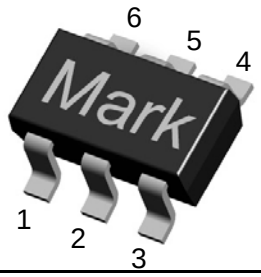
Dual P-Channel Enhancement-Mode MOSFET (-20V, -4.8A)

PRODUCT SUMMARY

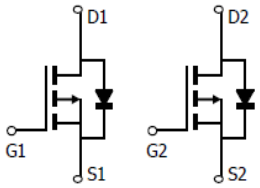
V_{DSS}	I_D	$R_{DS(on)}$ (mΩ)Max
-20V	-4.8A	85 @VGS = -2.5V,ID=-2.0A
		64 @VGS = -4.5V,ID=-4.8A

Features

- Super high dense cell trench design for low RDS(on)
- Advanced Trench Process Technology
- SOT-23-6L package
- Lead（Pb）-free and halogen-free



Pin 1:Gate 1
Pin 2:Soure 2
Pin 3:Gate 2
Pin 4:Drain 2
Pin 5:Source 1
Pin 6:Drain 1



Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current (Continuous)	-4.8	A
I_{DM}	Drain Current (Pulsed) [a]	-18	A
P_D	Total Power Dissipation @T_A=25°C	1.25	W
I_S	Maximum Diode Forward Current	-2	A
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R_{QJA}	Thermal Resistance Junction to Ambient (PCB mounted)[b]	60	°C/W

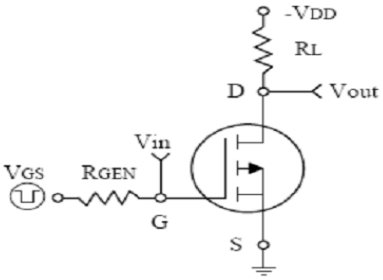
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

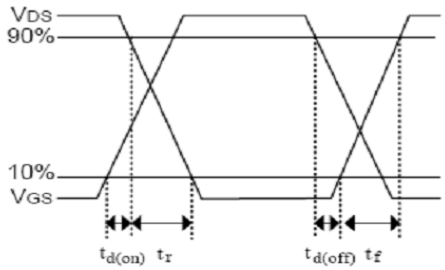
b: 1-in^2 2oz Cu PCB board

Electrical Characteristics (T_A=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-18V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V, V_{DS}=0V	-	-	±100	nA
• On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.4	-0.7	-0.9	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-4.8A	-	-	64	mΩ
		V_{GS}=-2.5V, I_D=-2A	-	-	85	
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-6V, V_{GS}=0V, f=1MHz	-	520	-	PF
C_{oss}	Output Capacitance		-	86	-	
C_{rss}	Reverse Transfer Capacitance		-	63	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-6V, I_D=-2.8A, V_{GS}=-4.5V	-	6.5	-	nC
Q_{gs}	Gate-Source Charge		-	0.39	-	
Q_{gd}	Gate-Drain Charge		-	1.2	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-6V, R_L=6Ω, I_D=1A, VGEN=-4.5V, RG=6Ω	-	9.6	-	nS
t_r	Turn-on Rise Time		-	3.3	-	
$t_{d(off)}$	Turn-off Delay Time		-	32	-	
t_f	Turn-off Fall Time		-	4.8	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=-1A	-	-	-1.2	V

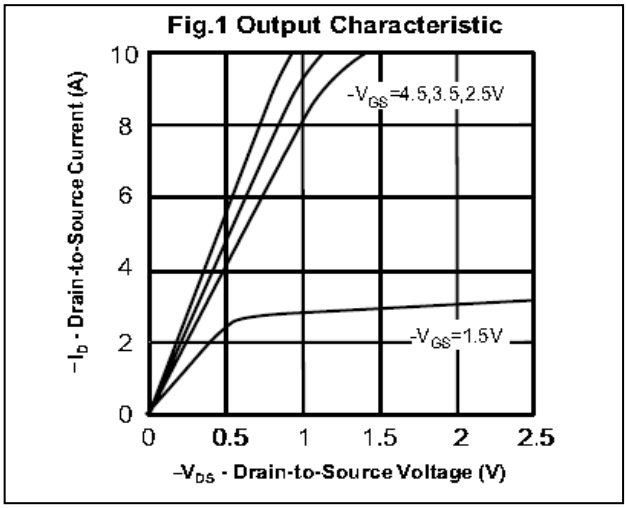
Note: Pulse Test: Pulse Width≤300us, Duty Cycle≤2%

