

TM04G03MI6

N+P-Channel Enhancement Mode Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

N Channel

$V_{DS} = 30V$, $I_D = 5.6A$

$R_{DS(ON)} = 26m\Omega(Typ.) @ V_{GS} = 10V$

P Channel

$V_{DS} = -30V$, $I_D = -3.9A$

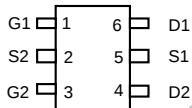
$R_{DS(ON)} = 52m\Omega(Typ.) @ V_{GS} = -10V$

100% UIS Tested

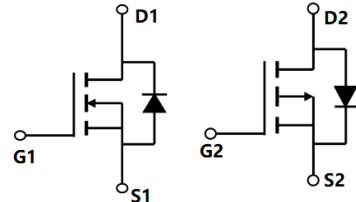
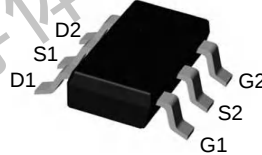
100% R_g Tested



MI6: SOT-23-6L



Marking: 04G03



Absolute Maximum Ratings: ($T_c = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_C = 25^\circ C$	5.6	-3.9	A
	Continuous Drain Current- $T_C = 100^\circ C$	3.6	-2.6	
I_{DM}	300 μs Pulsed Drain Current	21	-15	A
P_D	Power Dissipation	1.4	1.4	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	---	85	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	50	$^\circ C/W$

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N-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	N Channel			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	μA	
		T _J =85°C	-	-	30		
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.5	2.5	3.5	V	
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA	
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} =10V, I _{DS} =4.9A	-	26	35	mΩ	
		V _{GS} =4.5V, I _{DS} =3A	-	38	58		
Diode Characteristics							
V _{SD} ^a	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.75	1.1	V	
t _{rr}	Reverse Recovery Time	I _{SD} =4.9A, dI _{SD} /dt=100A/μs	-	9.2	-	ns	
Q _{rr}	Reverse Recovery Charge		-	4.3	-	nC	
Dynamic Characteristics ^b							
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2.3	-	Ω	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	215	-	pF	
C _{oss}	Output Capacitance		-	37	-		
C _{rss}	Reverse Transfer Capacitance		-	28	-		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	5.3	8	ns	
T _r	Turn-on Rise Time		-	11	16		
t _{d(OFF)}	Turn-off Delay Time		-	12	17		
T _f	Turn-off Fall Time		-	2.6	4		
Gate Charge Characteristics ^b							
Q _g	Total Gate Charge	V _{DS} =15V, I _{DS} =4.9A	V _{GS} =4.5V,	-	3	-	nC
			V _{GS} =10V	-	5.8	-	
Q _{gs}	Gate-Source Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =4.9A	-	1.1	-		
Q _{gd}	Gate-Drain Charge		-	1.5	-		
Q _{gth}	Threshold Gate Charge		-	0.5	-		

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P-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

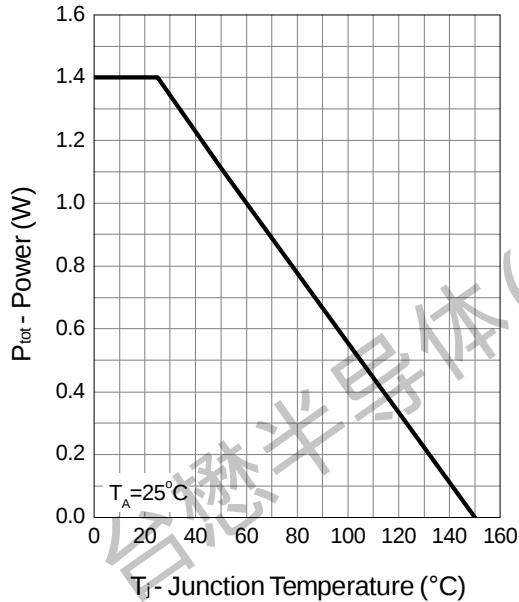
Symbol	Parameter	Test Conditions	P Channel			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-30	-	-	V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V T _J =85°C	-	-	-1	μA	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1.5	-2.5	-3.5	V	
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA	
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} =-10V, I _{DS} =-3A V _{GS} =-4.5V, I _{DS} =-1.9A	-	52 65	62 88	mΩ	
Diode Characteristics							
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1.1	V	
t _{rr}	Reverse Recovery Time	I _{SD} =-3A, dI _{SD} /dt=100A/μs	-	19	-	ns	
Q _{rr}	Reverse Recovery Charge		-	14	-	nC	
Dynamic Characteristics ^b							
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	7	-	Ω	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	-	229	-	pF	
C _{oss}	Output Capacitance		-	42	-		
C _{rss}	Reverse Transfer Capacitance		-	33	-		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, R _L =15Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	7.2	-	ns	
T _r	Turn-on Rise Time		-	9.3	-		
t _{d(OFF)}	Turn-off Delay Time		-	15.4	-		
T _f	Turn-off Fall Time		-	3.6	-		
Gate Charge Characteristics ^b							
Q _g	Total Gate Charge	V _{DS} =-15V, I _{DS} =-3A	V _{GS} =-4.5V, V _{GS} =-10V	- -	3.3 6.5	- -	nC
Q _{gs}	Gate-Source Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-3A	-	1.1	-		
Q _{gd}	Gate-Drain Charge		-	1.1	-		
Q _{gth}	Threshold Gate Charge		-	0.6	-		

