

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	130mΩ@-10V	-5A
	190mΩ@-4.5V	

Feature

- Advanced trench technology
- Excellent $R_{DS(on)}$
- Low gate charge

Application

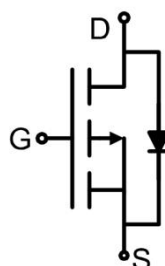
- Automotive lighting
- Load switch
- Uninterruptible power supply

Package

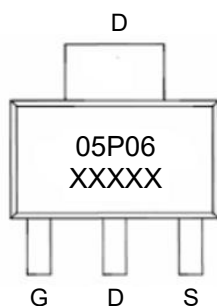


SOT-223

Circuit diagram



Marking



Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹⁾ ($V_{GS}=-10\text{V}$, $T_A=25^\circ\text{C}$)	I_D	-5	A
Continuous Drain Current ¹⁾ ($V_{GS}=-10\text{V}$, $T_A=70^\circ\text{C}$)	$I_D(70^\circ\text{C})$	-3.5	A
Pulsed Drain Current ²⁾	I_{DM}	-14	A
Power Dissipation ³⁾ ($T_A=25^\circ\text{C}$)	P_D	2	W
Thermal Resistance from Junction to Ambient ¹⁾	$R_{\theta JA}$	70	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics ($T_c=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-60			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-48V, V_{GS}=0V, T_J=25^{\circ}C$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.7	-2.5	V
Drain-source on-resistance ²⁾	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-2A$		110	130	m Ω
		$V_{GS}=-4.5V, I_D=-1.5A$		140	190	
Dynamic characteristics ⁴⁾						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$		715		pF
Output Capacitance	C_{oss}			51		
Reverse Transfer Capacitance	C_{rss}			34		
Total Gate Charge	Q_g	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-2A$		5.9		nC
Gate-Source Charge	Q_{gs}			2.9		
Gate-Drain Charge	Q_{gd}			1.8		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-12V, V_{GS}=-10V, I_D=-1A, R_G=3.3\Omega$		10		nS
Turn-on rise time	t_r			17		
Turn-off delay time	$t_{d(off)}$			22		
Turn-off fall time	t_f			21		
Source-Drain Diode characteristics						
Diode Continuous Current	I_S	$V_D=V_G=0V$, Force Current			-5	A
Diode Forward voltage	V_{SD}	$V_{GS}=0V, I_S=-1A, T_J=25^{\circ}C$			-1.2	V

Notes:

- 1) The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2) The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 3) The power dissipation is limited by 150°C junction temperature.
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

