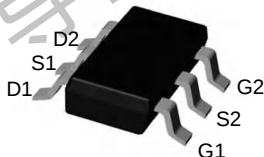


TM07G02MI6

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 $V_{DS} = 20V, I_D = 7.5A$ $R_{DS(ON)} = 15m\Omega (typ.) @ V_{GS} = 4.5V$ P Channel $V_{DS} = -20V, I_D = -6.8A$ $R_{DS(ON)} = 22m\Omega (typ.) @ V_{GS} = -4.5V$ 100% UIS Tested 100% R_g Tested 																																																														
MI6:SOT-23-6L G1 1 6 D1 S2 2 5 S1 G2 3 4 D2 Marking:4604A  G1 S1 D1 D1 S1 D2 G2 S2 G1 S2 G1 S1 D2 S1 D1																																																															
Absolute Maximum Ratings ($T_A = 25^{\circ}C$ unless otherwise noted) <table><tr><th rowspan="2">Symbol</th><th rowspan="2">Parameter</th><th colspan="2">Rating</th><th rowspan="2">Units</th></tr><tr><th>N-Channel</th><th>P-Channel</th></tr><tr><td>V_{DS}</td><td>Drain-Source Voltage</td><td>20</td><td>-20</td><td>V</td></tr><tr><td>V_{GS}</td><td>Gate-Source Voltage</td><td>± 12</td><td>± 12</td><td>V</td></tr><tr><td>$I_D @ T_A = 25^{\circ}C$</td><td>Continuous Drain Current, $V_{GS} @ 4.5V$</td><td>7.5</td><td>-6.8</td><td>A</td></tr><tr><td>$I_D @ T_A = 100^{\circ}C$</td><td>Continuous Drain Current, $V_{GS} @ 4.5V$</td><td>4.6</td><td>-3.5</td><td>A</td></tr><tr><td>I_{DM}</td><td>Pulsed Drain Current</td><td>29</td><td>-20</td><td>A</td></tr><tr><td>$P_D @ T_A = 25^{\circ}C$</td><td>Total Power Dissipation</td><td>1.5</td><td>1.5</td><td>W</td></tr><tr><td>T_{STG}</td><td>Storage Temperature Range</td><td>-55 to 175</td><td>-55 to 175</td><td>$^{\circ}C$</td></tr><tr><td>T_J</td><td>Operating Junction Temperature Range</td><td>-55 to 175</td><td>-55 to 175</td><td>$^{\circ}C$</td></tr></table> Thermal Data <table><tr><th>Symbol</th><th>Parameter</th><th>Typ.</th><th>Max.</th><th>Unit</th></tr><tr><td>$R_{\theta JA}$</td><td>Thermal Resistance Junction-Ambient</td><td>---</td><td>83</td><td>$^{\circ}C/W$</td></tr><tr><td>$R_{\theta JC}$</td><td>Thermal Resistance Junction-Case</td><td>---</td><td>---</td><td>$^{\circ}C/W$</td></tr></table>		Symbol	Parameter	Rating		Units	N-Channel	P-Channel	V_{DS}	Drain-Source Voltage	20	-20	V	V_{GS}	Gate-Source Voltage	± 12	± 12	V	$I_D @ T_A = 25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 4.5V$	7.5	-6.8	A	$I_D @ T_A = 100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 4.5V$	4.6	-3.5	A	I_{DM}	Pulsed Drain Current	29	-20	A	$P_D @ T_A = 25^{\circ}C$	Total Power Dissipation	1.5	1.5	W	T_{STG}	Storage Temperature Range	-55 to 175	-55 to 175	$^{\circ}C$	T_J	Operating Junction Temperature Range	-55 to 175	-55 to 175	$^{\circ}C$	Symbol	Parameter	Typ.	Max.	Unit	$R_{\theta JA}$	Thermal Resistance Junction-Ambient	---	83	$^{\circ}C/W$	$R_{\theta JC}$	Thermal Resistance Junction-Case	---	---	$^{\circ}C/W$
Symbol	Parameter			Rating			Units																																																								
		N-Channel	P-Channel																																																												
V_{DS}	Drain-Source Voltage	20	-20	V																																																											
V_{GS}	Gate-Source Voltage	± 12	± 12	V																																																											
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TM07G02MI6

N+P-Channel Enhancement Mode Mosfet

N-Electrical Characteristics (TJ=25℃ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourctce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =20V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±10V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	0.4	0.75	1	V
R _{DS(on)}	Drain-Source On Resistance	V _{GS} =4.5V, I _D =4A	---	15	20	m Ω
		V _{GS} =2.5V, I _D =3A	---	18	23	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	---	750	---	pF
C _{Oss}	Output Capacitance		---	135	---	
C _{rss}	Reverse Transfer Capacitance		---	75	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =10V, I _D =3.5A, R _{ENG} =3 Ω ,V _{GS} =4.5V	---	9	---	ns
t _r	Rise Time		---	30	---	ns
t _{d(off)}	Turn-Off Delay Time		---	35	---	ns
t _f	Fall Time		---	10	---	ns
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =3.5A	---	11	---	nc
Q _{gs}	Gate-Source Charge		---	2.3	---	nc
Q _{gd}	Gate-Drain “Miller” Charge		---	2.9	---	nc
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =6.8A	---	---	1.2	V
I _S	Continuous Drain Curren	V _D =V _G =0V	---	---	7.5	A
I _{SM}	Pulsed Drain Current		---	---	29	A