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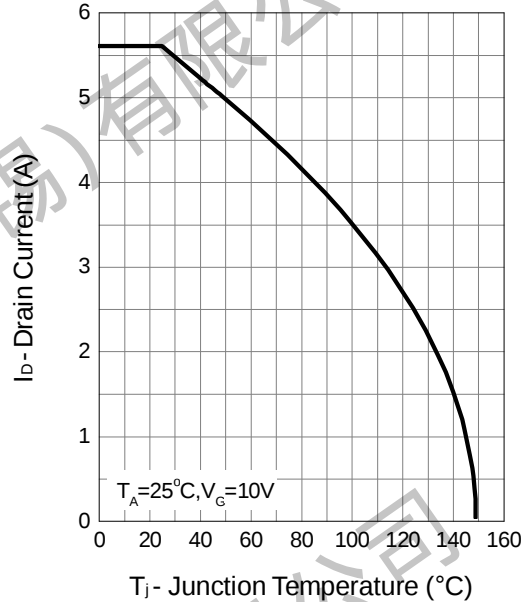
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N-Channel Typical Characteristics

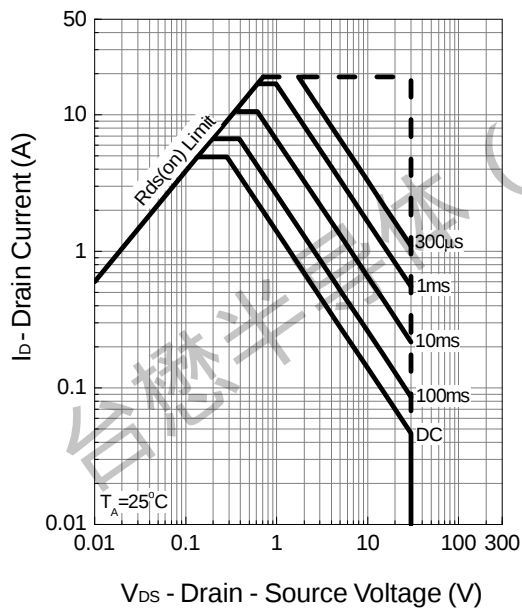
Power Dissipation



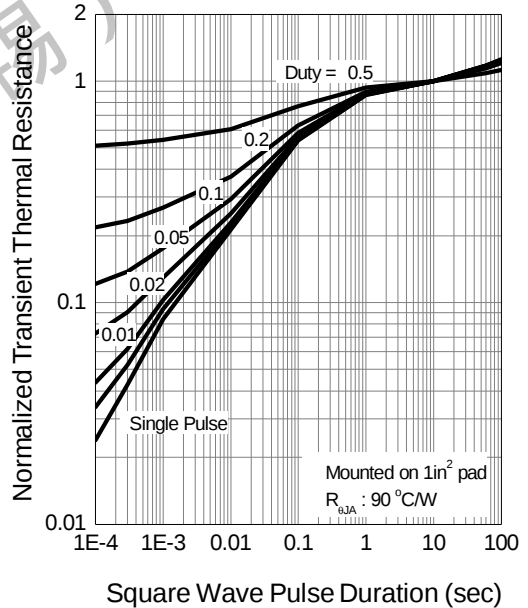
Drain Current



Safe Operation Area



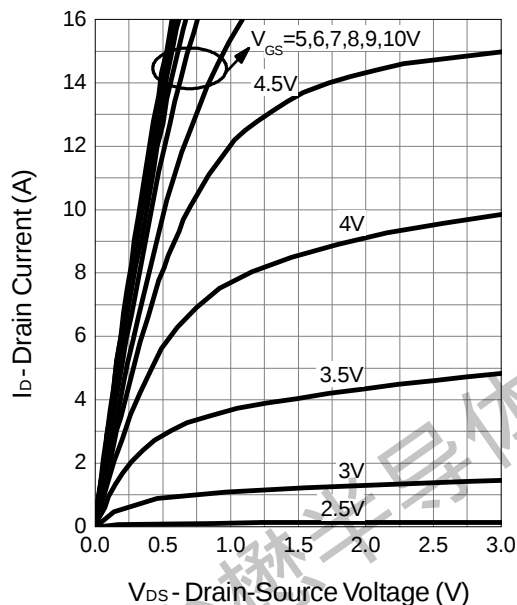
Thermal Transient Impedance



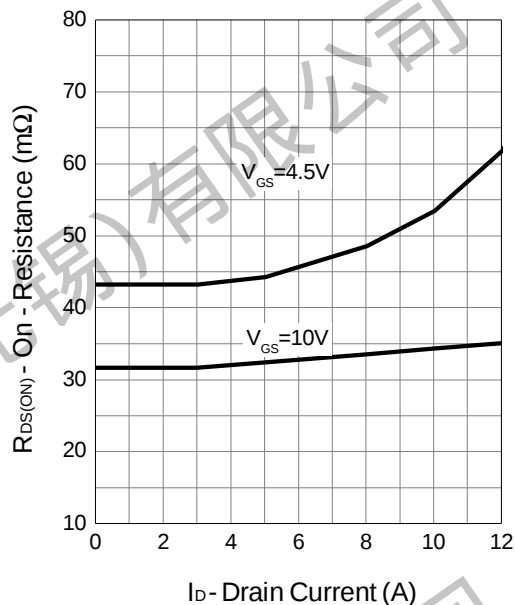
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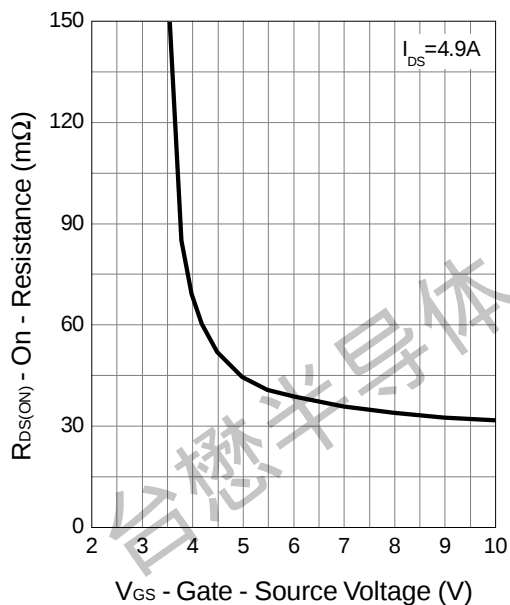
Output Characteristics