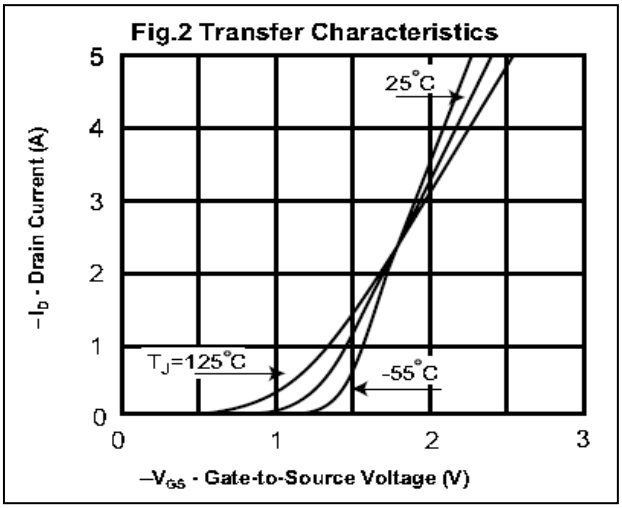


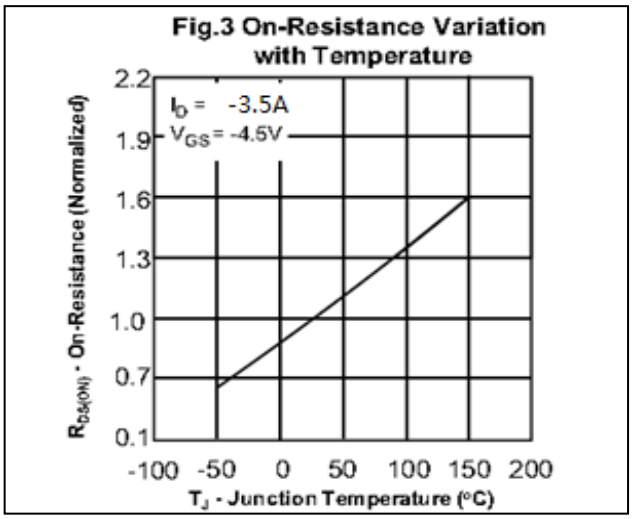


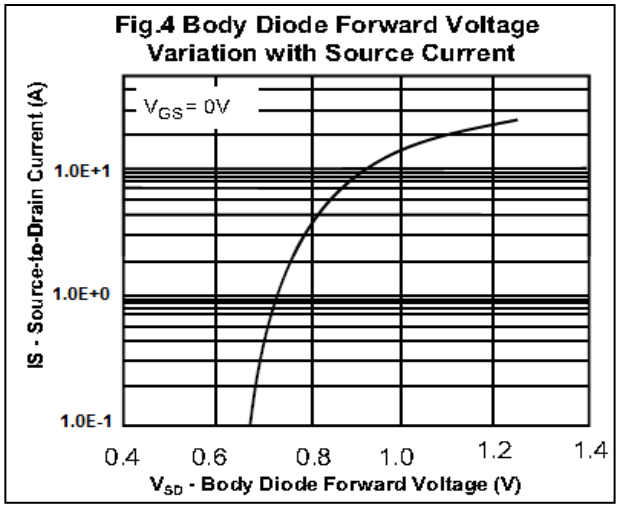
Switching Test Circuit and Swithcing Waveforms

