

FEATURES

20V, 0.8A, $R_{DS(ON)} = 110m\Omega @ V_{GS} = 4.5V$

Improved dv/dt capability

Fast switching

Green Device Available

V_{DSS} 20 V
 I_D 0.8 A
 $R_{DS(ON)}$ 110m Ω

APPLICATION

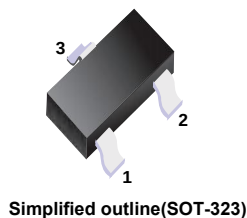
Notebook

Load Switch

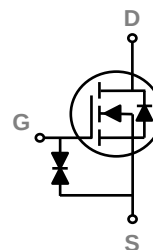
Battery Protection

Hand-held Instruments

21N



Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Maximum ratings ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage	V_{RM}	100	V
Reverse Voltage	V_R	75	V
Continuous Forward Current	I_F	175	mA
Single diode loaded Double diode loaded		100	
Repetitive Peak Forward Current	I_{FRM}	500	mA
Non-repetitive Peak Forward Surge Current	I_{FSM}	0.5	A
at $t = 1$ s		1	
at $t = 1$ ms at $t = 1$ μ s		4	
Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 65 to + 150	$^\circ\text{C}$

Electrical Characteristics

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to $25^\circ C, I_D=1mA$	---	-0.01	---	V/ $^\circ C$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	μA
		$V_{DS}=16V, V_{GS}=0V, T_J=125^\circ C$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 10V, V_{DS}=0V$	---	---	± 10	μA

On Characteristics

$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=0.6A$	---	110	180	m Ω
		$V_{GS}=2.5V, I_D=0.5A$	---	160	250	
		$V_{GS}=1.8V, I_D=0.2A$	---	300	500	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.7	1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3	---	mV/ $^\circ C$

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=10V, V_{GS}=4.5V, I_D=0.5A$	---	1	---	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	0.26	---	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	0.2	---	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=10V, V_{GS}=4.5V, R_G=10\Omega$ $I_D=0.5A$	---	5	---	ns
T_r	Rise Time ^{2, 3}		---	3.5	---	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	14	---	
T_f	Fall Time ^{2, 3}		---	6	---	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, F=1MHz$	---	38.2	---	pF
C_{oss}	Output Capacitance		---	14.4	---	
C_{rss}	Reverse Transfer Capacitance		---	6	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	0.8	A
I_{SM}	Pulsed Source Current		---	---	1.2	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=0.5A, T_J=25^\circ C$	---	---	1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