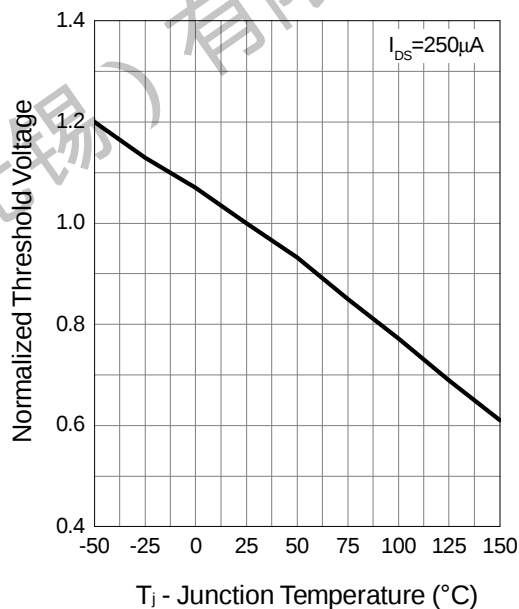
Drain-Source On Resistance



Gate-Source On Resistance



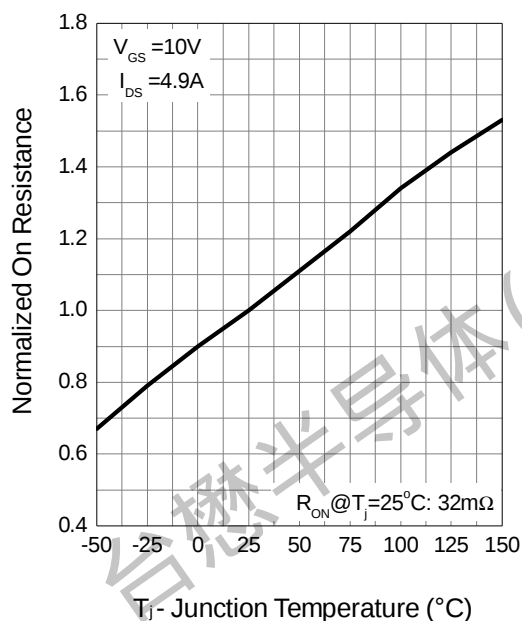
Gate Threshold Voltage



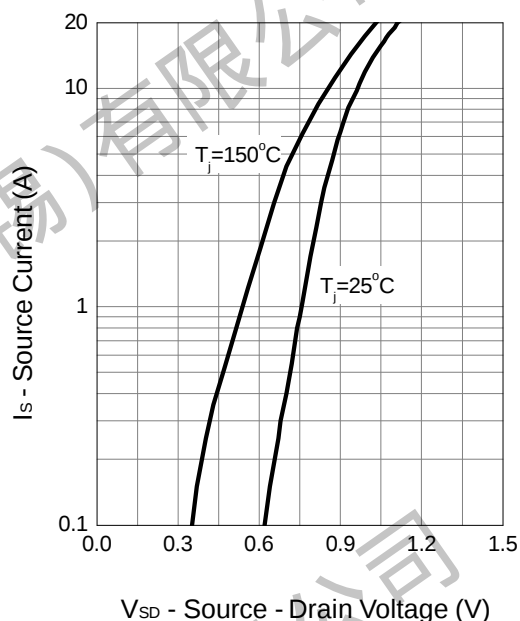
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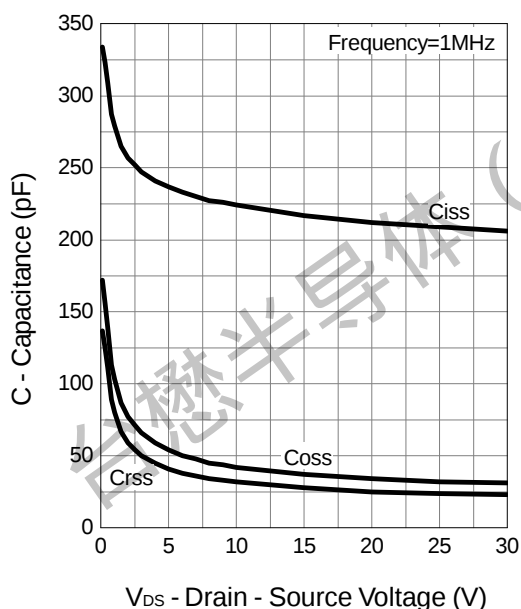
Drain-Source On Resistance