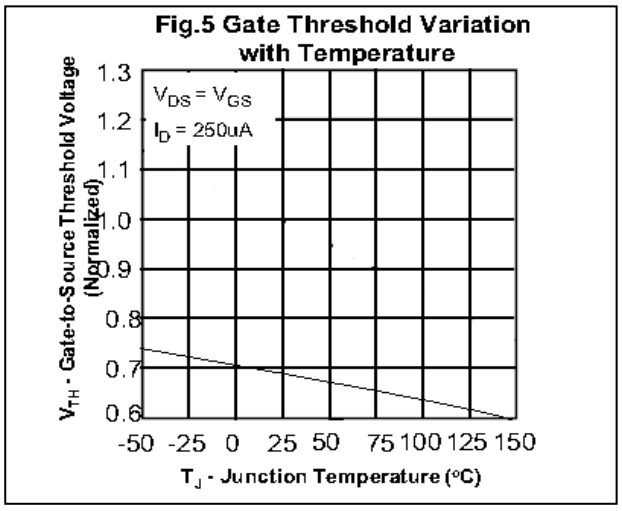
Typical Characteristics Curves (Ta=25°C, unless otherwise note)

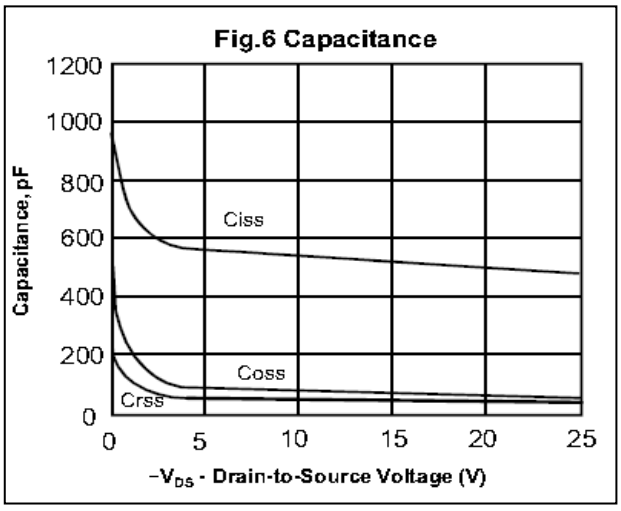












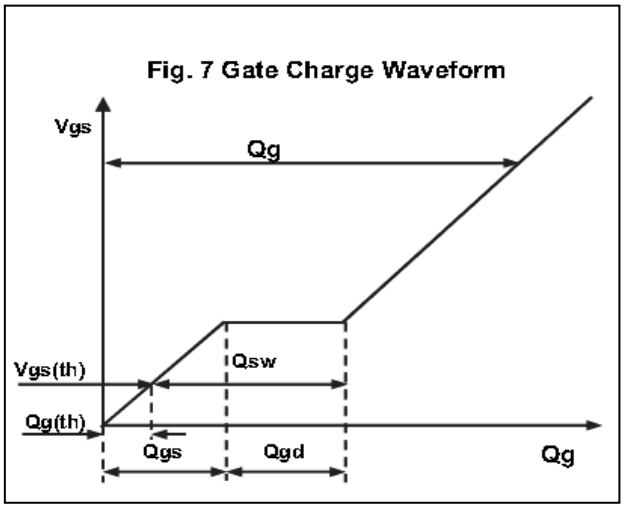


Fig. 7 Gate Charge Waveform
Vgs
Qg
Vgs(th)
Qsw
Qg(th)
Qgs
Qgd
Qg

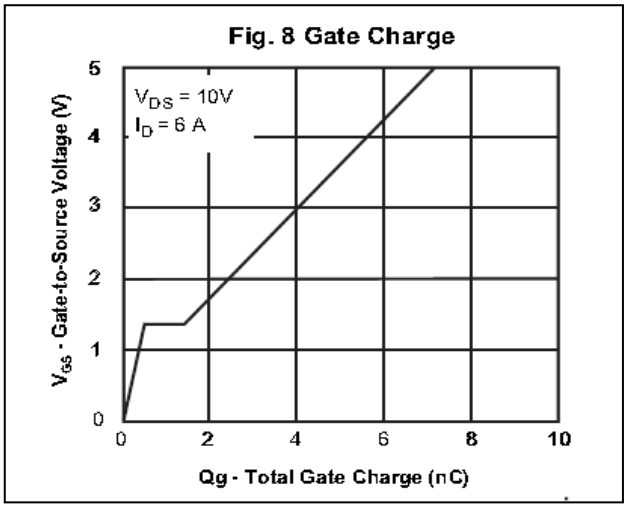


Fig. 8 Gate Charge
VDS = 10V
ID = 6 A
VGS - Gate-to-Source Voltage (V)
Qg - Total Gate Charge (nC)

