

Features

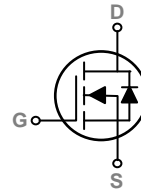
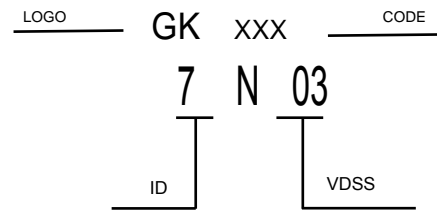
30V,7A, $R_{DS(ON)} = 18.5\text{ m}\Omega$ @ $V_{GS} = 10\text{V}$
Improved dv/dt capability
Fast switching
Green Device Available

V_{DSS} 30 V
 I_D 7.0 A
 $R_{DS(ON)}$ 18.5m Ω



Applications

- Case: Molded plastic
- Mounting Position: Any
- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275°C maximum, 10s per JESD 22-B106



SOT223 Pin Configuration

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	7.0	A
	Drain Current – Continuous ($T_A=100^\circ\text{C}$)	4.1	A
I_{DM}	Drain Current – Pulsed ¹	28	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.56	W
	Power Dissipation – Derate above 25°C	0.012	W/°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	80	°C/W

Electrical Characteristics $T_J=25^\circ\text{C}$ unless otherwise specified

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.04	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=5A$	---	18.5	26	$m\Omega$
		$V_{GS}=4.5V, I_D=4A$	---	27	35	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	$mV/^\circ\text{C}$

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=15V, V_{GS}=4.5V, I_D=6A$	---	4.1	---	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	1	---	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	2.1	---	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega$ $I_D=1A$	---	2.8	---	ns
T_r	Rise Time ^{2, 3}		---	7.2	---	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	15.8	---	
T_f	Fall Time ^{2, 3}		---	4.6	---	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	345	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{riss}	Reverse Transfer Capacitance		---	32	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	7.0	A
I_{SM}	Pulsed Source Current		---	---	14	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=23A, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES