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N+P-Channel Enhancement Mode Mosfet

N-Typical Characteristics:

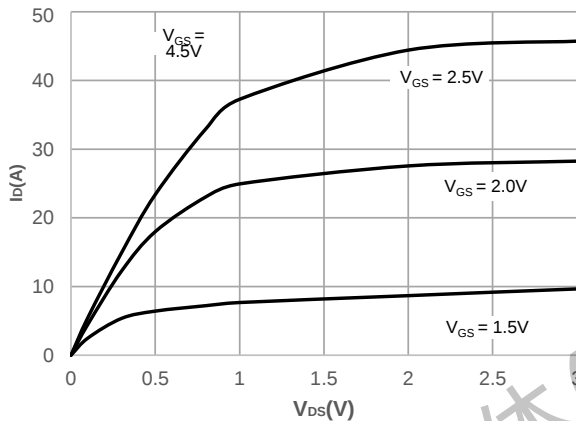


Figure 1: Output Characteristics

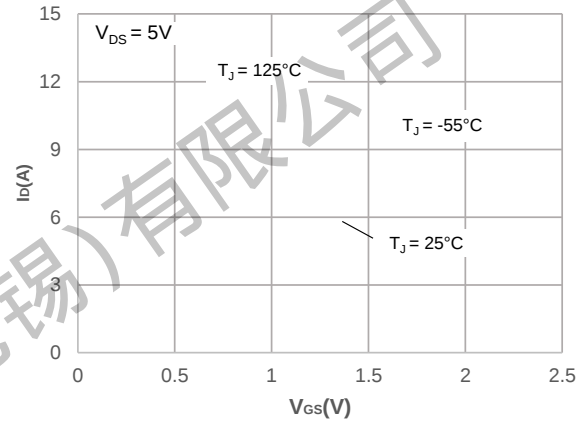


Figure 2: Typical Transfer Characteristics

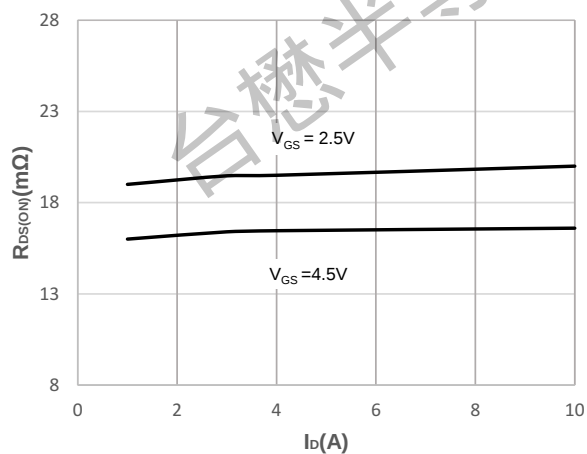


Figure 3: On-resistance vs. Drain Current

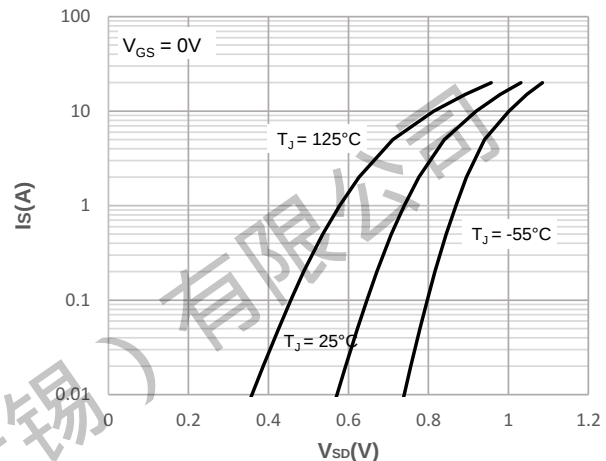


Figure 4: Body Diode Characteristics

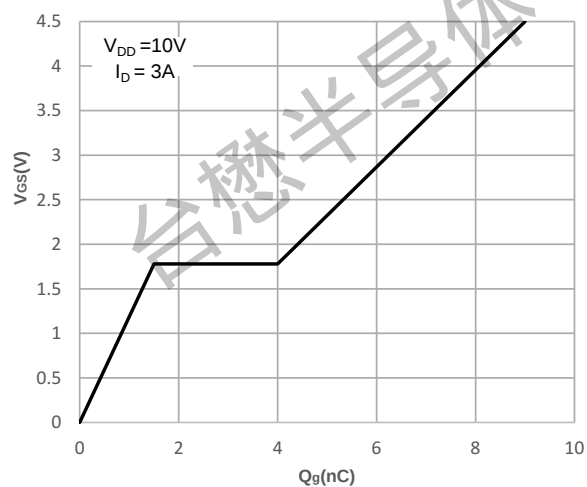