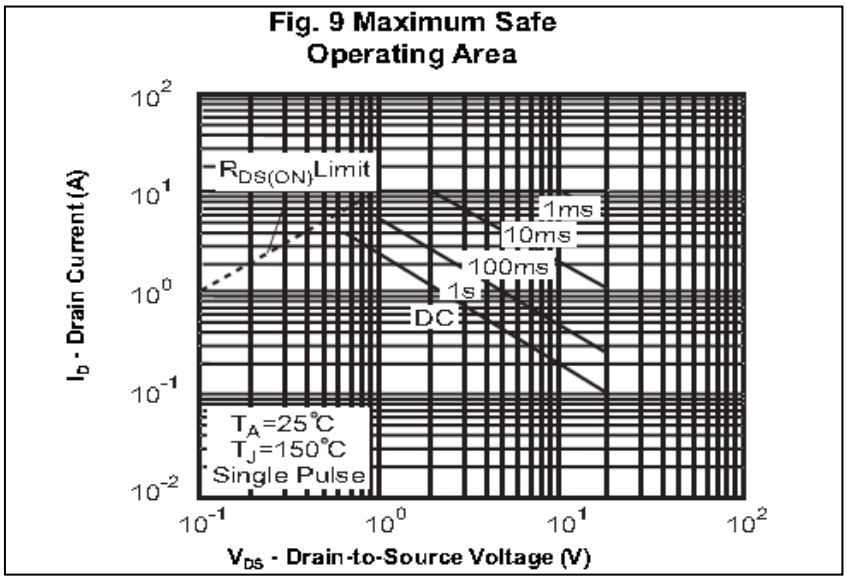


Fig. 9 Maximum Safe Operating Area
RDS(ON)Limit
1ms
10ms
100ms
1s
DC
TA=25°C
TJ=150°C
Single Pulse
ID - Drain Current (A)
VDS - Drain-to-Source Voltage (V)