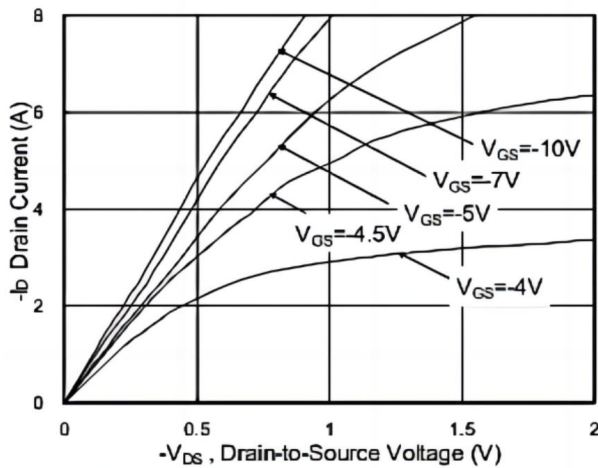


Fig.1 Typical Output Characteristics

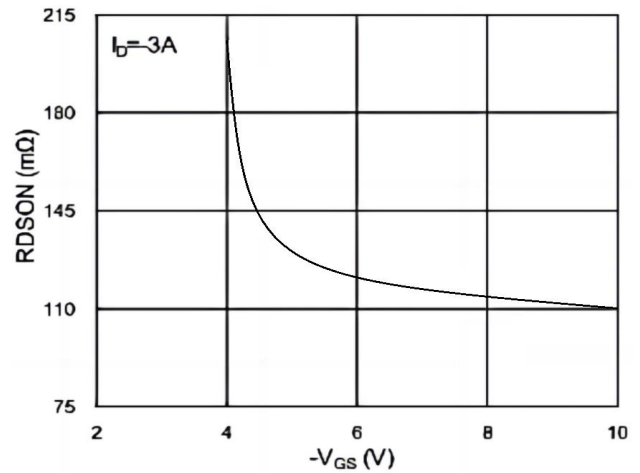


Fig.2 On-Resistance vs. G-S Voltage

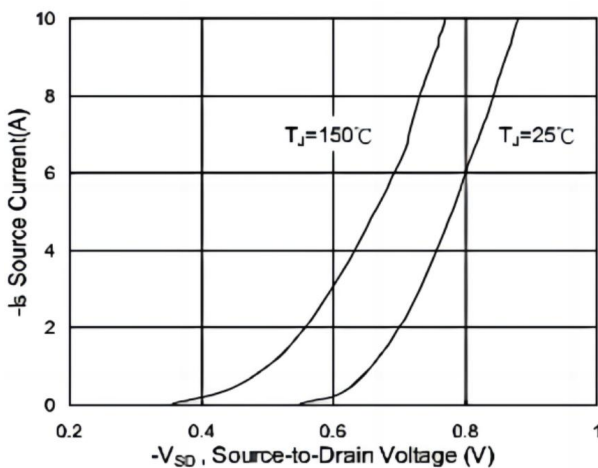


Fig.3 Forward Characteristics Of Reverse

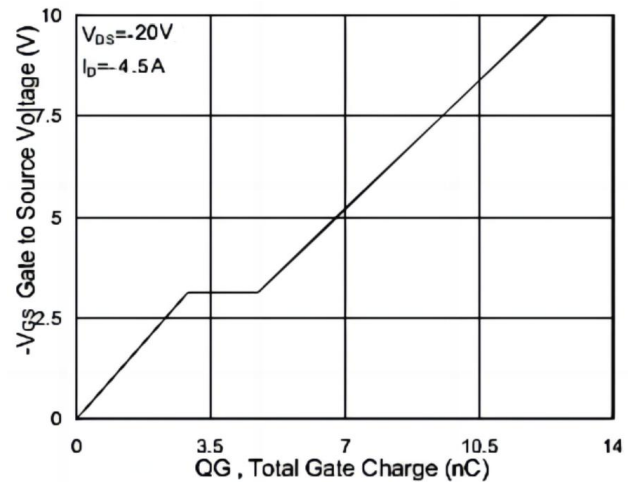


Fig.4 Gate-Charge Characteristics

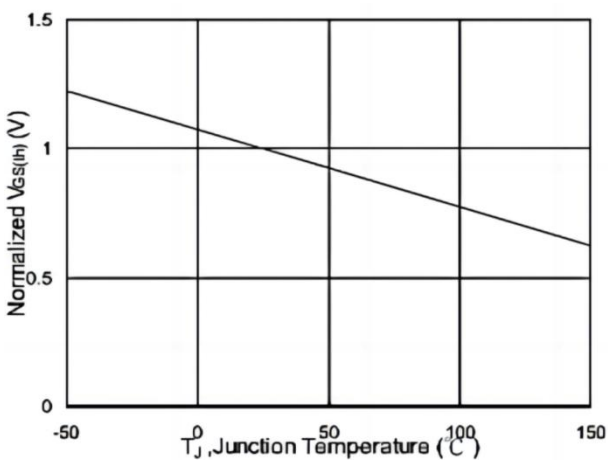


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