Figure 5: Gate Charge Characteristics

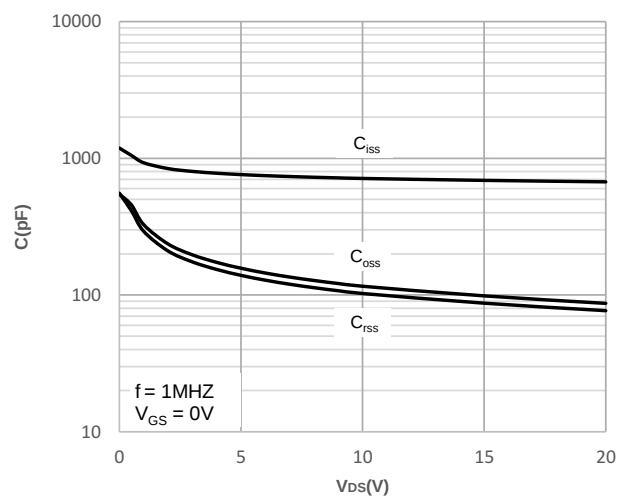


Figure 6: Capacitance Characteristics

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N+P-Channel Enhancement Mode Mosfet

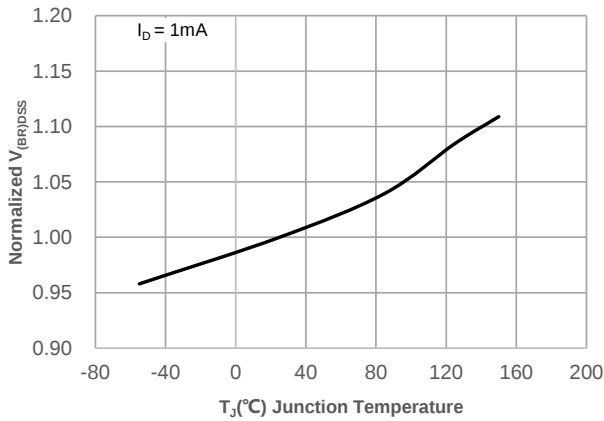


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

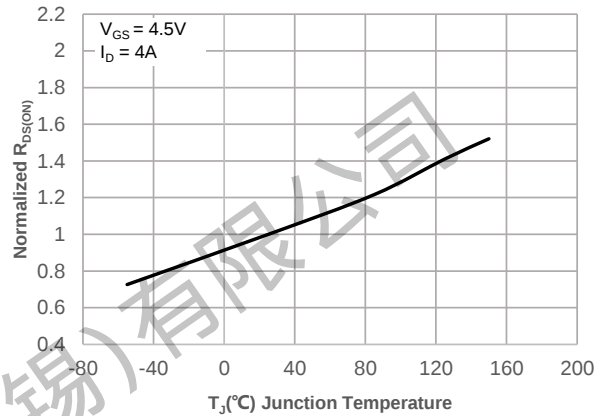


Figure 8: Normalized on Resistance vs. Junction Temperature

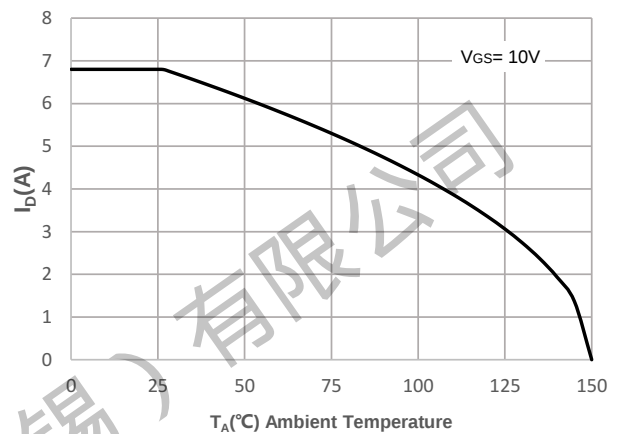
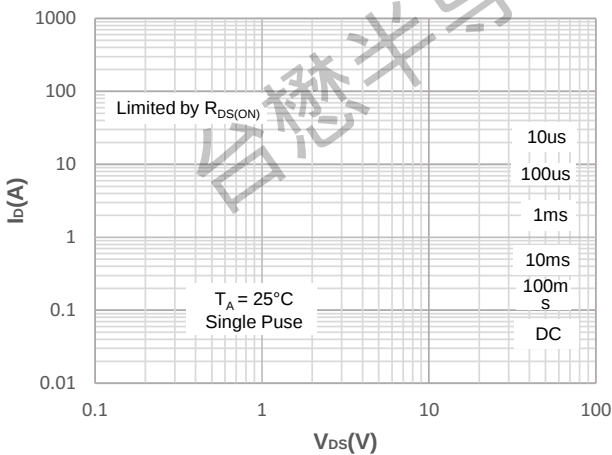


