

-20V P-Channel Trench Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	320mΩ@-4.5V	-0.7A
	450mΩ@-2.5V	

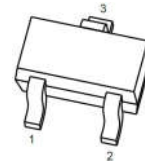
Features

- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- ESD Protected Up to 2.0KV (HBM)

Applications

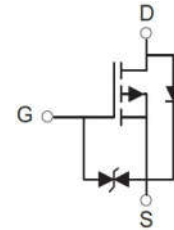
- Interfacing, Logic switch
- Load switch
- Power management

SOT-523

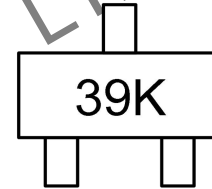


PIN1:GATE
PIN2:SOURCE
PIN3:DRAIN

Schematic diagram



Marking



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

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±10	V
Drain Current	$T_A = 25^\circ\text{C}$	I_D	-0.7	A
	$T_A = 100^\circ\text{C}$		-0.36	A
Drain Current - Pulsed		I_{DM}	-2.8	A
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	0.2	W
Thermal Resistance, Junction-to-Ambient		$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain - Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250μA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V			-1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±10V, V _{DS} = 0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.65	-1	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -0.5A		320	390	mΩ
		V _{GS} = -2.5V, I _D = -0.4A		450	540	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0V, F= 1.0MHz		65		pF
Output Capacitance	C _{oss}			14		
Reverse Transfer Capacitance	C _{rss}			8		
Switching Characteristics						
Total Gate Charge	Q _g	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -0.5A		1.15		nC
Gate-source Charge	Q _{gs}			0.37		
Gate-drain Charge	Q _{gd}			0.25		
Turn-on Delay Time	t _{d(on)}	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -0.5A, R _{GEN} = 3Ω		4		ns
Turn-on Rise Time	t _r			19		
Turn-off Delay Time	t _{d(off)}			16		
Turn-off Fall Time	t _f			25		
Source - Drain Diode Characteristics						
Drain to Source Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _{SD} = -0.5A, T _J = 25℃			-1.2	V