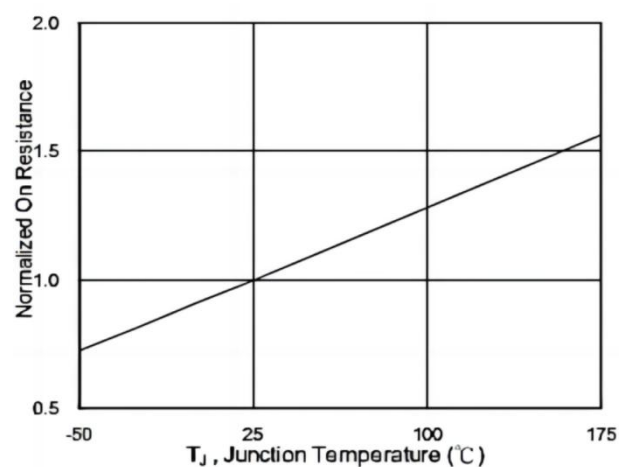


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

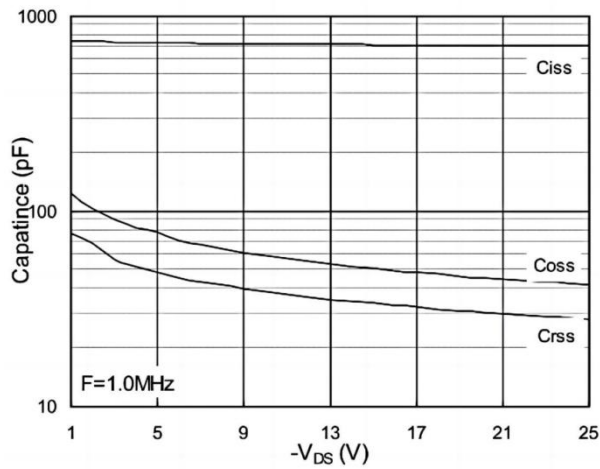


Fig.7 Capacitance

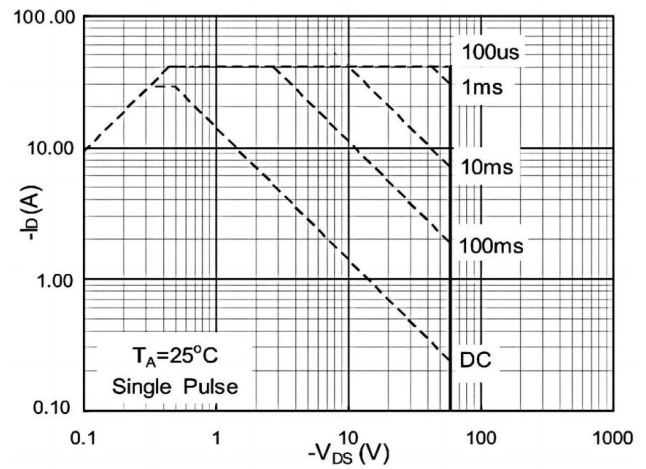


Fig.8 Safe Operating Area

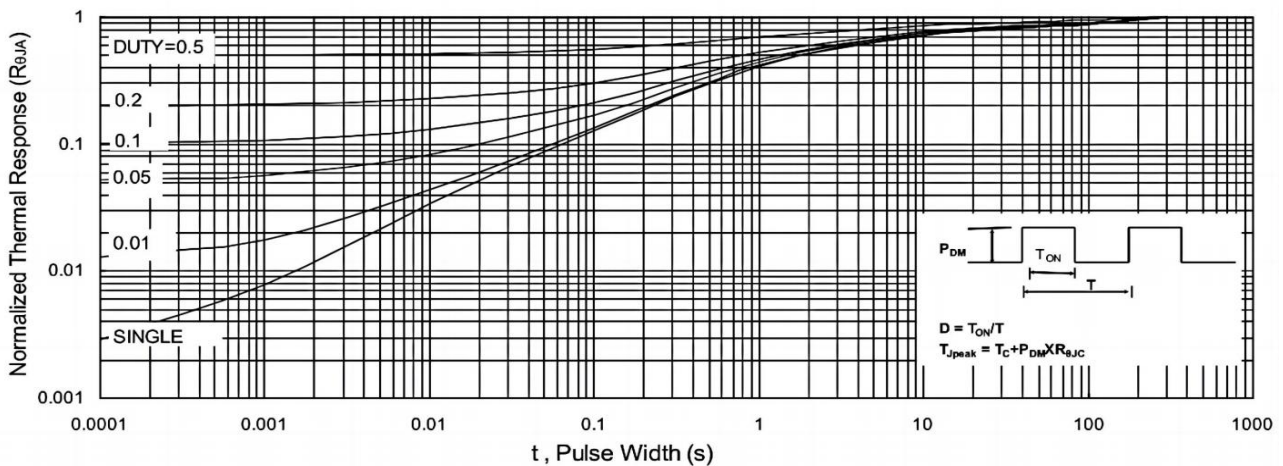


Fig.9 Normalized Maximum Transient Thermal Impedance

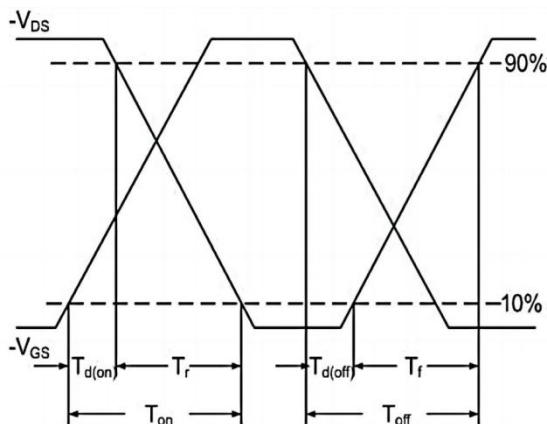


Fig.10 Switching Time Waveform

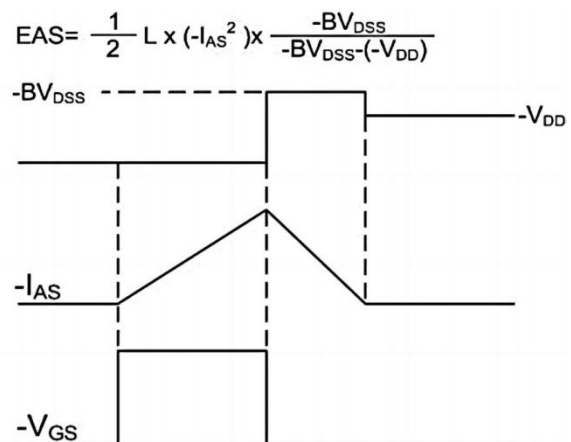