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

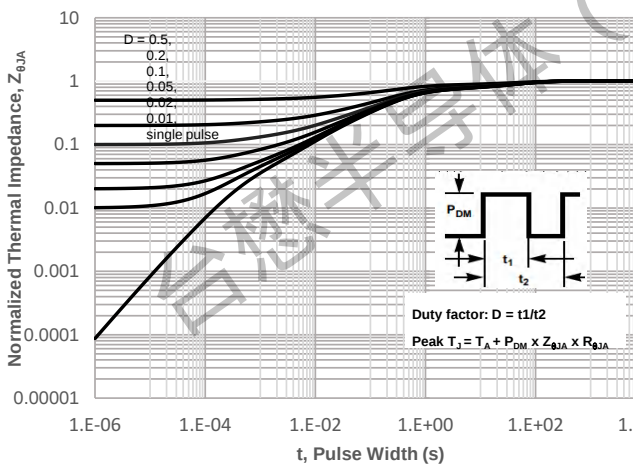


Figure 11: Normalized Maximum Transient Thermal Impedance

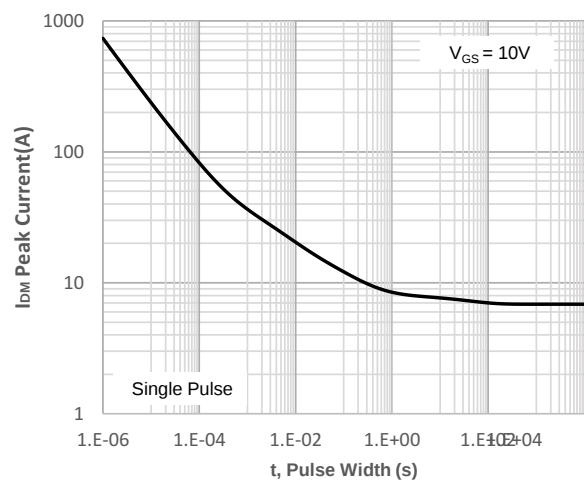


Figure 12: Peak Current Capacity

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N+P-Channel Enhancement Mode Mosfet

P-Electrical Characteristics (T_J=25 °C unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μA	-20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-20V	---	---	-1	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μA	-0.3	-0.65	-1.0	V
R _{DS(on)}	Drain-Source On Resistance	V _{GS} =-4.5V, I _D =-4A	---	22	28	mΩ
		V _{GS} =-2.5V, I _D =-4A	---	28	36	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	---	980	---	pF
C _{oss}	Output Capacitance		---	160	---	
C _{rss}	Reverse Transfer Capacitance		---	70	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -10V, I _D =-3.7A V _{GS} = -4.5V, R _{GEN} =1 Ω	---	712	---	ns
t _r	Rise Time		---	1386	---	ns
t _{d(off)}	Turn-Off Delay Time		---	9.1	---	ns
t _f	Fall Time		---	4	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-4.5V, I _D =-4A	---	11.1	---	nC
Q _{gs}	Gate-Source Charge		---	3.1	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	2.4	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-6.8	A
I _{SM}	Pulsed Drain to Source Diode		---	---	-20	---
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-1A	---	-0.67	-1.2	V

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P-Typical Characteristics:

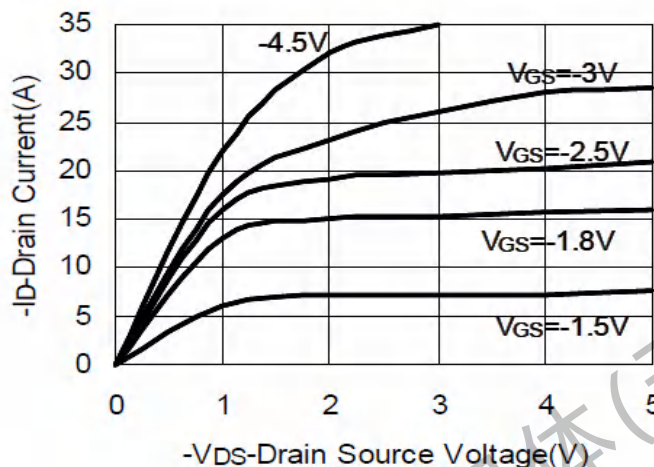


Figure1: Output Characteristics

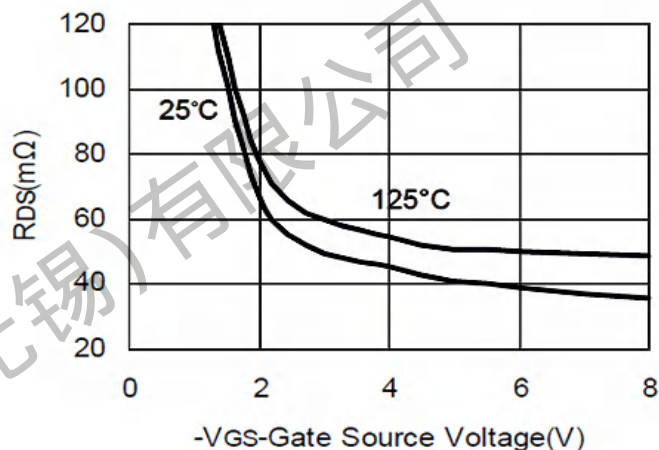


Figure 2: Drain-Source On Resistance

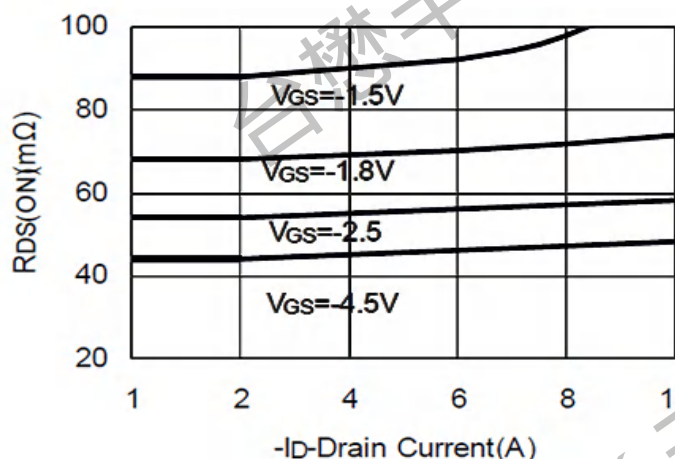


Figure 3: Drain Source On Resistance

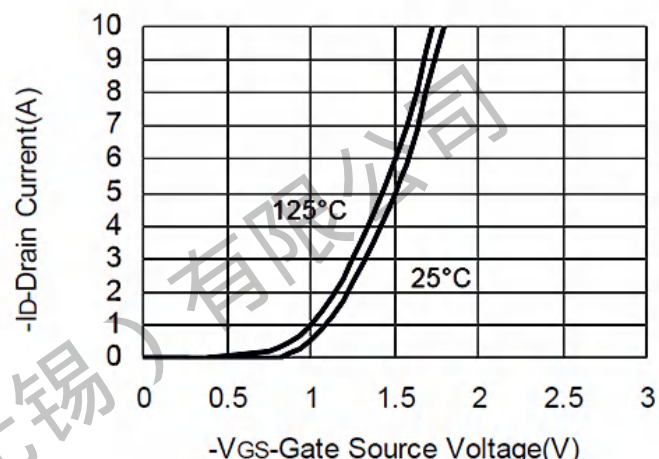


Figure 4: Transfer Characteristics

