

Features

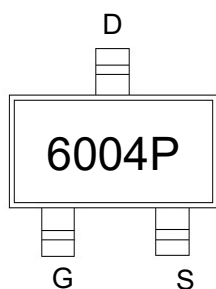
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Product Summary

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
-60V	150mΩ@-10V	-3.5A
	180mΩ@-4.5V	

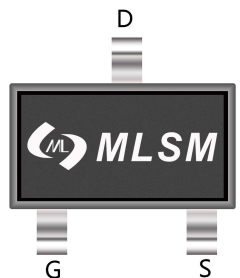
Application

- PWM applications
- Power management
- Load switch

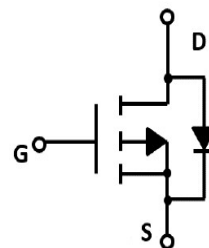


6004P: Device code

Marking and pin assignment



SOT-23-3L top view



Schematic diagram



Pb-Free



RoHS



Halogen-Free

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Unit
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Common Ratings ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

V_{DS}	Drain-Source Breakdown Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
T_J	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}\text{C}$ -3.5	A

Mounted on Large Heat Sink

I_{DM}	Pulse Drain Current Tested	$T_C=25^{\circ}\text{C}$ -15	A
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$ -3.5	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$ -1.5	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient	113	$^{\circ}\text{C/W}$

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MLSK6004P	SOT-23-3L	6004P	3,000	45,000	180,000	7"reel

Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
B _{V(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-60	–	–	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-60V, V _{GS} =0V	–	–	-1	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	-1.8	-2.5	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-2A	–	110	150	mΩ
		V _{GS} =-4.5V, I _D =-1A	–	147	180	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{ISS}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	–	715	–	pF
C _{OSS}	Output Capacitance		–	51	–	pF
C _{RSS}	Reverse Transfer Capacitance		–	34	–	pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} =-20V, I _D =-2A, V _{GS} =-4.5V	–	6	–	nC
Q _{gs}	Gate Source Charge		–	3	–	nC
Q _{gd}	Gate Drain Charge		–	2	–	nC
t _{d(on)}	Turn-on Delay Time	V _{DD} =-12V, I _D =-1A, V _{GS} =-10V, R _G =3.3Ω	–	10	–	nS
t _r	Turn-on Rise Time		–	17	–	nS
t _{d(off)}	Turn-Off Delay Time		–	22	–	nS
t _f	Turn-Off Fall Time		–	21	–	nS
Source- Drain Diode Characteristics						
V _{SD}	Forward on voltage	T _J =25°C, I _S =-3A	–	–	-1.2	V