Typical Characteristic

Figure 1: Output Characteristics

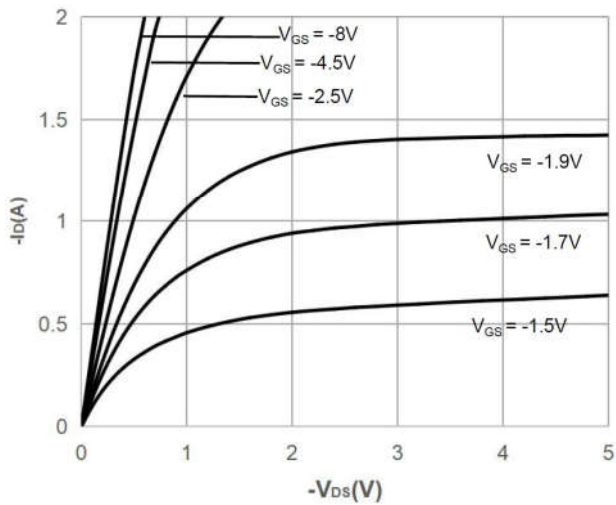


Figure 2: Typical Transfer Characteristics

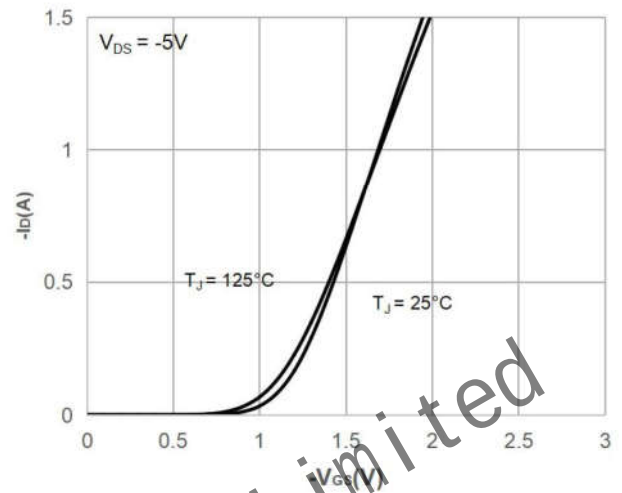


Figure 3: On-resistance vs. Drain Current

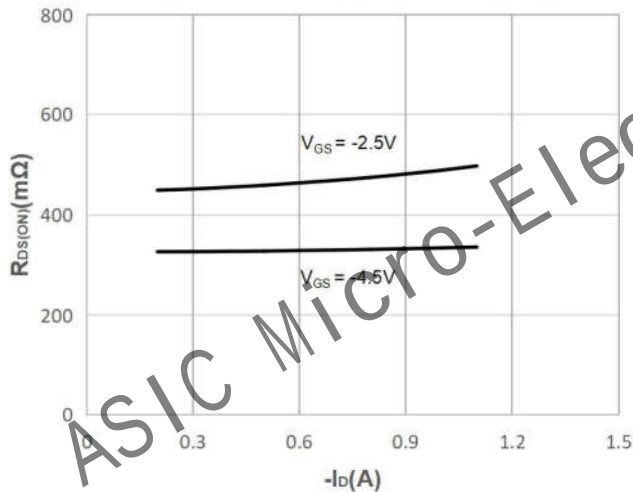


Figure 4: Body Diode Characteristics

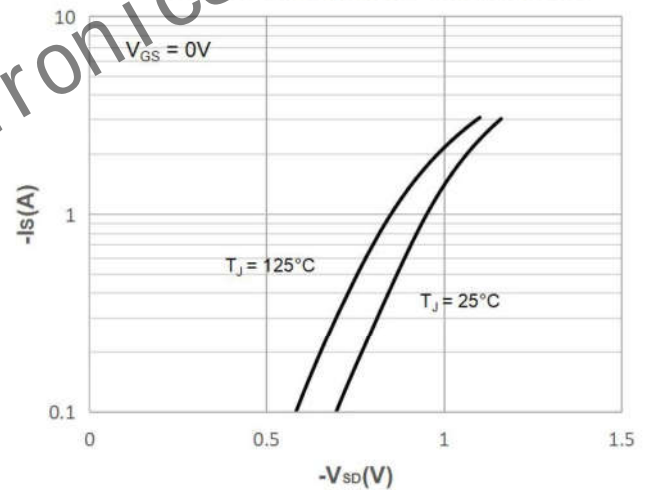


Figure 5: Gate Charge Characteristics

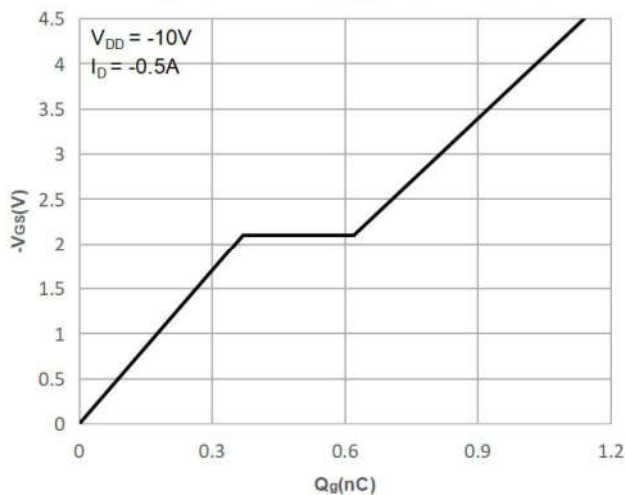


Figure 6: Capacitance Characteristics