RATING AND CHARACTERISTIC CURVES

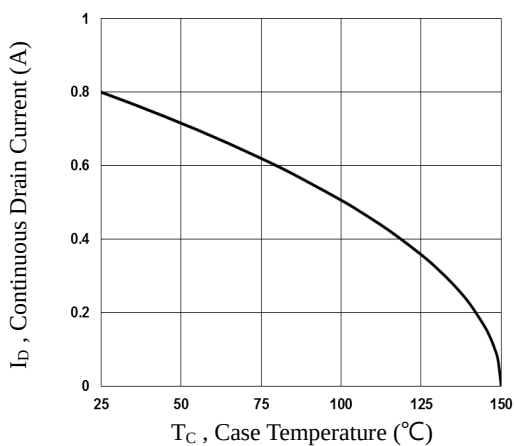


Fig.1 Continuous Drain Current vs. T_C

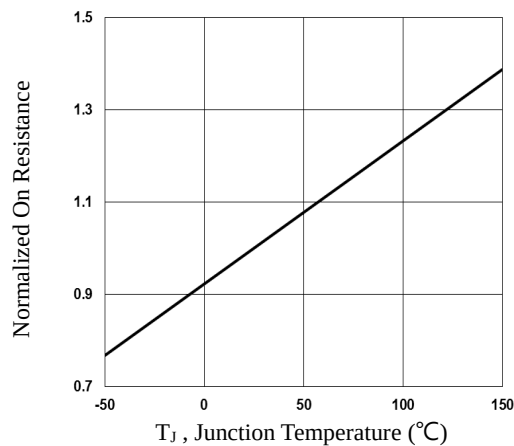


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

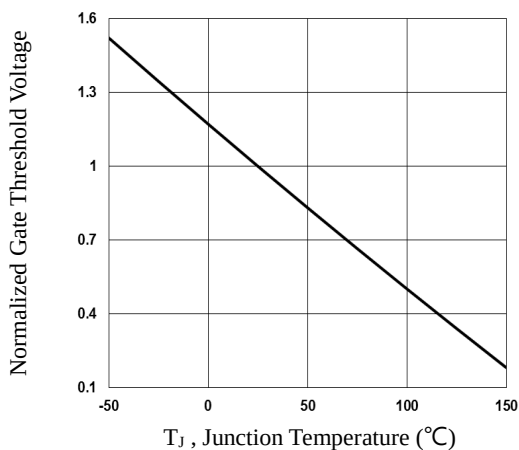


Fig.3 Normalized V_{th} vs. T_J

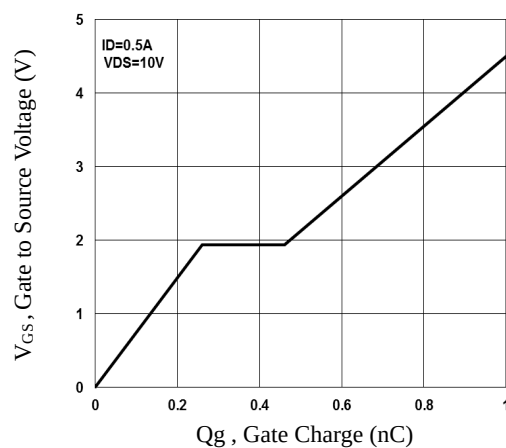


Fig.4 Gate Charge Waveform

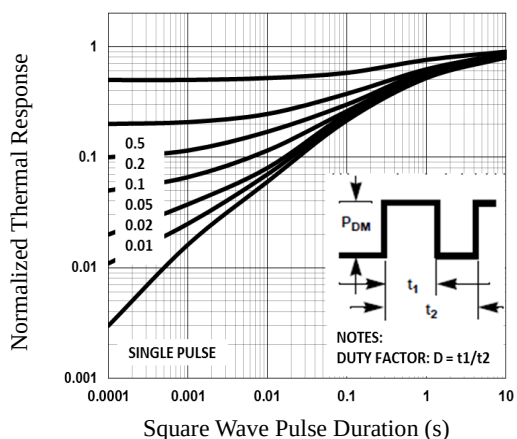


Fig.5 Normalized Transient Response

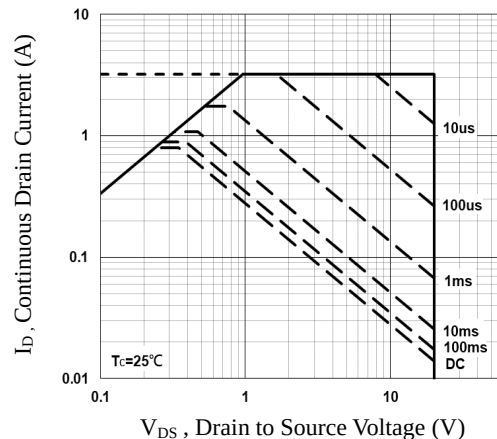


Fig.6 Maximum Safe Operation Area

RATING AND CHARACTERISTIC CURVES

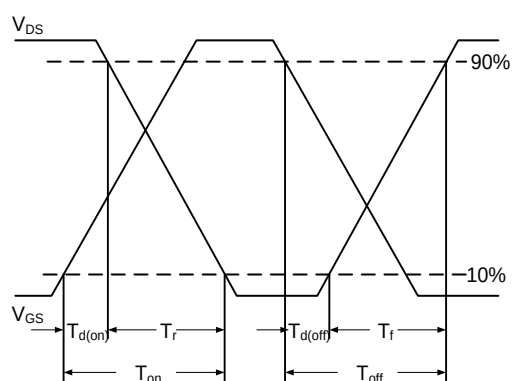


Fig.7 Switching Time Waveform

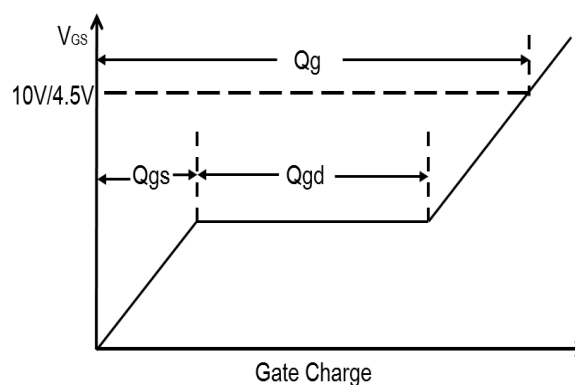
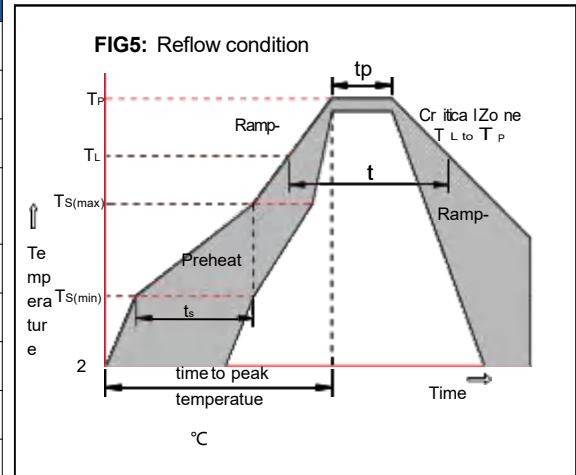


Fig.8 Gate Charge Waveform

