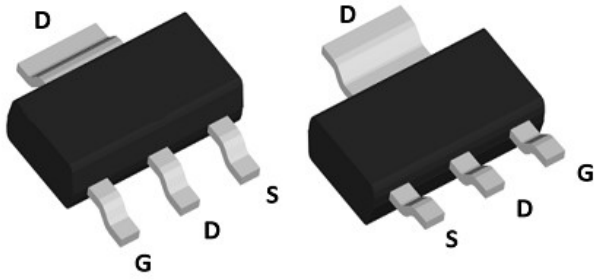
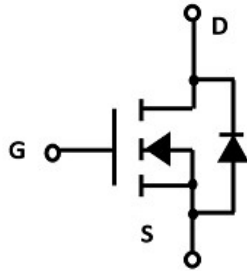


## N-Channel Enhancement Mode Field Effect Transistor



**SOT-223**



### Product Summary

- $V_{DS}$  60V
- $I_D$  10A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ ) < 35 mohm
- $R_{DS(ON)}$  (at  $V_{GS}=4.5V$ ) < 45 mohm

### General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

### Applications

- DC-DC Converters
- Power management functions

### ■ Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	60	V
Gate-source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current	$I_D$	10	A
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	33	A
Total Power Dissipation @ $T_c=25^\circ C$	$P_D$	1.2	W
Thermal Resistance Junction-to-Ambient <sup>B</sup>	$R_{\theta JA}$	105	$^\circ C/W$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	$^\circ C$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS1}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.7	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$		30	35	m $\Omega$
		$V_{GS}=4.5V, I_D=4A$		35	45	
Diode Forward Voltage	$V_{SD}$	$I_S=5A, V_{GS}=0V$		0.8	1.2	V
Maximum Body-Diode Continuous Current	$I_S$				3.0	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$		1018		pF
Output Capacitance	$C_{oss}$			70		
Reverse Transfer Capacitance	$C_{rss}$			62		
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=30V, I_D=10A$		26		nC
Gate-Source Charge	$Q_{gs}$			5.4		
Gate-Drain Charge	$Q_{gd}$			6.5		
Reverse Recovery Charge	$Q_{rr}$	$I_F=20A, di/dt=500A/\mu s$		11.7		ns
Reverse Recovery Time	$t_{rr}$			23		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=30V, I_D=2A, R_L=1\Omega$ $R_{GEN}=3\Omega$		10		ns
Turn-on Rise Time	$t_r$			20		
Turn-off Delay Time	$t_{D(off)}$			29		
Turn-off fall Time	$t_f$			22		

