

DESCRIPTION

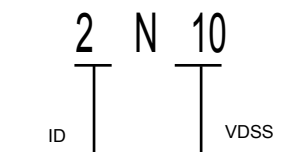
The 2N10 is the high cell density trench N-ch MOSFETs, which provides excellent R_{DS(on)} and efficiency for most of the small power switching and load switch applications.

The 2N10 meet the RoHS and Green Product requirement with full function reliability approved.

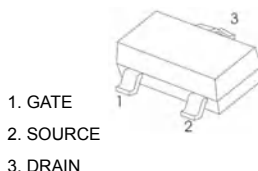
Features

Green Device Available
Super Low Gate Charge
Excellent C_{dv/dt} effect decline
Advanced high cell density Trench technology

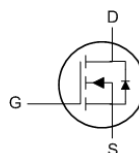
V_{DS} 100 V
 I_D 2 A
 $R_{DS(ON)}$ 225m Ω



SOT-23



Equivalent Circuit



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter		Max.	Units
V_{DS}	Drain-Source Voltage		100	V
V_{GS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	2	A
		$T_A = 100^\circ\text{C}$	1.4	A
I_{DM}	Pulsed Drain Current ^{note1}		8.8	A
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$	2.3	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		54	$^\circ\text{C/W}$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ\text{C}$

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =100V, V _{GS} =0V	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.2	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =10V, I _D =2A	-	225	295	mΩ
		V _{GS} =4.5V, I _D =1A	-	235	330	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	321	-	pF
C _{oss}	Output Capacitance		-	21	-	pF
C _{rss}	Reverse Transfer Capacitance		-	15	-	pF
Q _g	Total Gate Charge	V _{DS} =30V, I _D =2A, V _{GS} =10V	-	5.3	-	nC
Q _{gs}	Gate-Source Charge		-	1.3	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	1.7	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =30V, I _D =1A, R _{GEN} =3Ω, V _{GS} =10V	-	14	-	ns
t _r	Turn-on Rise Time		-	54	-	ns
t _{d(off)}	Turn-off Delay Time		-	18	-	ns
t _f	Turn-off Fall Time		-	11	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	2.2	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	8.8	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =2.2A	-	-	1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