Typical Operating Characteristics

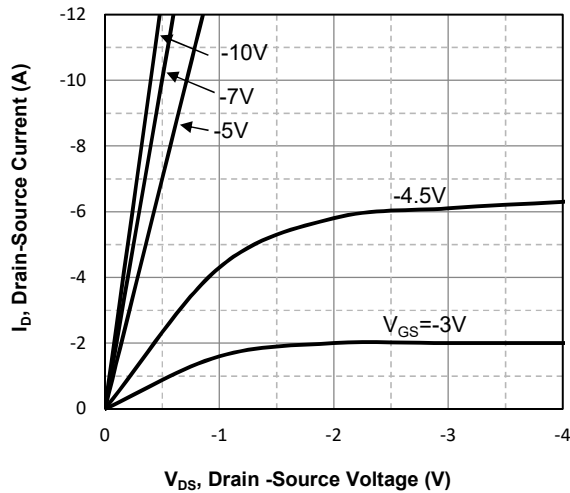


Fig1. Typical Output Characteristics

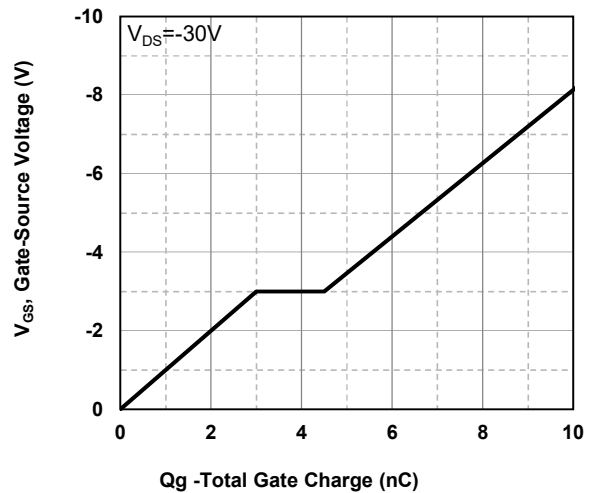


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

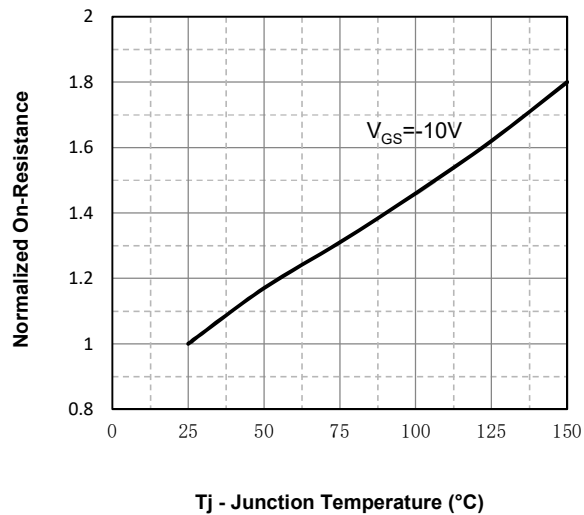


Fig3. Normalized On-Resistance Vs. Temperature

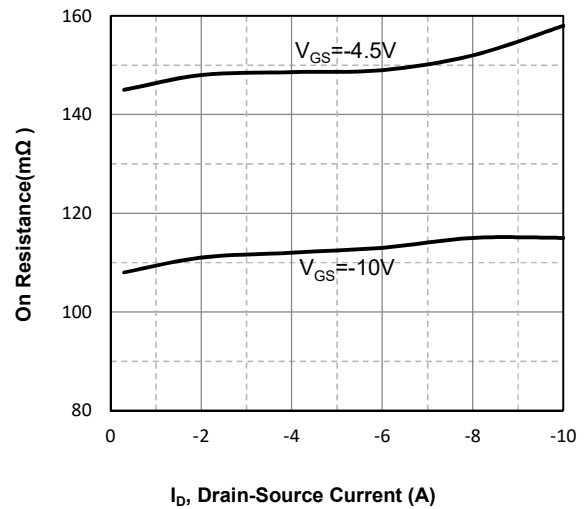


Fig4. On Resistance Vs. Drain-Source Current

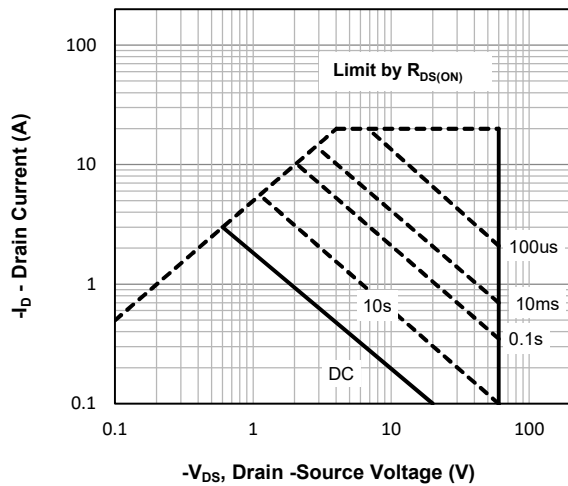


Fig5. Maximum Safe Operating Area

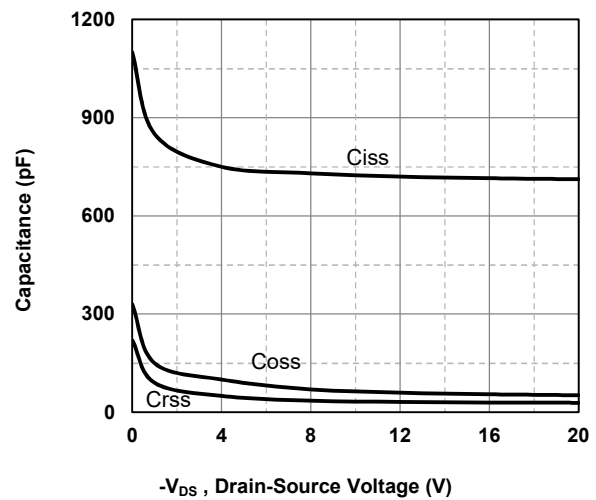
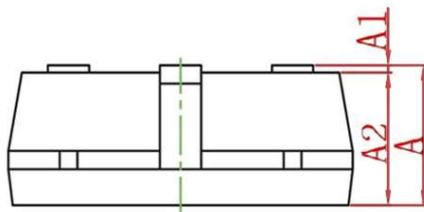
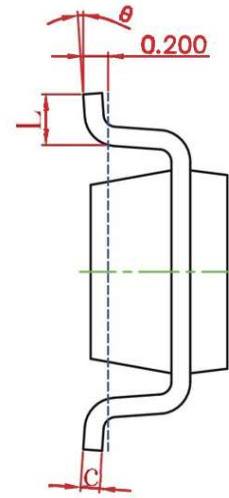
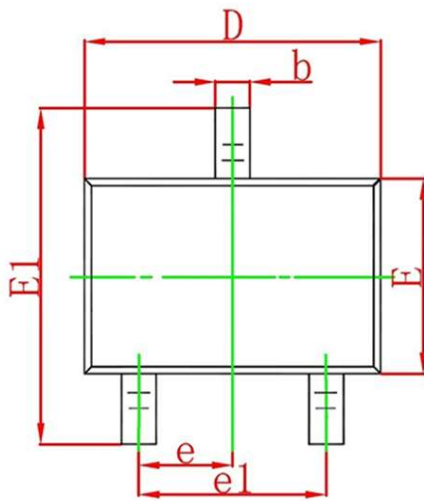


Fig6 Typical Capacitance Vs. Drain-Source Voltage

SOT-23-3L Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.042	0.050
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.042	0.046
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.112	0.120
E	1.500	1.700	0.060	0.068
E1	2.650	2.950	0.106	0.118
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°