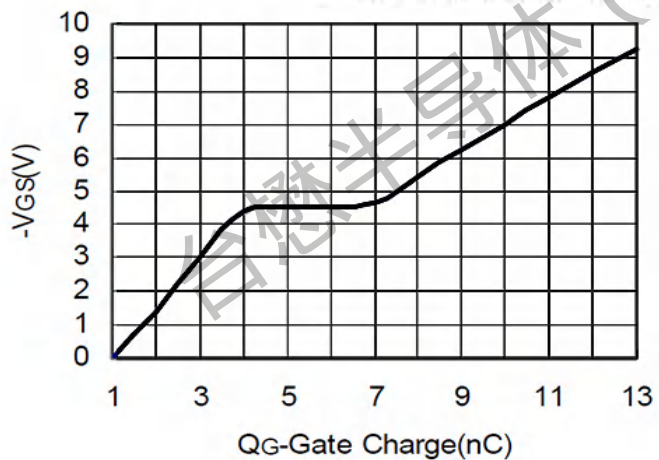


Figure 5 Gate Charge

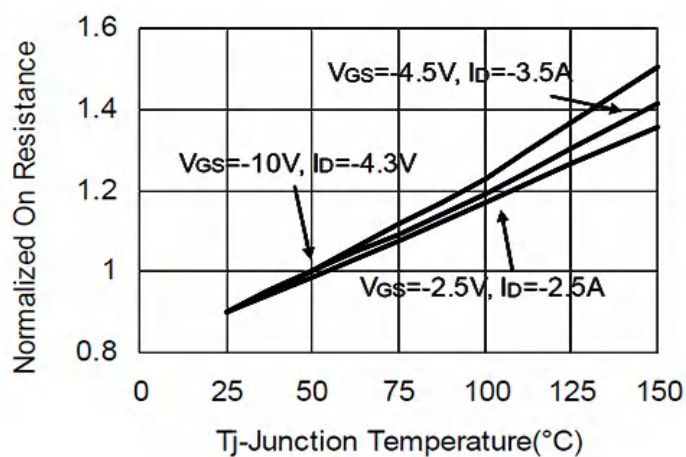
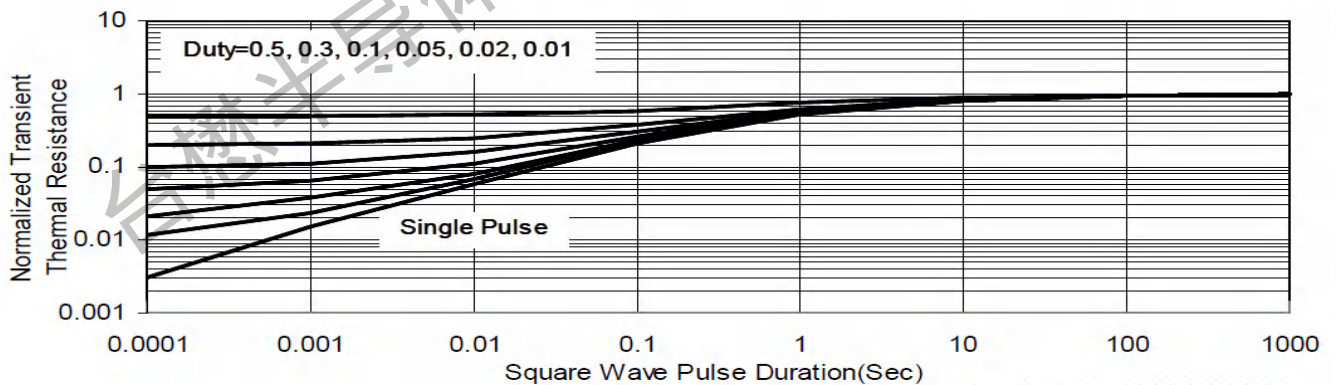
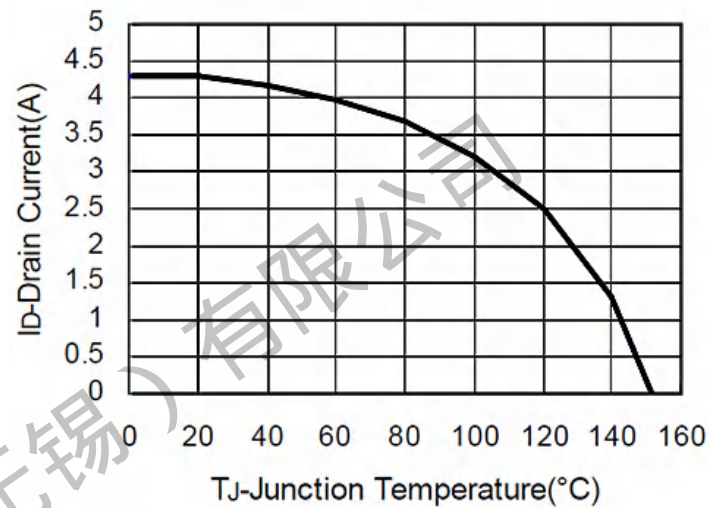
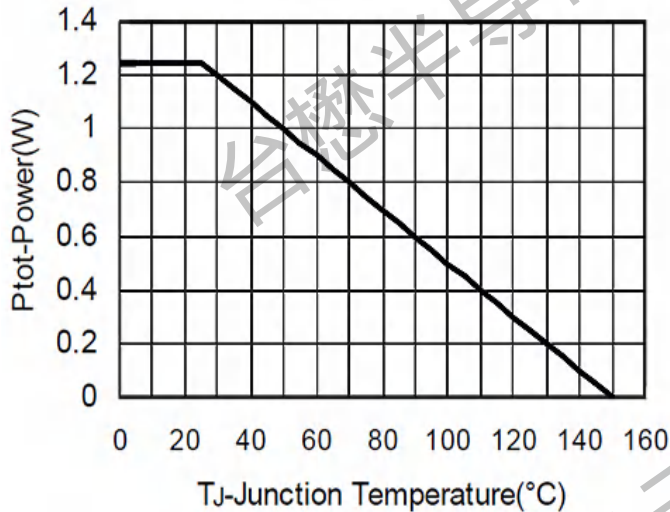
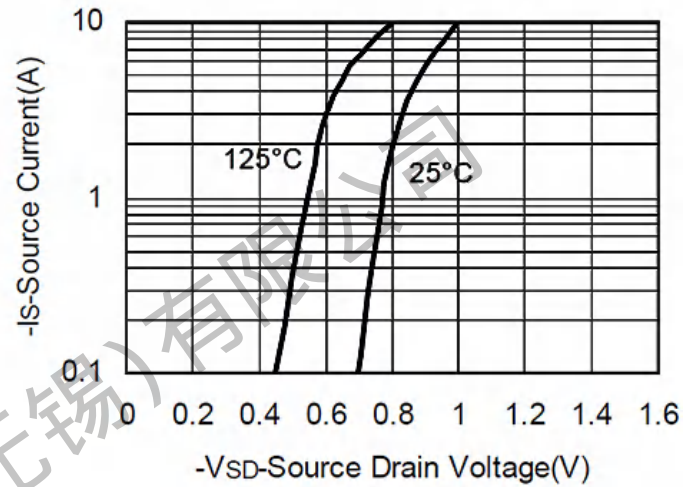
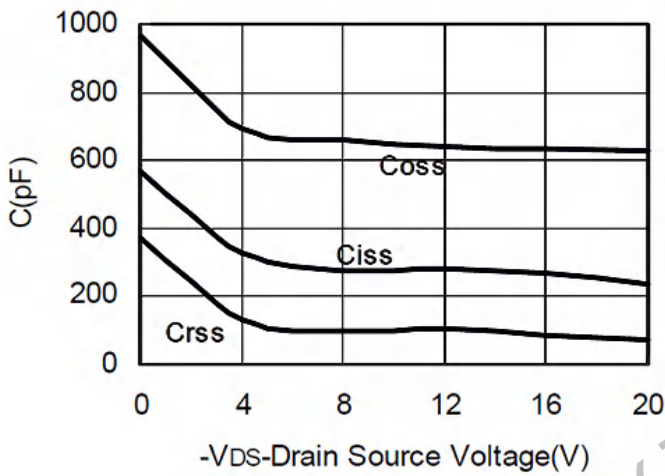