RATING AND CHARACTERISTIC CURVES

Figure1: Output Characteristics

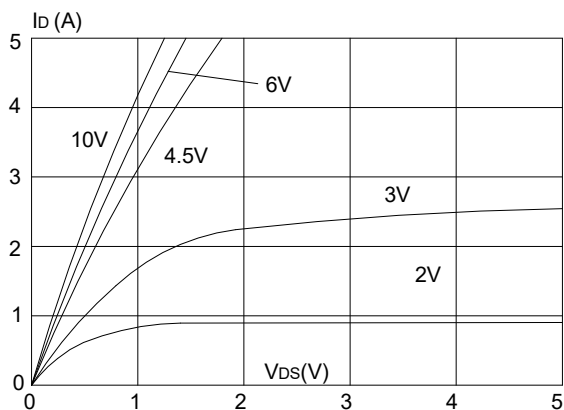


Figure 2: Typical Transfer Characteristics

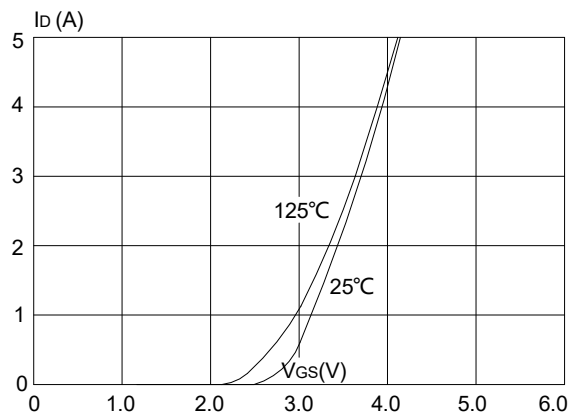


Figure 3: On-resistance vs. Drain Current

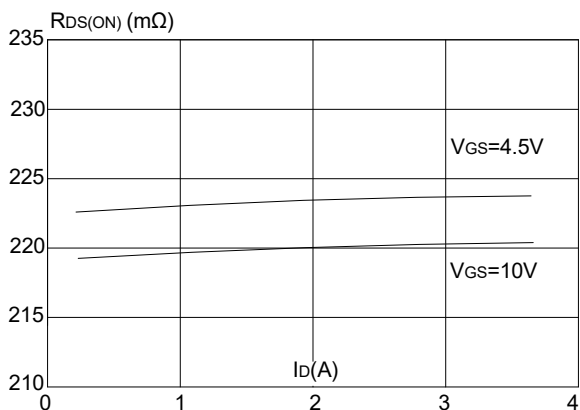


Figure 4: Body Diode Characteristics

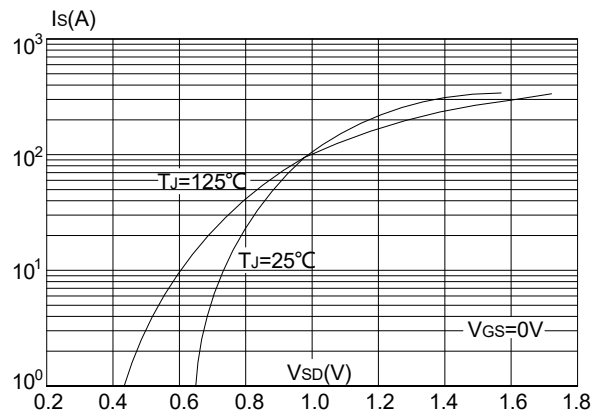


Figure 5: Gate Charge Characteristics

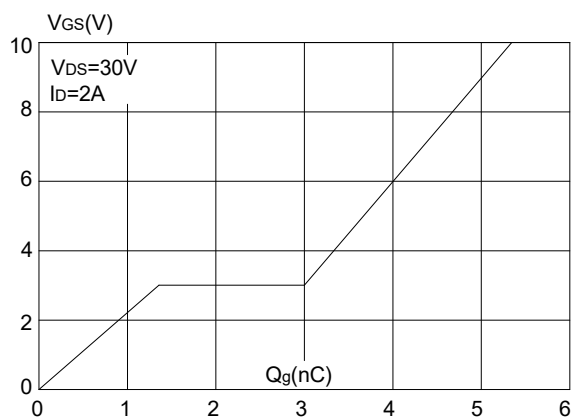
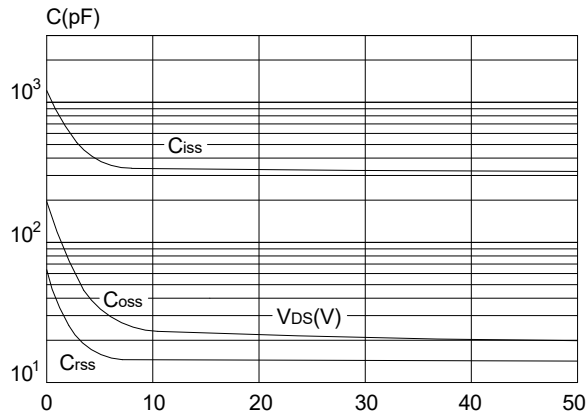