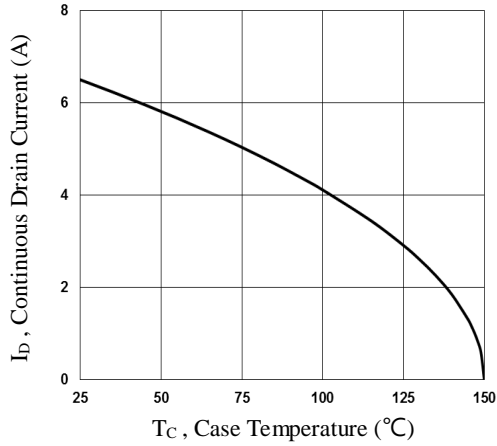


Fig.1 Continuous Drain Current vs. T_c

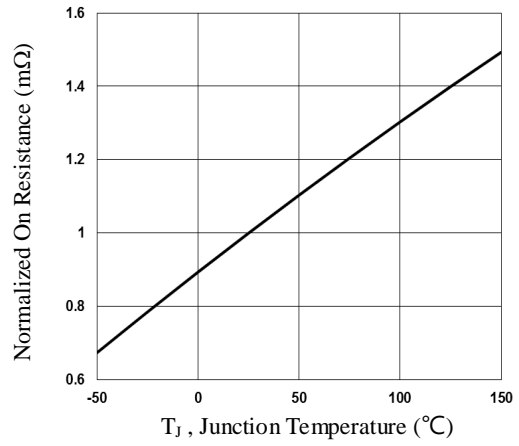


Fig.2 Normalized R_{DSon} vs. T_j

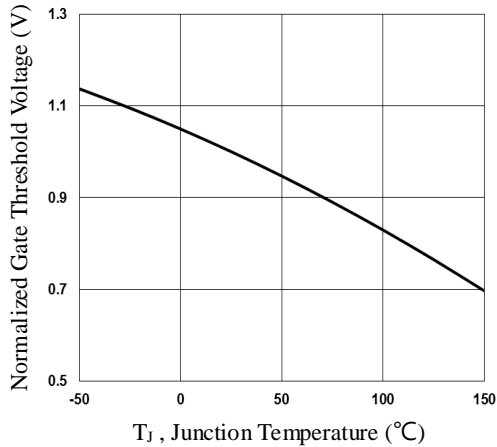


Fig.3 Normalized V_{th} vs. T_j

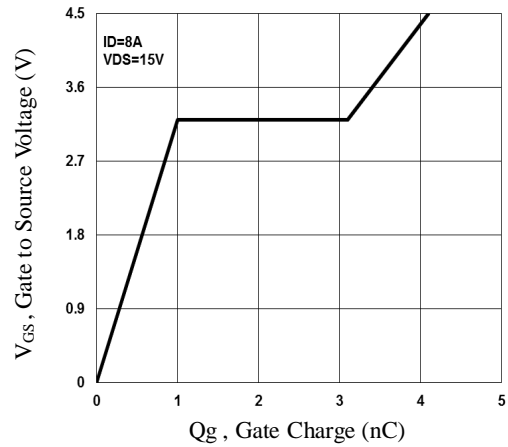


Fig.4 Gate Charge Waveform

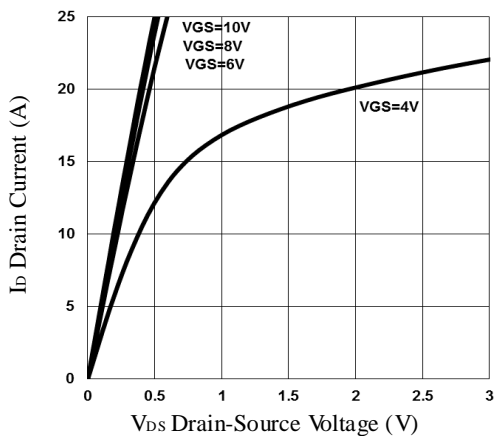


Fig.5 On Region Characteristics

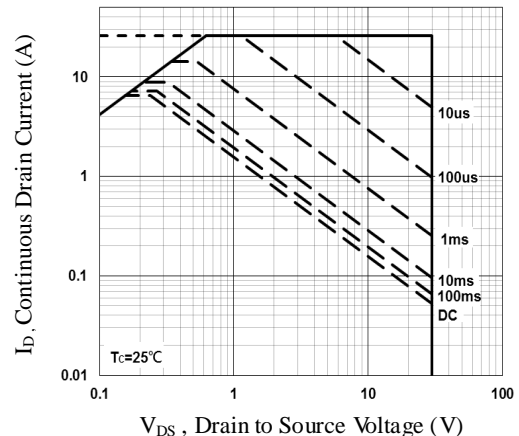


Fig.6 Maximum Safe Operation Area

RATING AND CHARACTERISTIC CURVES

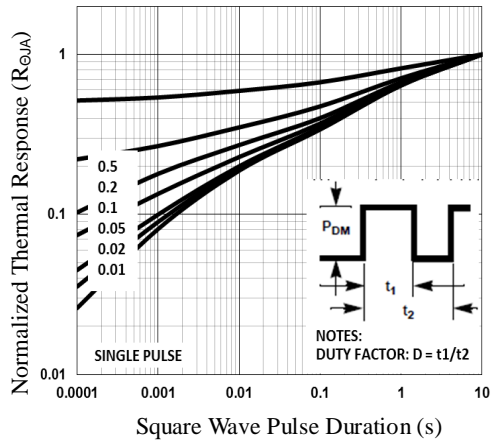


Fig.7 Normalized Transient Response

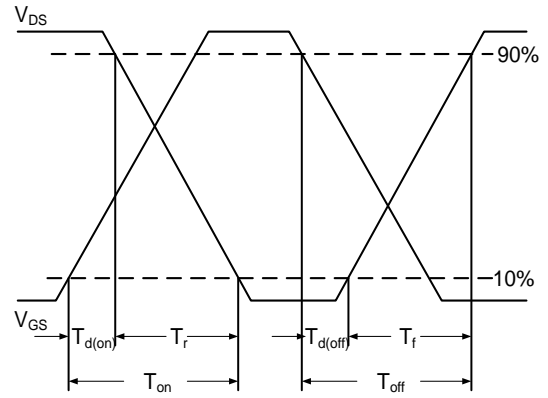


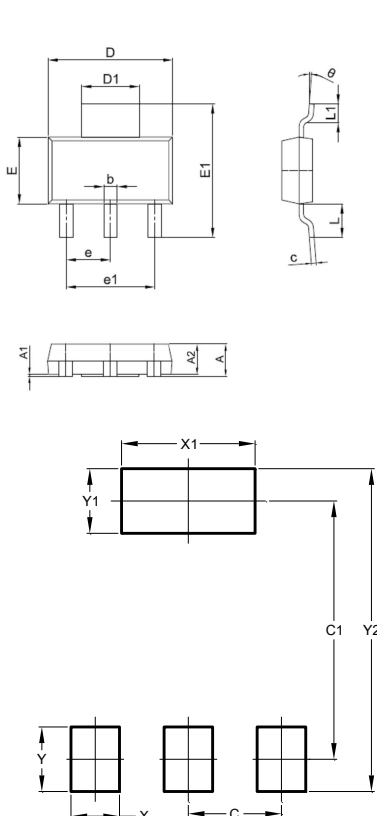
Fig.8 Switching Time Waveform

Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150 °C
	-Temperature Max($T_{s(max)}$)	+200 °C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3 °C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3 °C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217 °C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5) °C