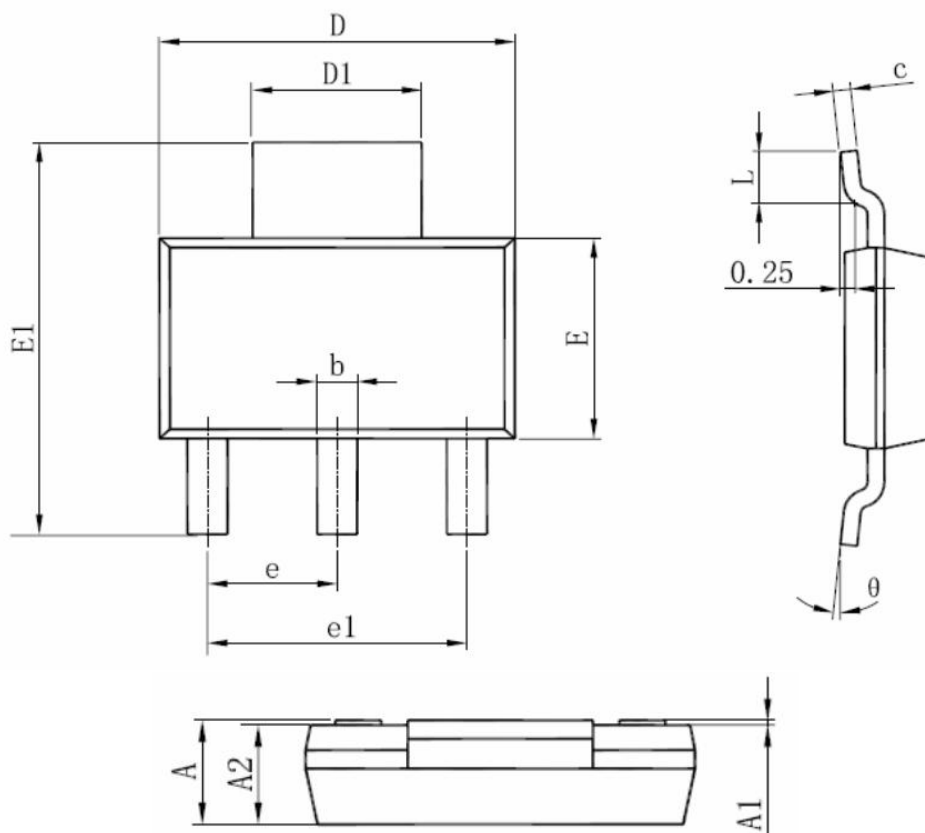


Fig.11 Unclamped Inductive Waveform

SOT-223 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.520	1.800	0.060	0.071
A1	0.000	0.120	0.000	0.005
A2	1.450	1.750	0.057	0.069
b	0.600	0.820	0.024	0.032
c	0.240	0.350	0.010	0.014
D	6.200	6.500	0.244	0.256
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 BSC.		0.091 BSC.	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°