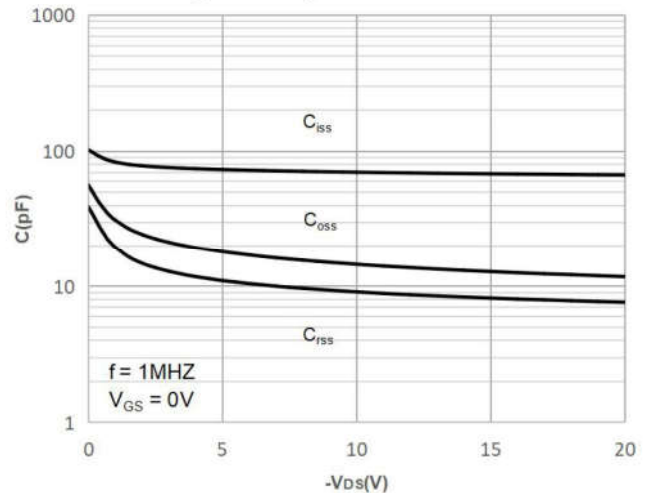


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

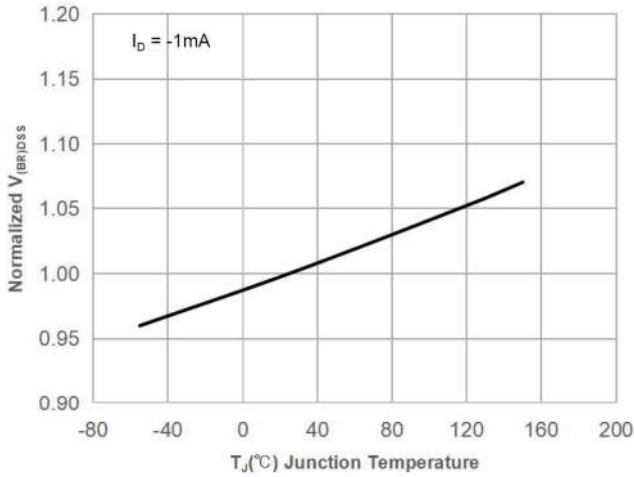


Figure 8: Normalized on Resistance vs. Junction Temperature

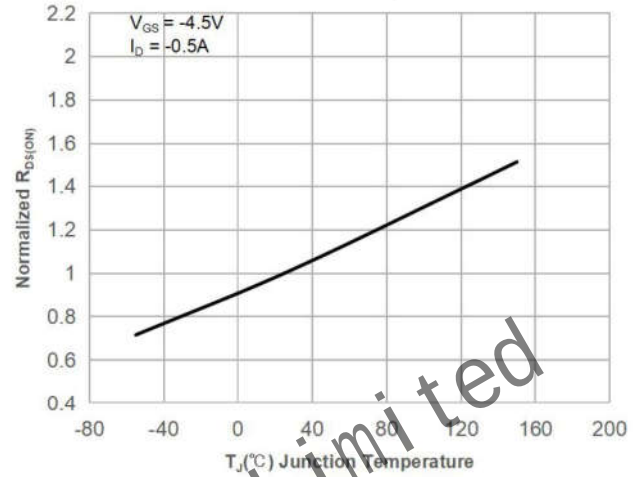


Figure 9: Maximum Safe Operating Area

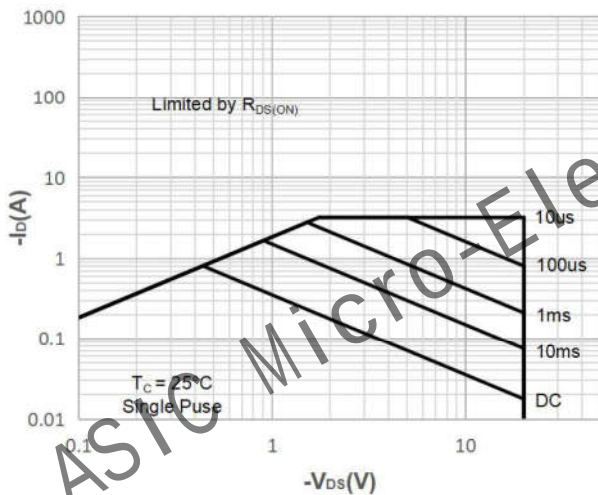


Figure 10: Maximum Continuous Driant Current vs. Case Temperature

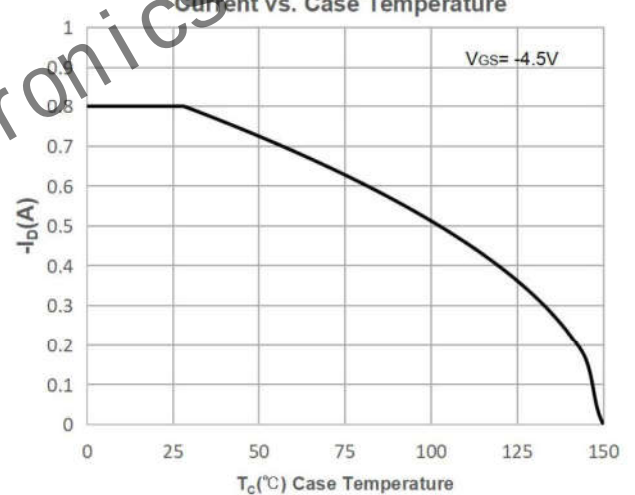


Figure 11: Normalized Maximum Transient Thermal Impedance

