

P-Channel Enhancement Mode Power MOSFET

Description

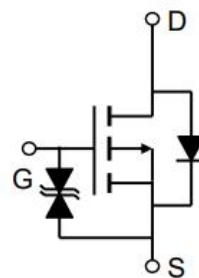
The G500P03IE uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

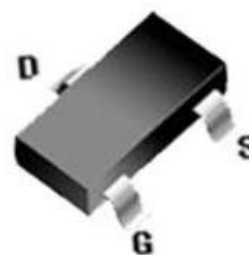
- V_{DS} -30V
- I_D (at $V_{GS} = -10V$) -4.6A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 55m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 65m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -2.5V$) < 90m Ω
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM) : 7KV

Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-23

Ordering Information

Device	Package	Marking	Packaging
G500P03IE	SOT-23	G500P03E	3000pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-30	V
Continuous Drain Current	I_D	-4.6	A
Pulsed Drain Current (note1)	I_{DM}	-18.4	A
Gate-Source Voltage	V_{GS}	± 12	V
Power Dissipation	P_D	1.4	W
Single pulse avalanche energy (note2)	E_{AS}	14	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient, $t \leq 10s$	R_{thJA}	89	$^\circ\text{C/W}$

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±12V	--	--	±20	uA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.6	-0.8	-1.3	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -4A	--	43	55	mΩ
		V _{GS} = -4.5V, I _D = -4A	--	50	65	
		V _{GS} = -2.5V, I _D = -2A	--	65	90	
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -4A	--	9	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -15V, f = 1.0MHz	--	680	--	pF
Output Capacitance	C _{oss}		--	79	--	
Reverse Transfer Capacitance	C _{rss}		--	62	--	
Total Gate Charge	Q _g	V _{DD} = -15V, I _D = -4A, V _{GS} = -10V	--	13	--	nC
Gate-Source Charge	Q _{gs}		--	2.9	--	
Gate-Drain Charge	Q _{gd}		--	2.7	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15V, I _D = -4A, R _G = 3Ω	--	9	--	ns
Turn-on Rise Time	t _r		--	5	--	
Turn-off Delay Time	t _{d(off)}		--	27	--	
Turn-off Fall Time	t _f		--	13	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-4.6	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -4A, V _{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = -4A, V _{GS} = 0V di/dt=-100A/us	--	11	--	nC
Reverse Recovery Time	T _{rr}		--	5.3	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^{\circ}\text{C}$, $V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$
The table shows the minimum avalanche energy, which is 36mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