Figure 6: Drain Source Resistance



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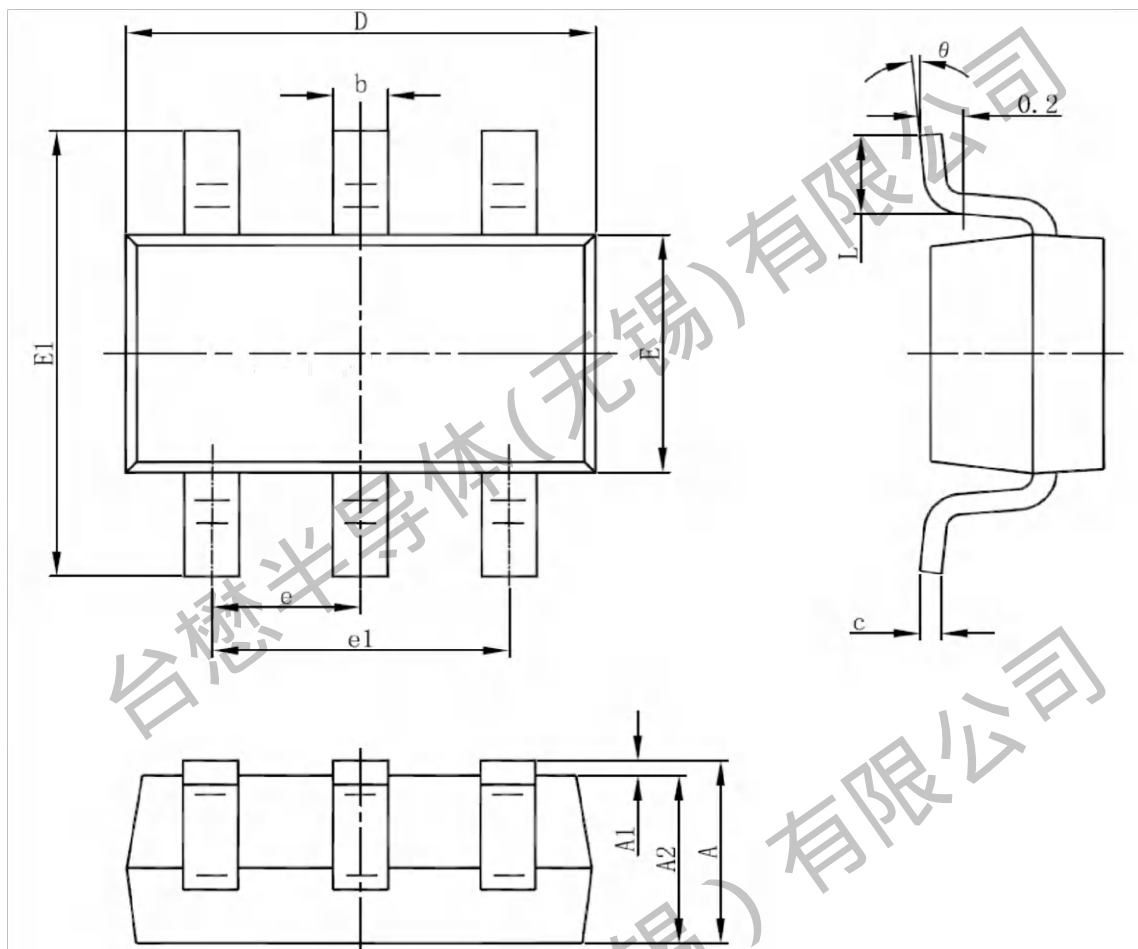
N+P-Channel Enhancement Mode Mosfet