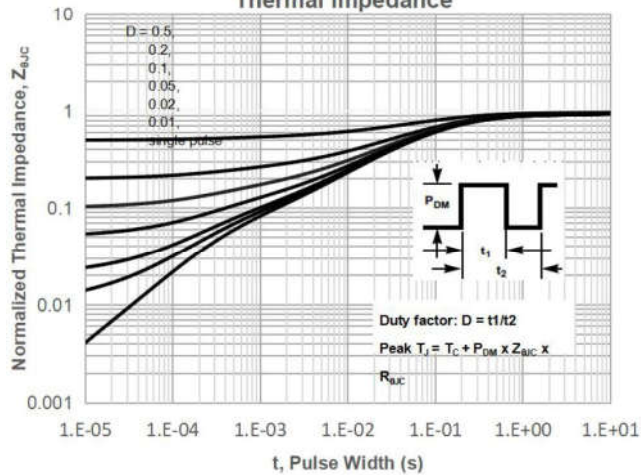
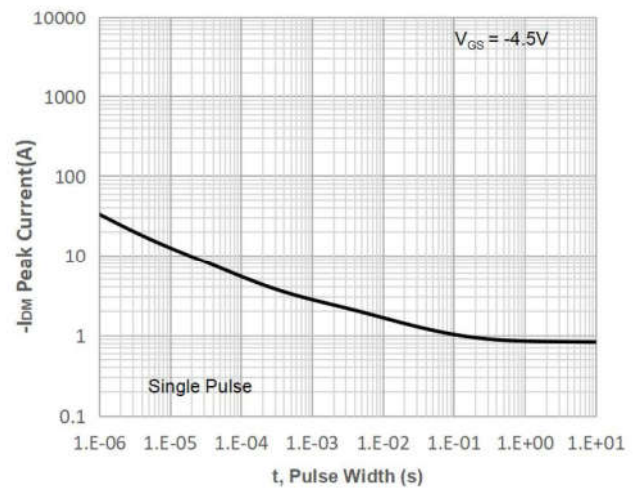
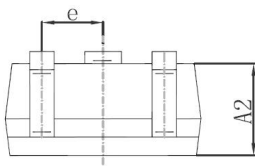
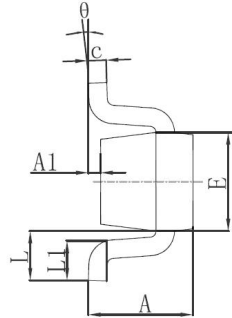
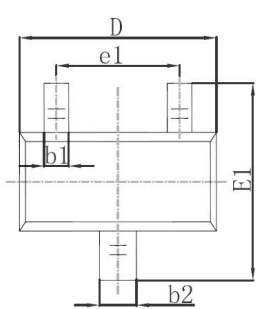


Figure 12: Peak Current Capacity



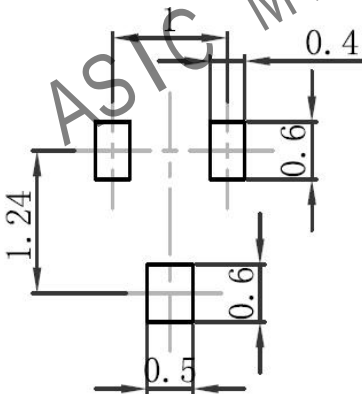
Dimension

SOT-523



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Recommended Land Pattern



Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference only
4. Unit: mm