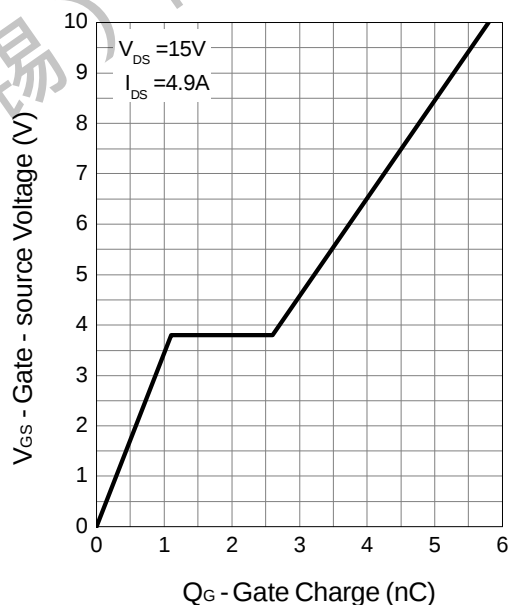
Source-Drain Diode Forward



Capacitance



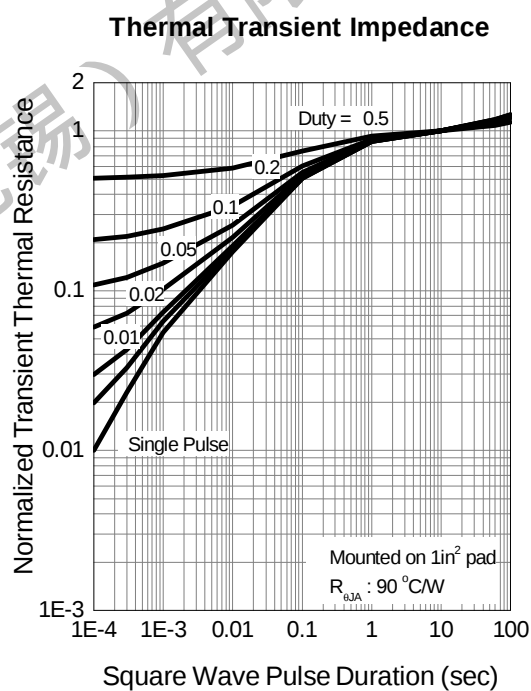
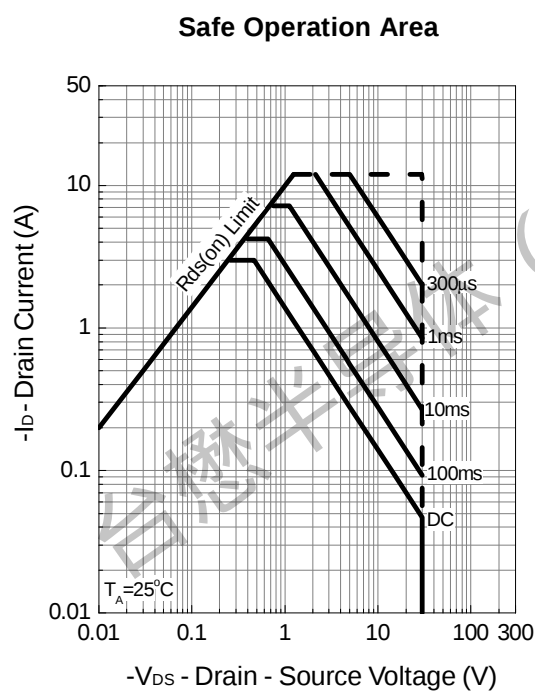
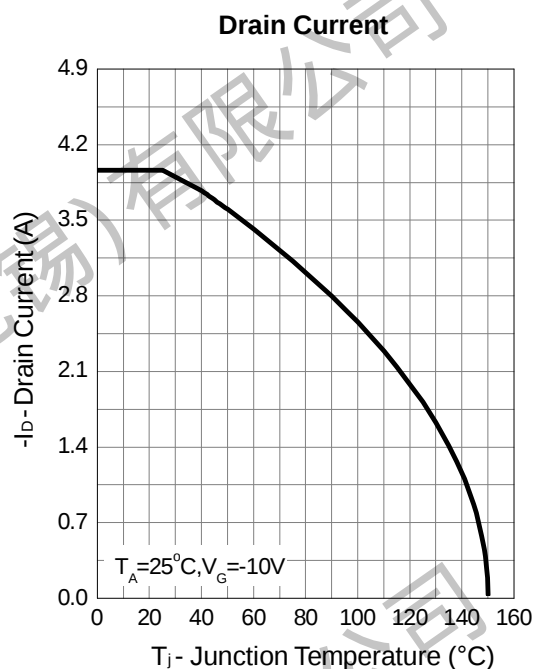
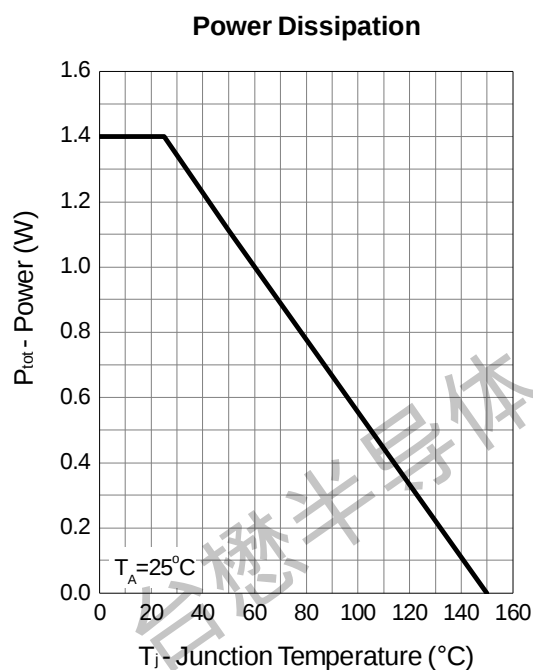
Gate Charge