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N+P-Channel Enhancement Mode Mosfet

Package Mechanical Data :SOT-23-6L

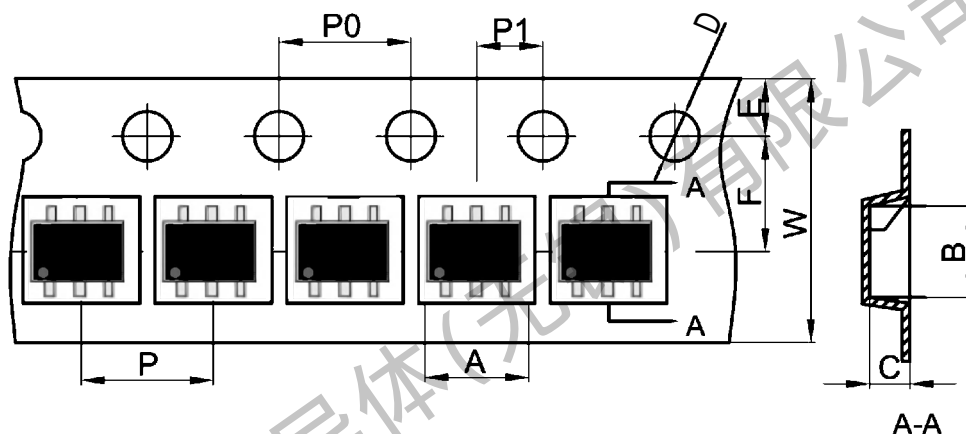


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
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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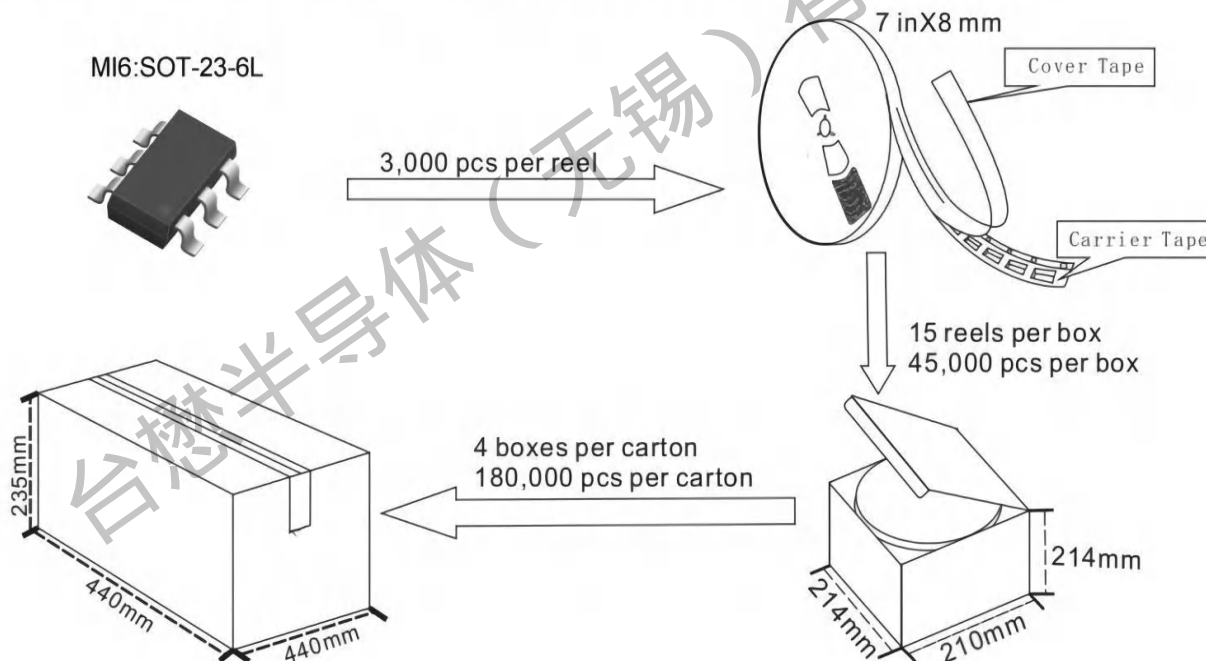
SOT-23-6L Embossed Carrier Tape



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
2022.11.23	22.11	Original	