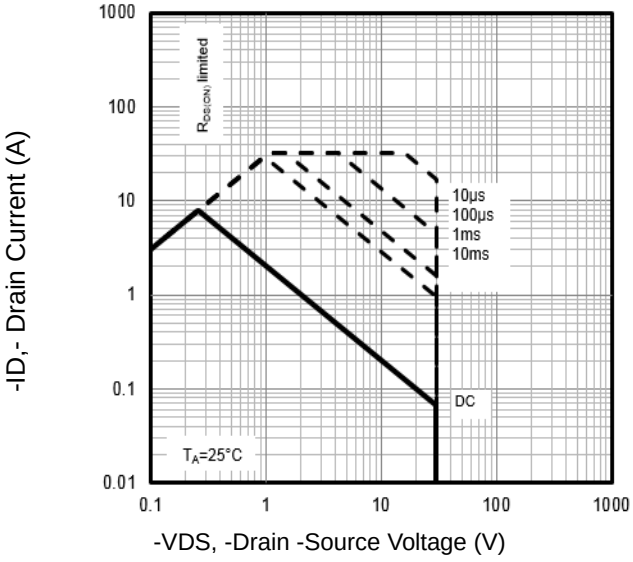


Fig6. Maximum Safe Operating Area

P-Channel Typical Characteristics

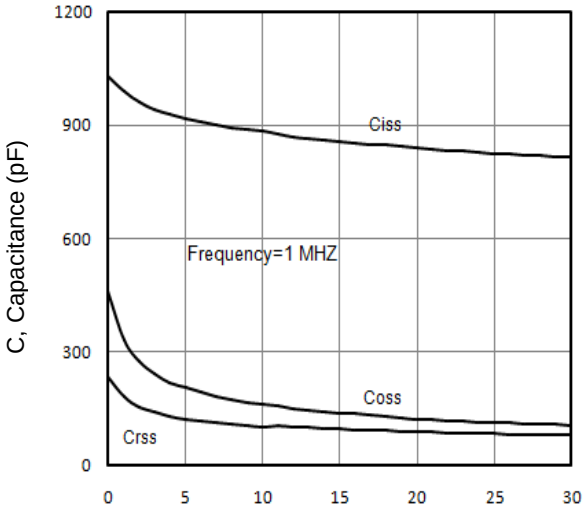


Fig7. Typical Capacitance Vs.Drain-Source Voltage

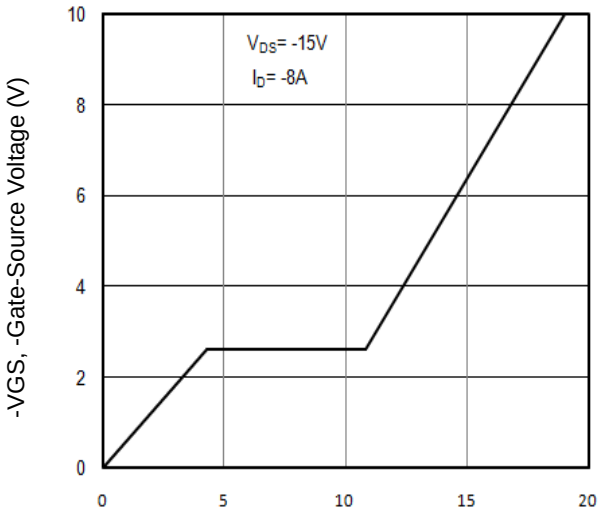


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

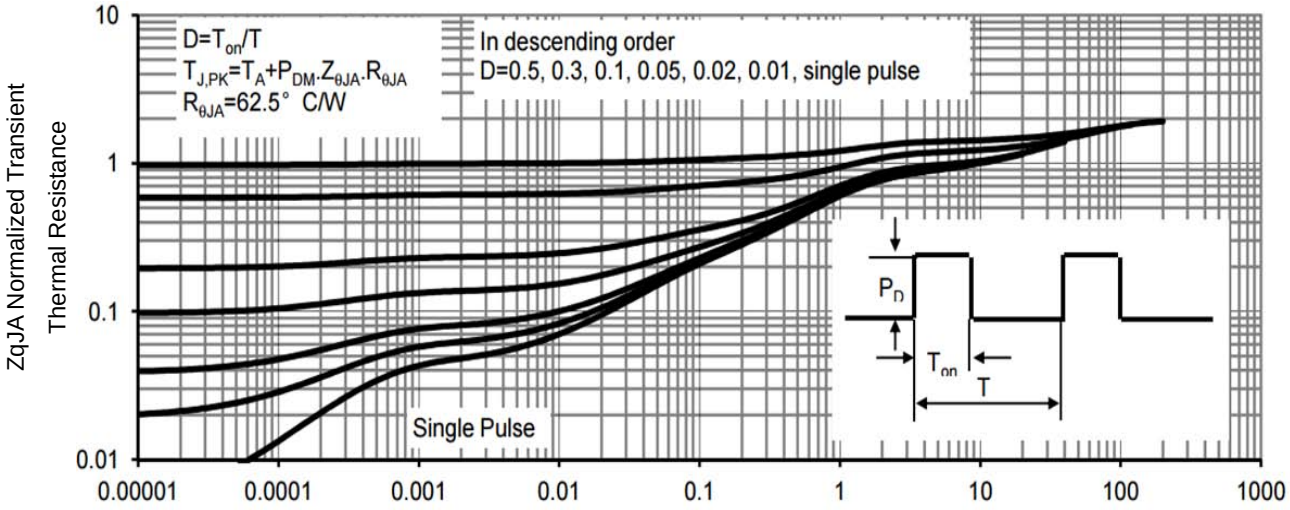


Fig9. Normalized Maximum Transient Thermal Impedance

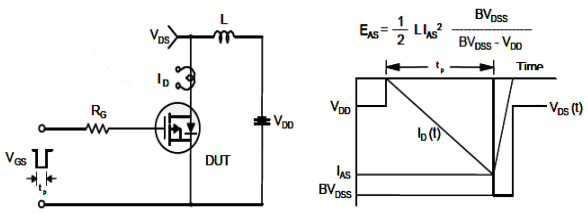


Fig10. Unclamped Inductive Test Circuit and Waveforms

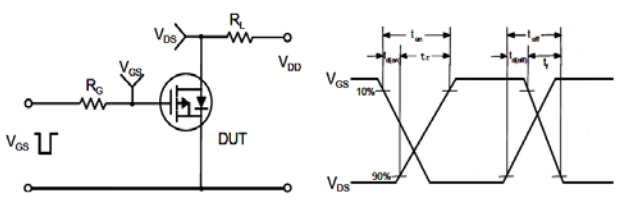
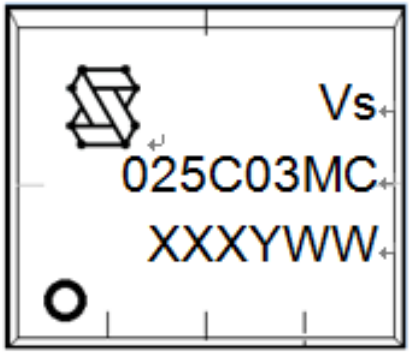


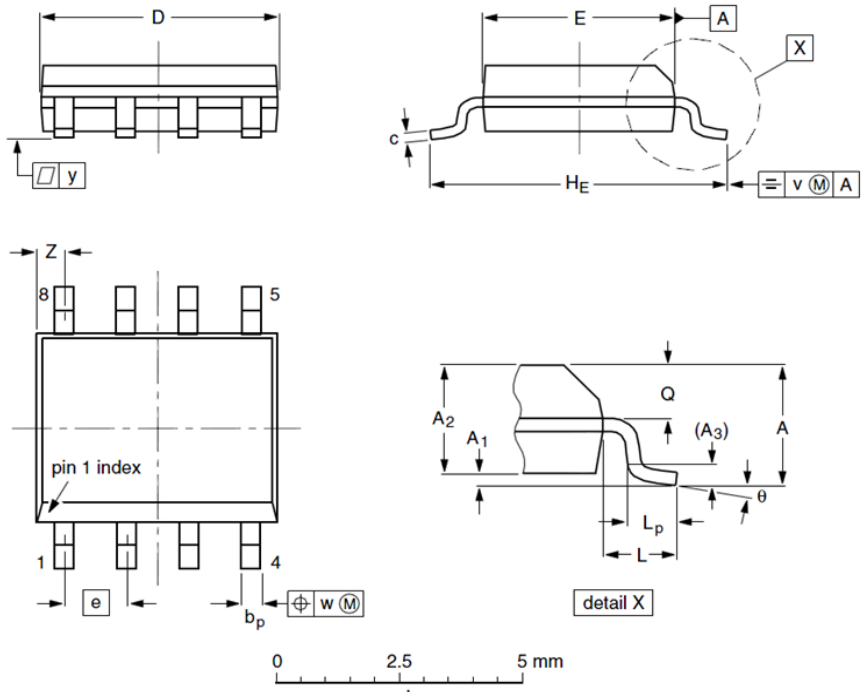
Fig11. Switching Time Test Circuit and waveforms

Marking Information



1st line：Company Code（Vs），Company Logo
2nd line：Part Number（025C03MC）
3rd line：Date code （XXXYWW）
LOT：Wafer Lot Number
Y：Year Code，e.g. E means 2017
WW：Week Code

SOP8 Package Outline Data



Label	Dimensions (unit: mm)		
	Min	Typ	Max
A	--	--	1.75
A_1	0.10	0.18	0.25
A_2	1.25	1.35	1.50
A_3	--	0.25	--
b_p	0.36	0.42	0.51
c	0.19	0.22	0.25
D	4.80	4.92	5.00
E	3.80	3.90	4.00
e	--	1.27	--
H_E	5.80	6.00	6.20
L	--	1.05	--
L_p	0.40	0.68	1.00
Q	0.60	0.65	0.725
v	--	0.25	--
w	--	0.25	--
y	--	0.10	--
Z	0.30	0.50	0.70
θ	0°		8°

Notes:

1. Follow JEDEC MS-012.
2. Dimension "D" does NOT include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15mm per side.
3. Dimension "E" does NOT include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.25mm per side.
4. Dimension "bp" does NOT include dambar protrusion. Allowable dambar protrusion shall be 0.1mm total in excess of "bp" dimension at maximum material condition. The dambar cannot be located on the lower radius of the foot.

Customer Service

Sales and Service:
sales@vgsemi.com
Vanguard Semiconductor CO., LTD
TEL: (86-755) -26902410
FAX: (86-755) -26907027
WEB: www.vgsemi.com