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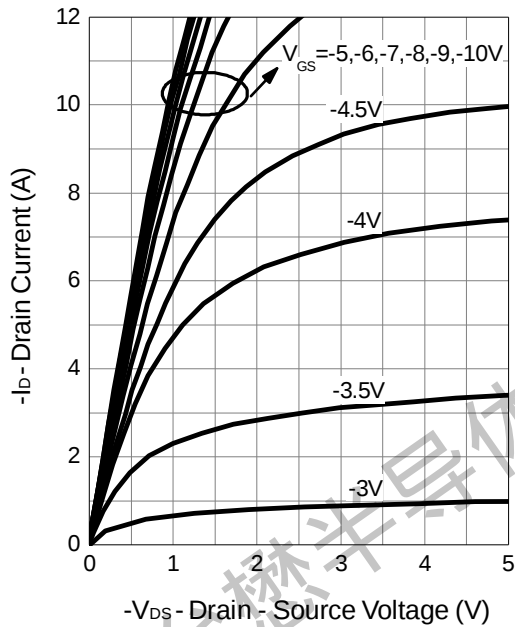
P-Typical Characteristics



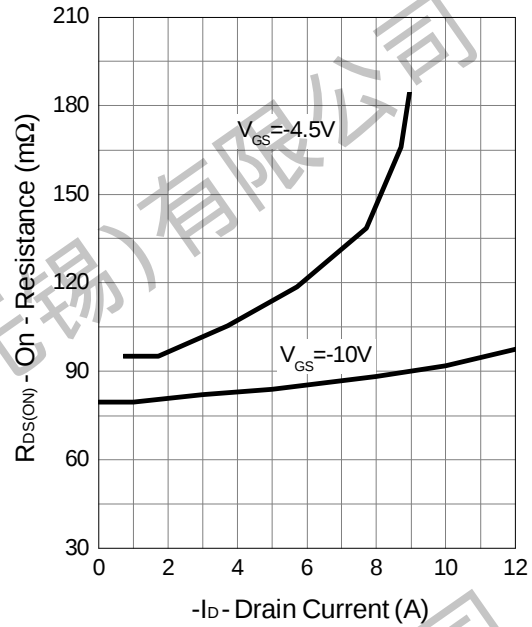
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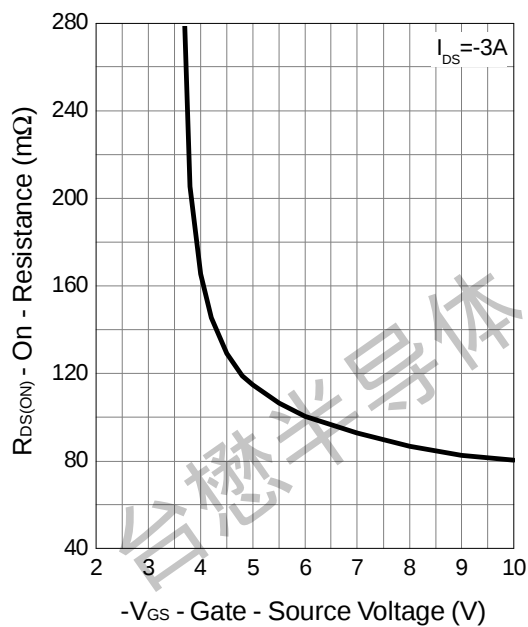
Output Characteristics