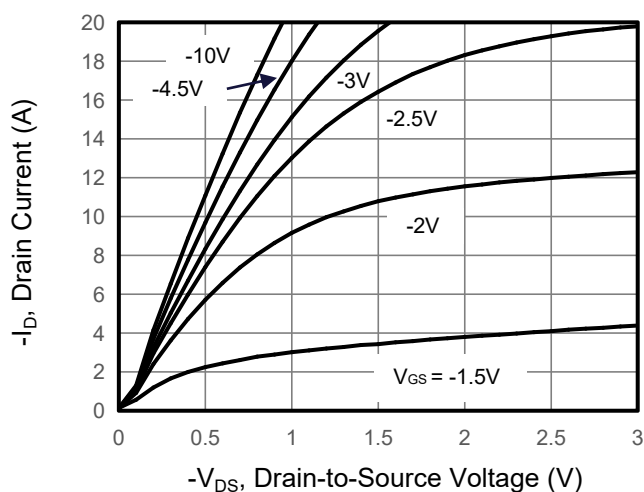


Figure 2. Transfer Characteristics

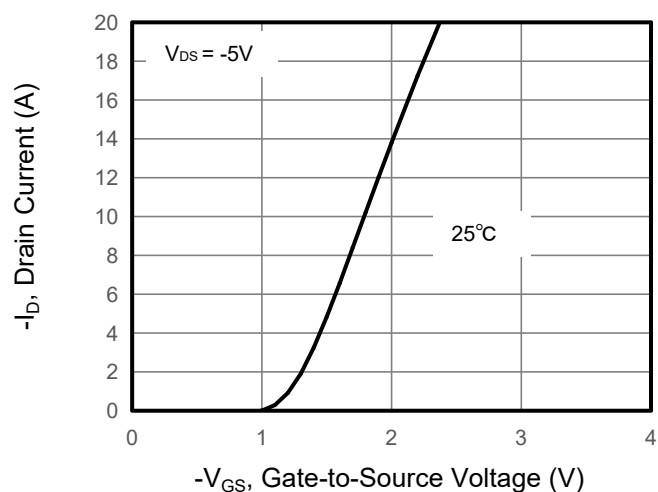


Figure 3. Drain Source On Resistance

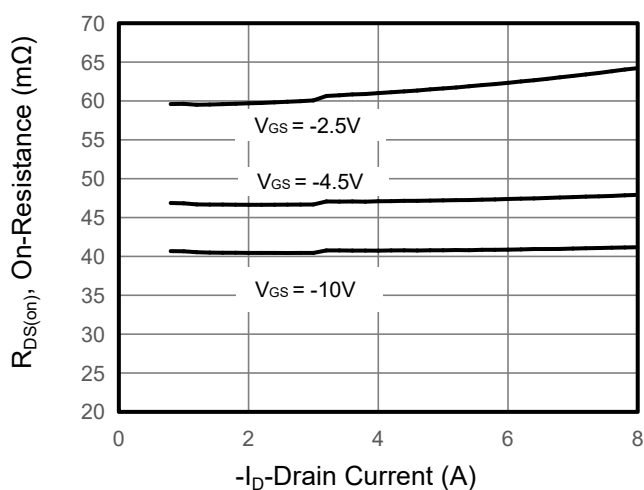


Figure 4. Gate Charge

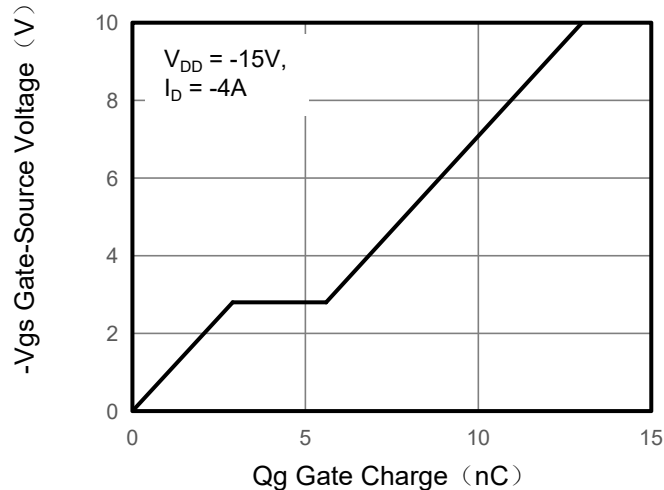


Figure 5. Capacitance

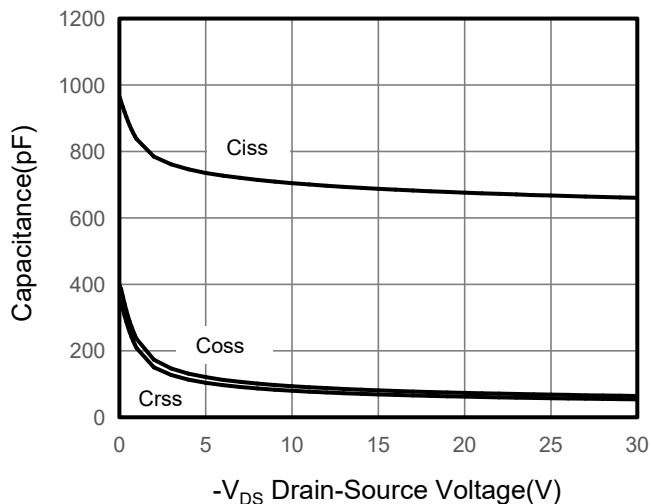
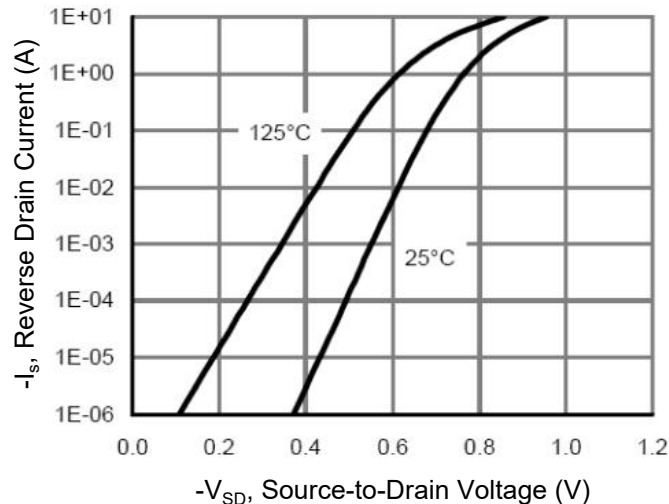