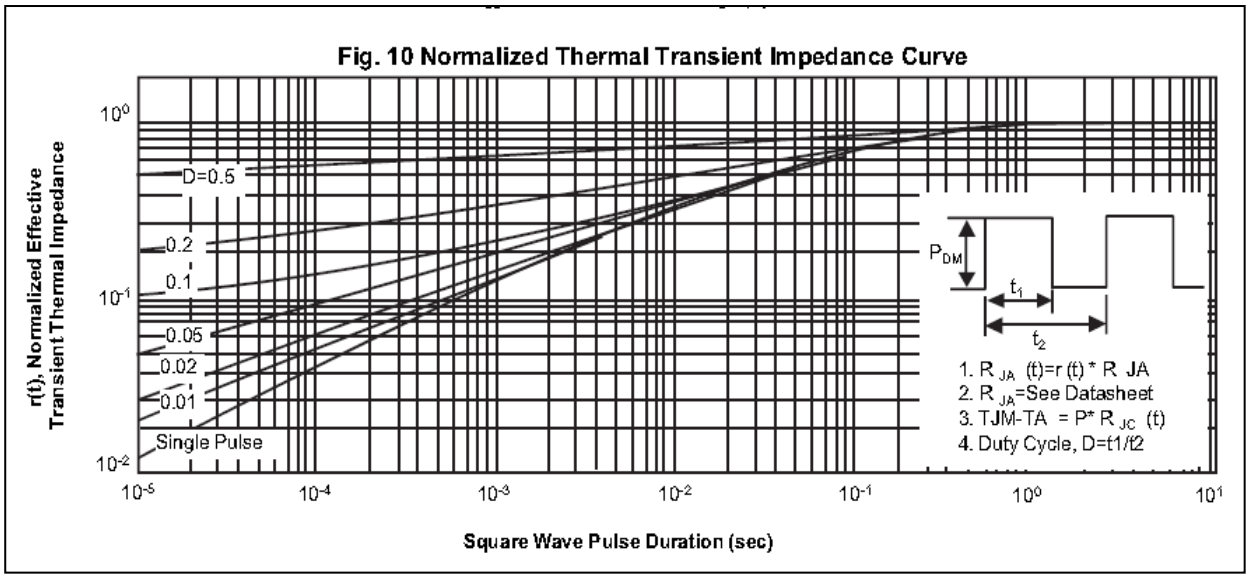
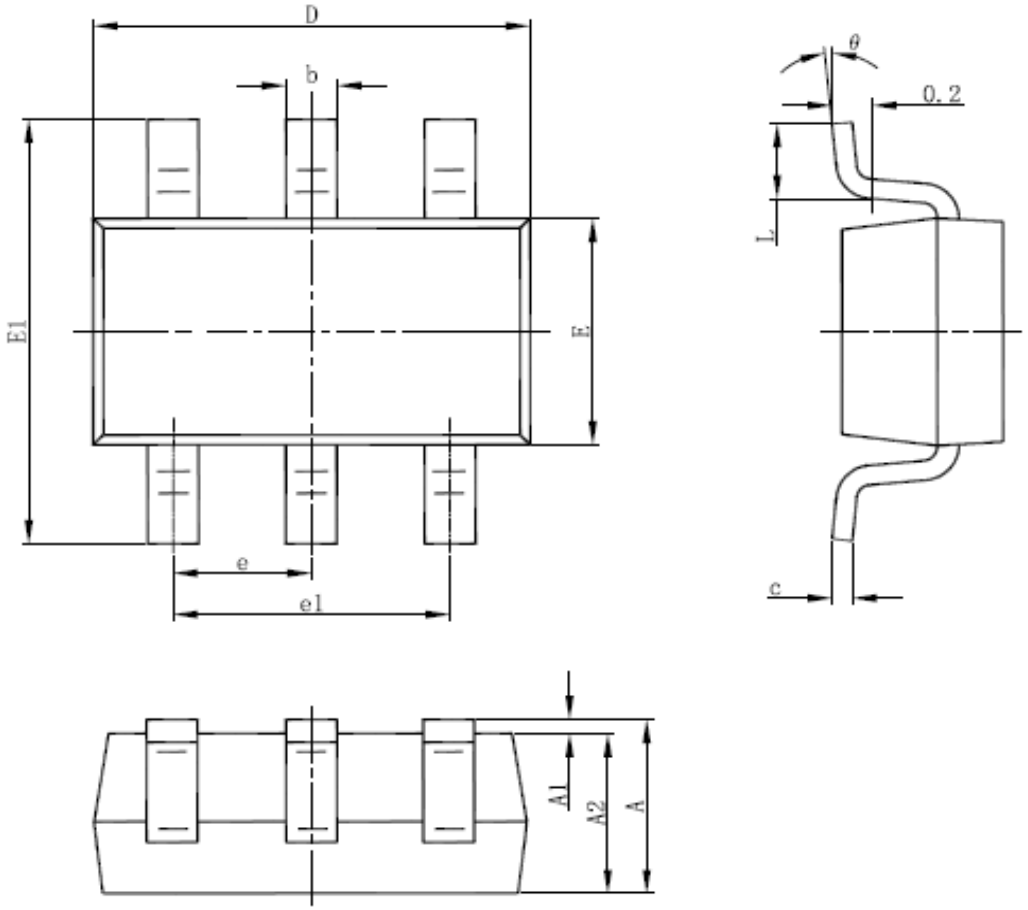


Fig. 10 Normalized Thermal Transient Impedance Curve
D=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
PDM
t1
t2
1. RJA (t)=r (t) * R JA
2. RJA=See Datasheet
3. TJM-TA = P* RJC (t)
4. Duty Cycle, D=t1/t2
r(t), Normalized Effective Transient Thermal Impedance
Square Wave Pulse Duration (sec)

EC4953 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.040	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.95（BSC)		0.037（BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°