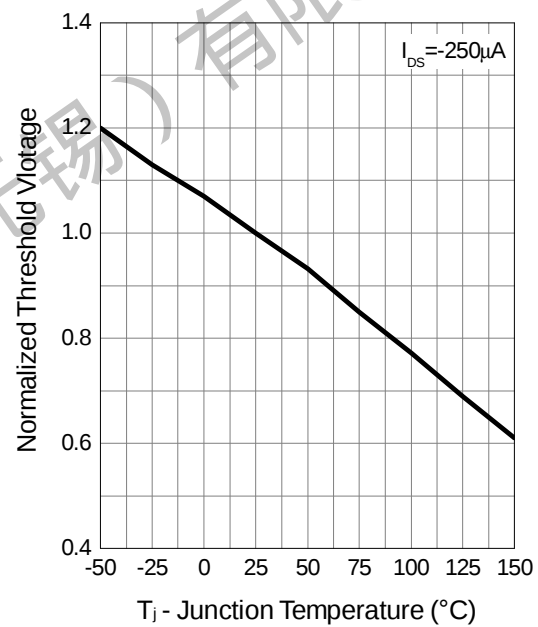
Drain-Source On Resistance



Gate-Source On Resistance



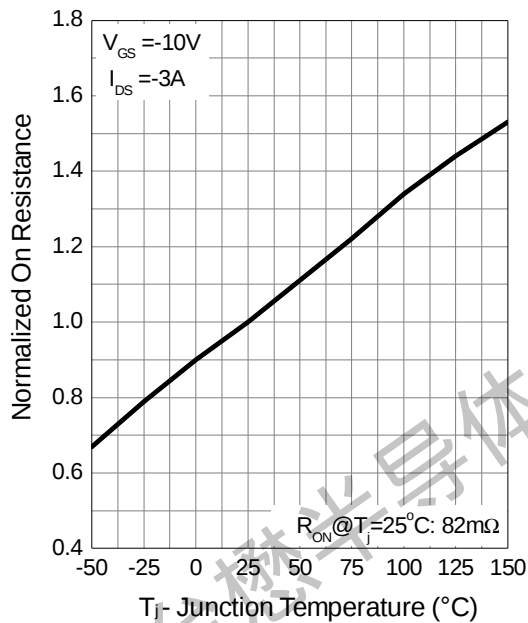
Gate Threshold Voltage



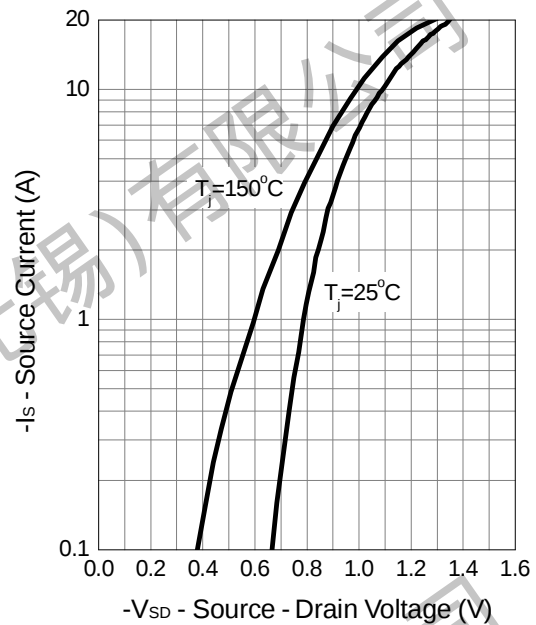
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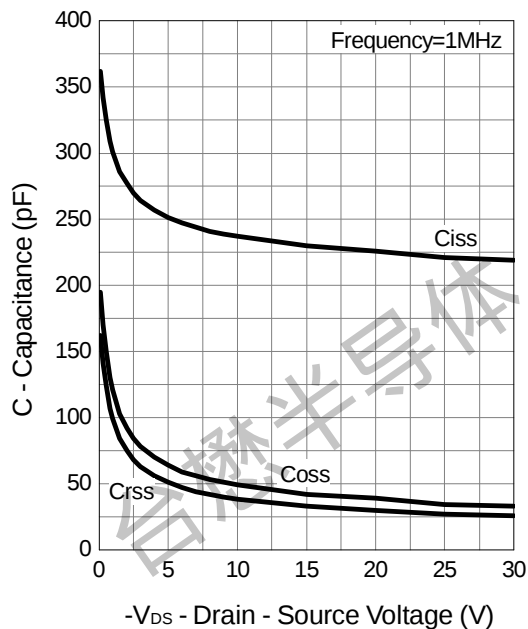
Drain-Source On Resistance