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

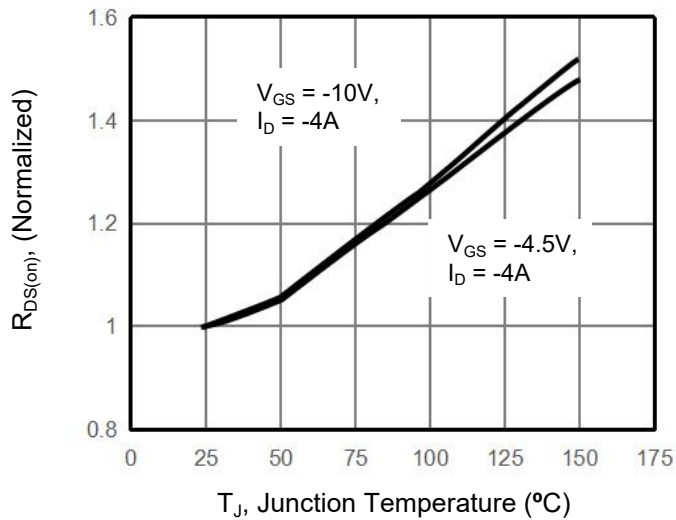


Figure 10. Safe Operation Area

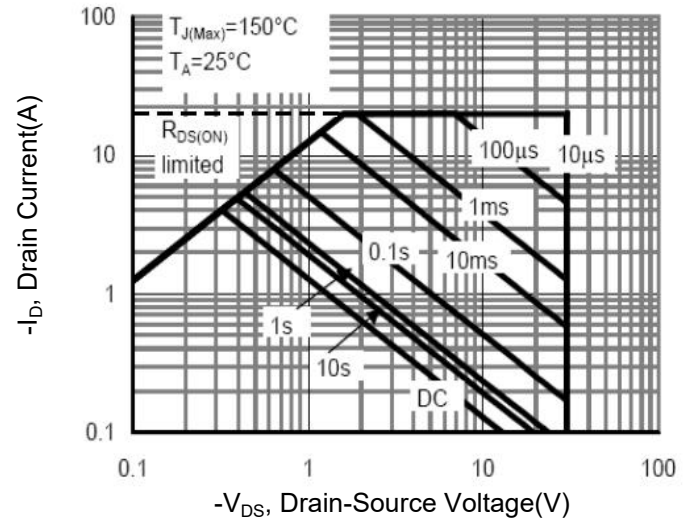