Time within 5 °C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6 °C/sec. Max
Time 25 °C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260 °C



Package Dimensions & Suggested Pad Layout



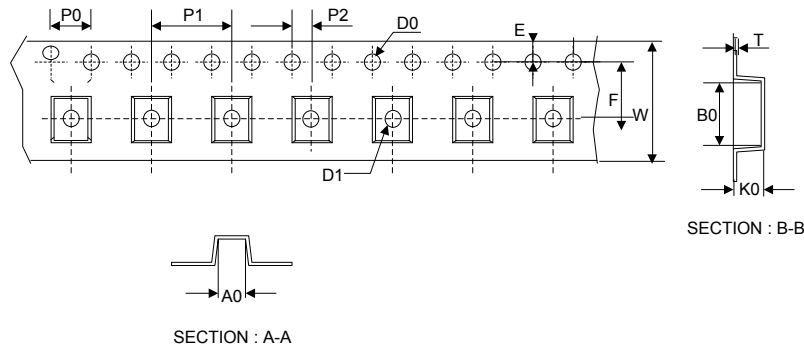
SOT-223

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	1.50	1.80	0.059	0.071
A1	0.00	0.10	0.000	0.004
A2	1.50	1.70	0.059	0.067
b	0.65	0.75	0.026	0.030
c	0.20	0.30	0.008	0.012
D	6.40	6.60	0.252	0.260
D1	2.90	3.10	0.114	0.122
E	3.30	3.70	0.130	0.146
E1	6.85	7.15	0.270	0.281
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	1.65	1.85	0.065	0.073
L1	0.90	1.15	0.035	0.045

Dimensions	Value (in mm)
C	2.30
C1	6.00
X	1.20
X1	3.60
Y	1.70
Y1	1.70
Y2	7.70

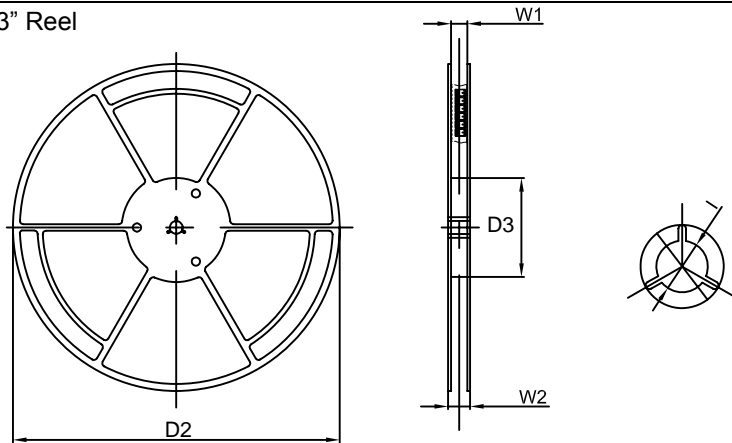
Tape & reel specification

Tape



Symbol	Dimension (mm)
P0	4.00±0.20
P1	8.00±0.20
P2	2.00±0.20
D0	1.55±0.20
D1	1.55±0.20
E	1.75±0.20
F	5.50±0.20
W	12.00±0.20
A0	7.40±0.20
B0	7.50±0.20
K0	2.10±0.20
T	0.20±0.20
D2	330.0±5.0
D3	100.0±4.0
W1	18.0±5.0
W2	22.0±5.0
I	13.0±2.0

13" Reel



Quantity: 2500PCS