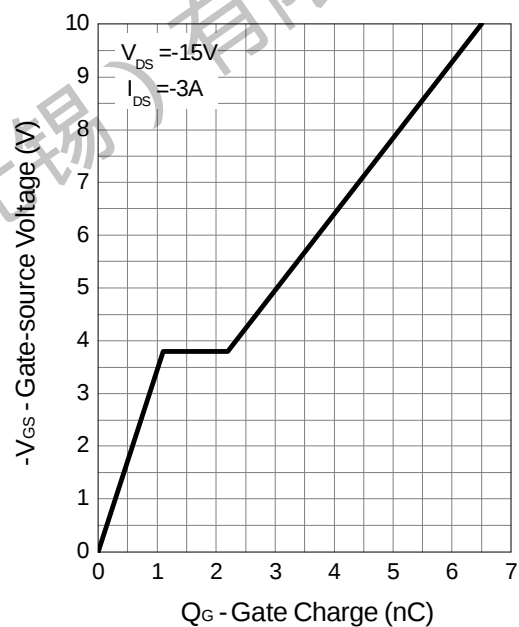
Source-Drain Diode Forward



Capacitance



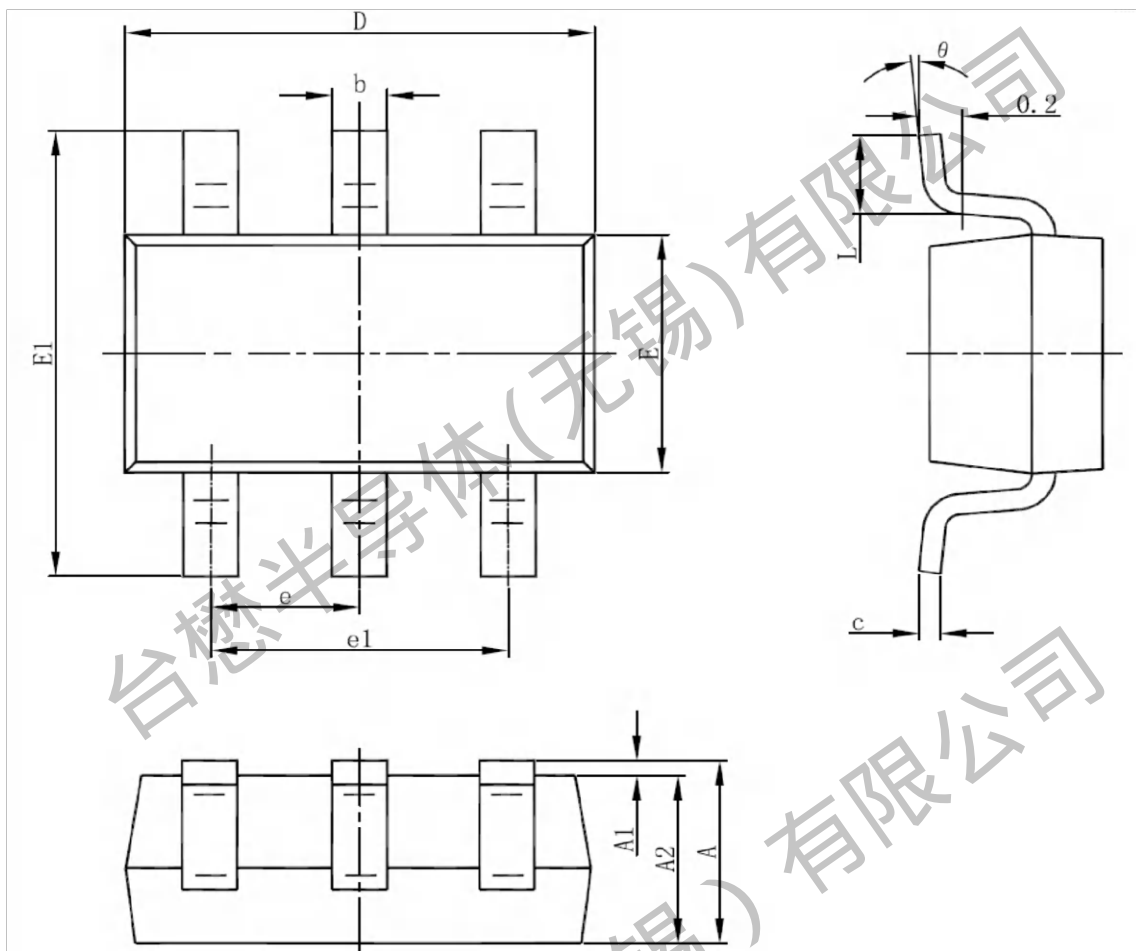
Gate Charge



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Package Mechanical Data:SOT-23-6L