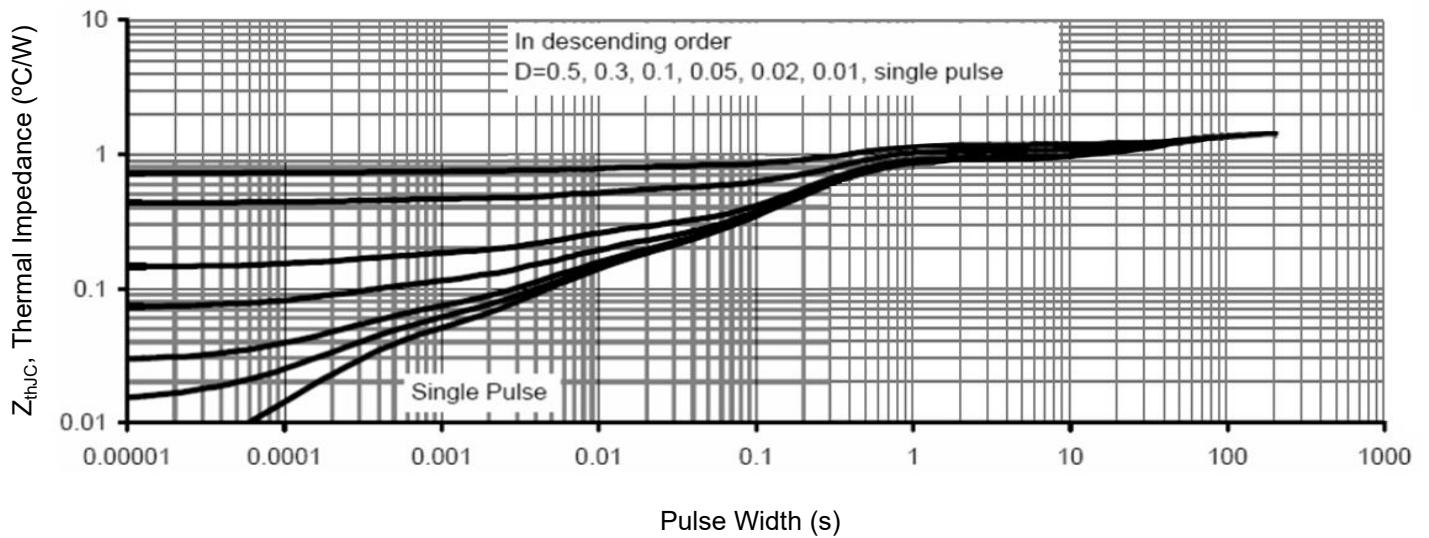
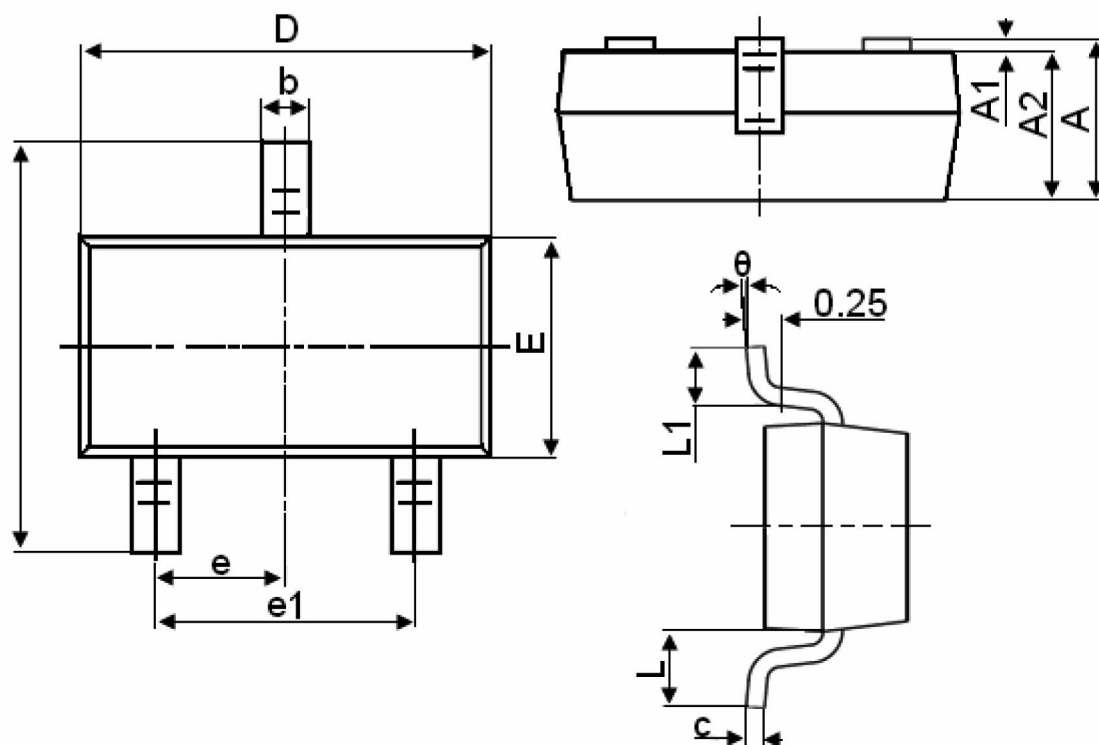


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23 Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°