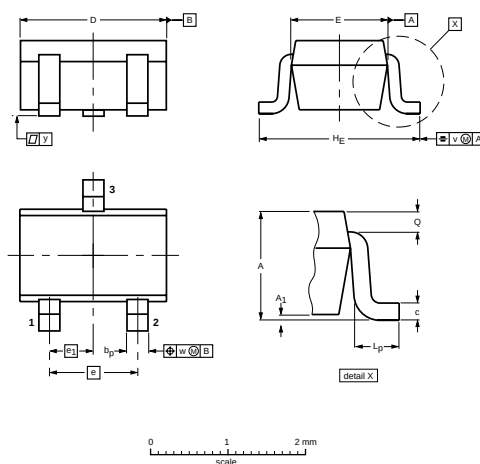
Soldering parameters

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



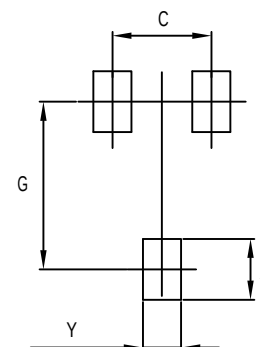
Package Dimensions & Suggested Pad Layout

SOT-323



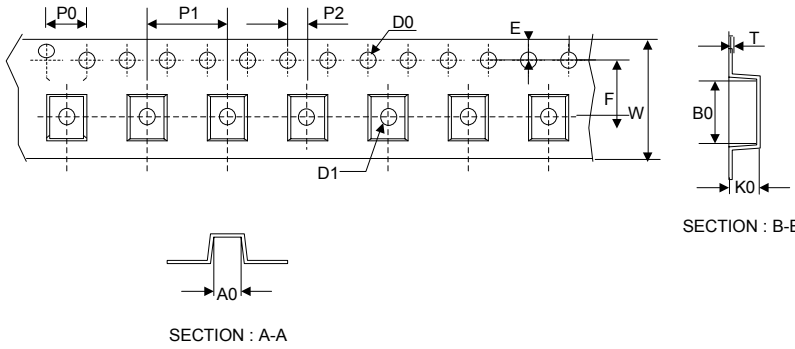
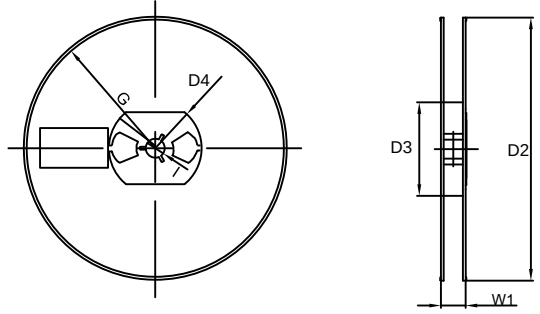
DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2



Dimensions	Value (in mm)
C	1.30
G	2.00
X	0.90
Y	0.65

Tape & reel specification

Tape		Symbol	Dimension (mm)
		P0	4.00±0.20
		P1	4.00±0.20
		P2	2.00±0.20
		D0	1.55±0.20
		D1	1.00±0.20
		E	1.55±0.25
		F	3.60±0.20
		W	8.00±0.20
		A0	2.50±0.20
		B0	2.60±0.20
		K0	1.40±0.20
		T	0.20±0.20
		D2	177.0±5.0
		D3	55Min.
		D4	R24.6±2.0
7" Reel		G	R82.0±2.0
		I	13.0±2.0
		W1	10.20±3.0
		Quantity: 3000PCS	