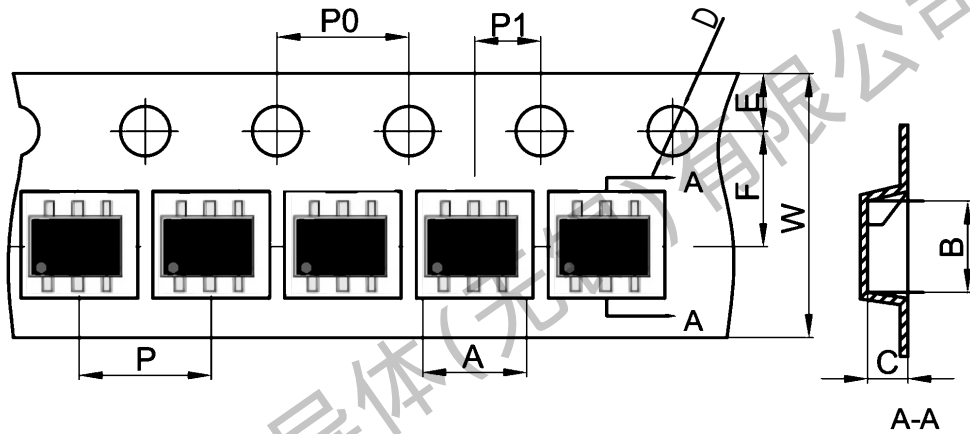


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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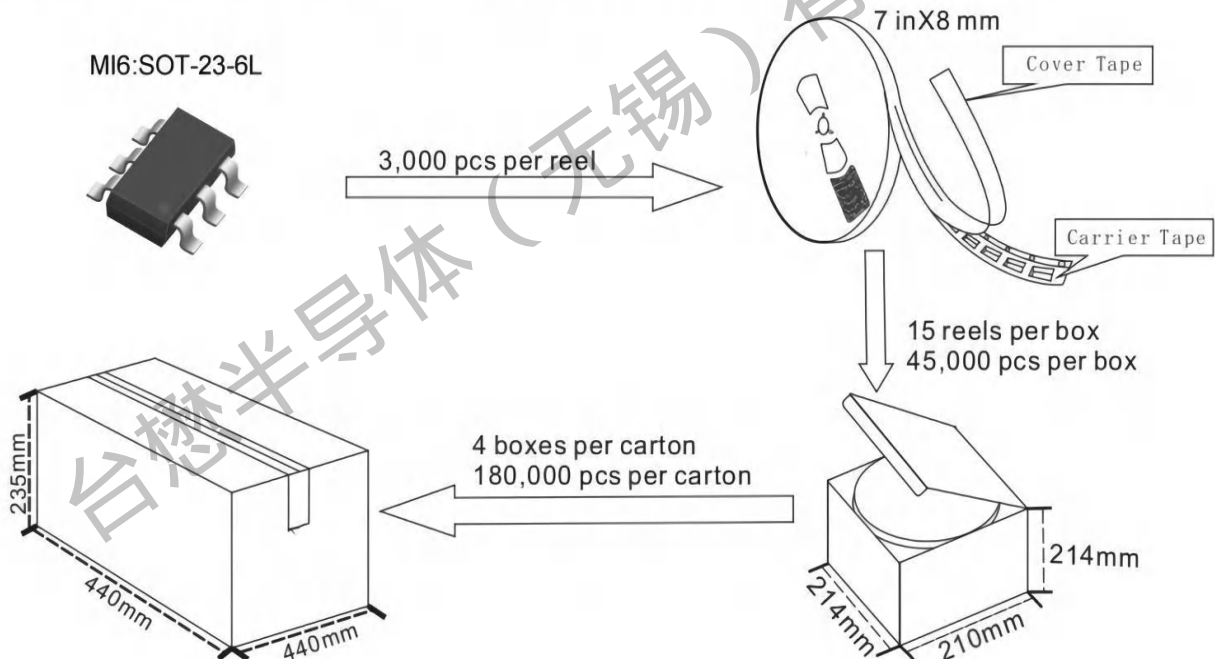
SOT-23-6L Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23-6L	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-6L Packing

The method of packaging and dimension are shown as below figure. (Dimension in mm)



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Revision history:

Date	Rev	Description	Page
2023.06.22	23.06	Original	