## ■ Typical Performance Characteristics

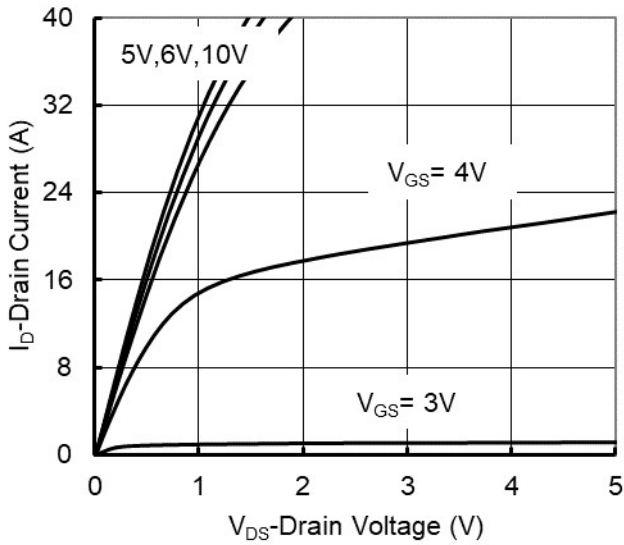


Figure 1. Output Characteristics

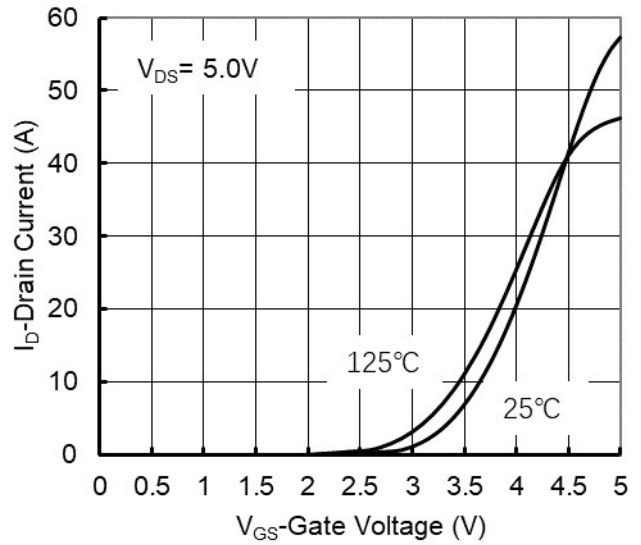


Figure 2. Transfer Characteristics

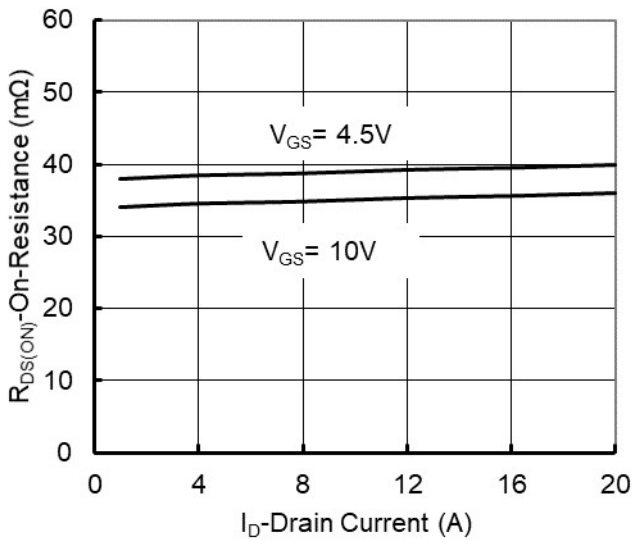


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

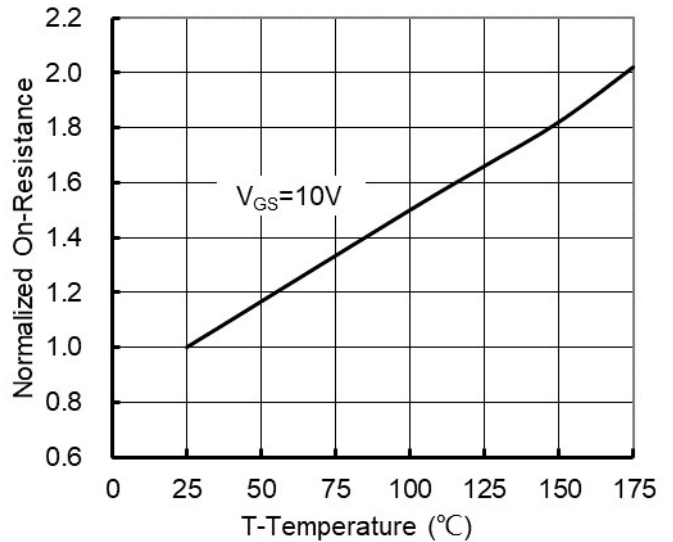


Figure 4. On-Resistance vs. Junction Temperature

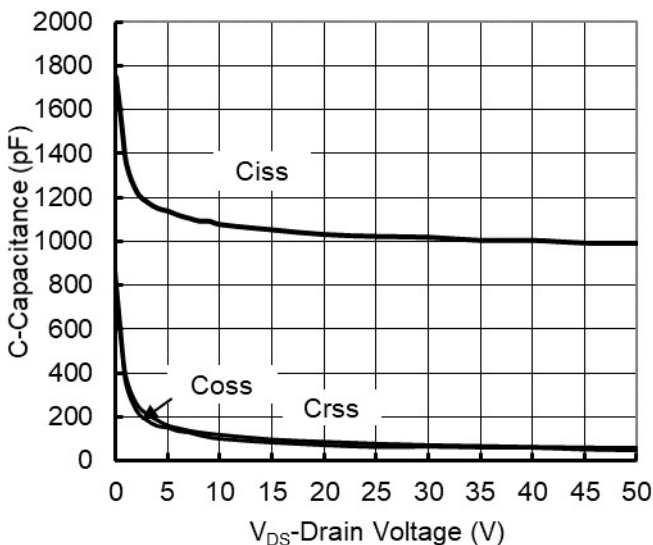


Figure 5. Capacitance Characteristics

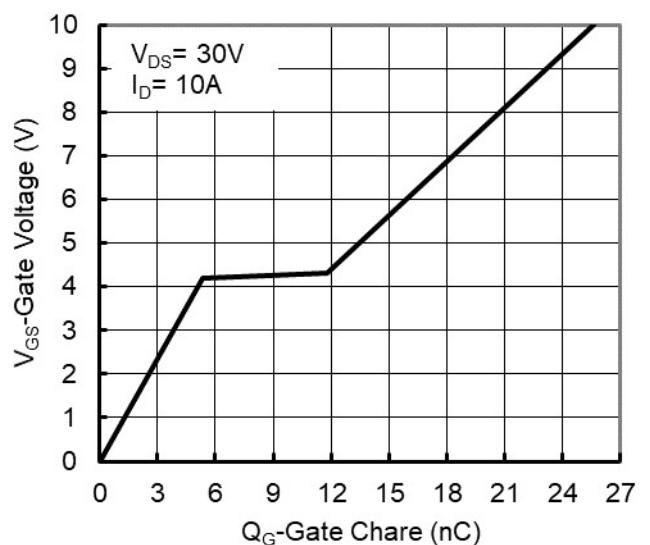


Figure 6. Gate Charge

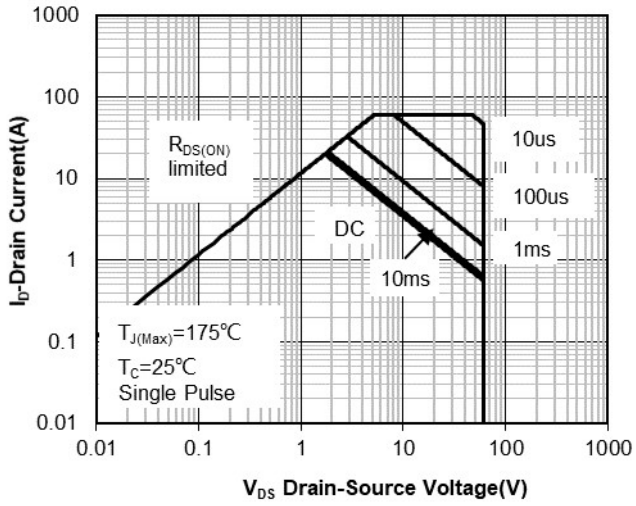


Figure 7. Safe Operation Area

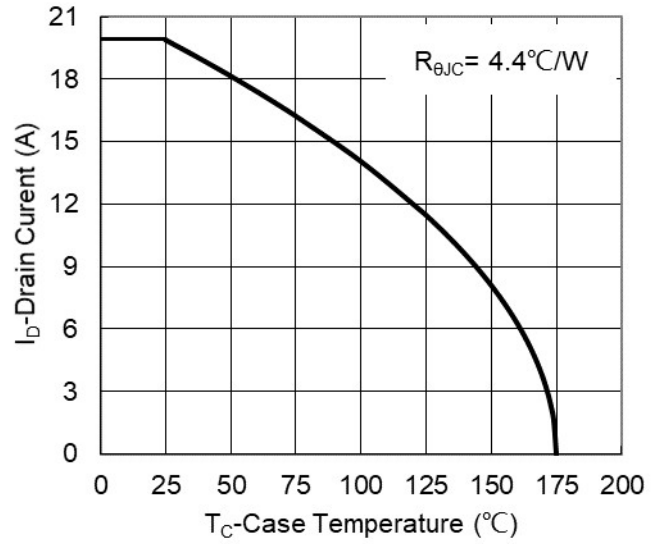
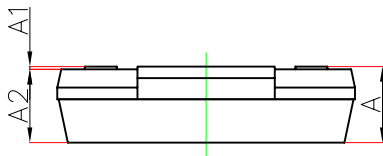
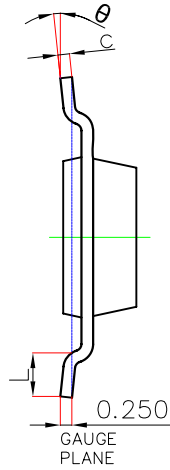
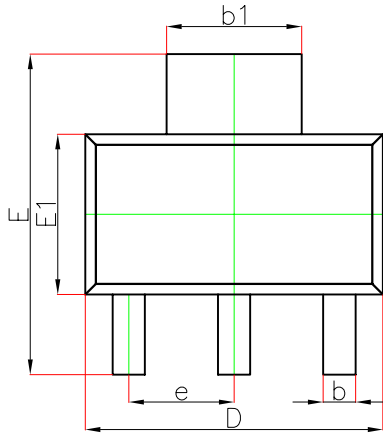


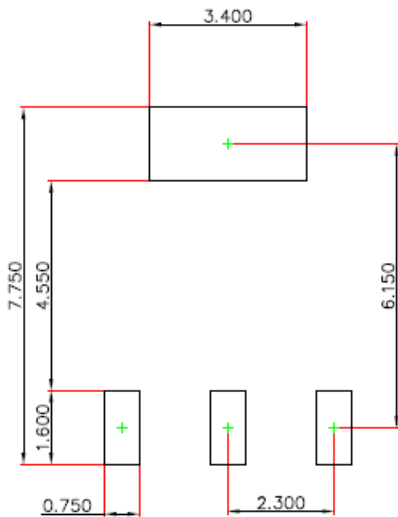
Figure 8. Maximum Continuous Drain Current vs Case Temperature

## ■ SOT-223 Package information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	—	0.030	—
θ	0°	10°	0°	10°

## ■ SOT-223 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050$  mm.
3. The pad layout is for reference purposes only.