Figure 6: Capacitance Characteristics



RATING AND CHARACTERISTIC CURVES

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

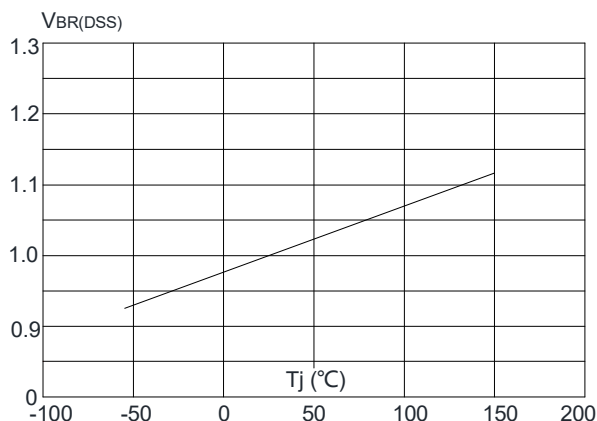


Figure 8: Normalized on Resistance vs. Junction Temperature

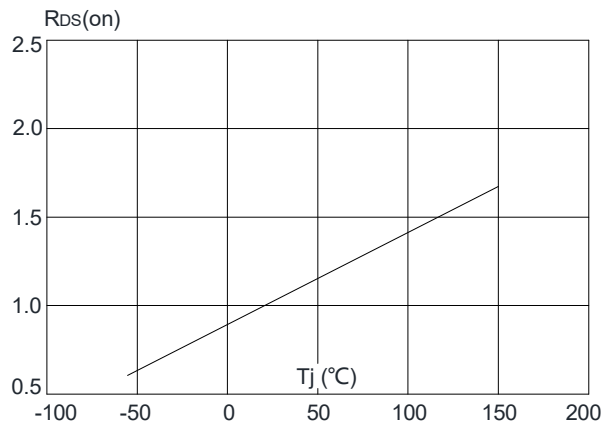


Figure 9: Maximum Safe Operating Area

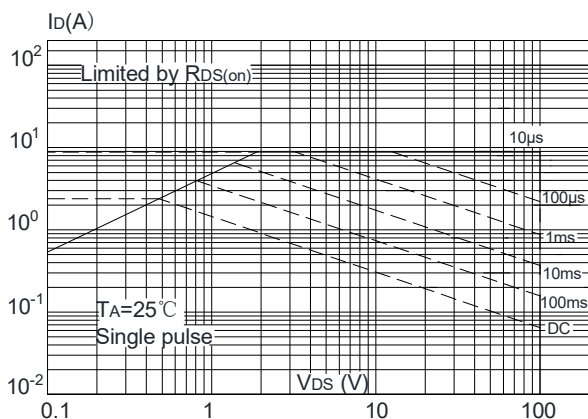


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

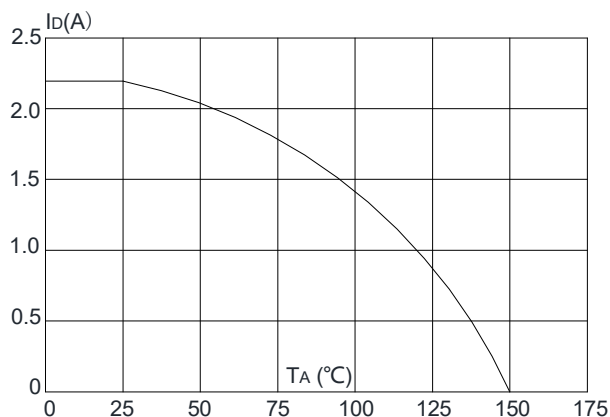
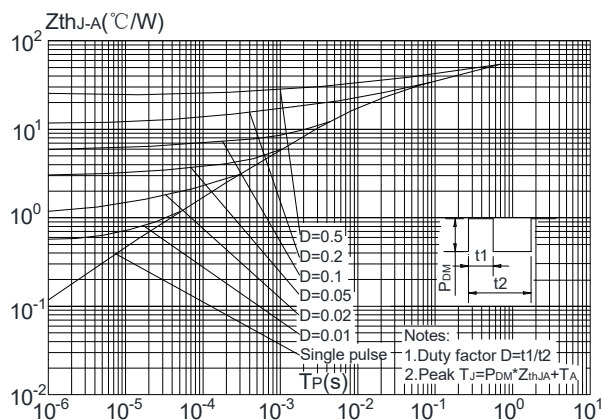
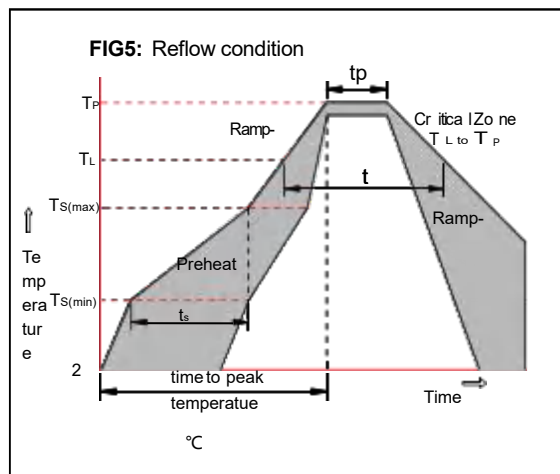


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



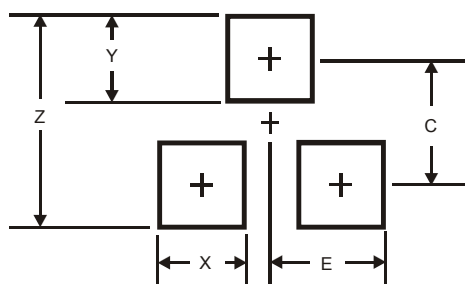
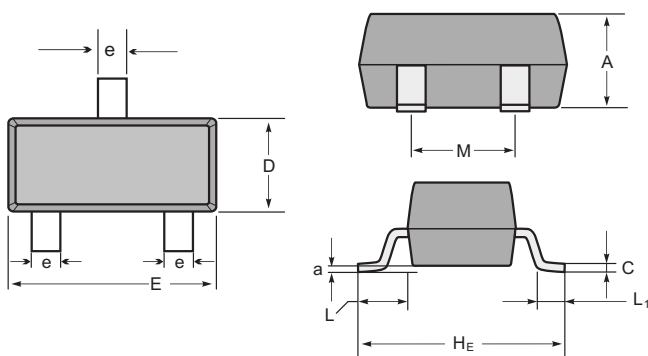
Soldering parameters

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

SOT23

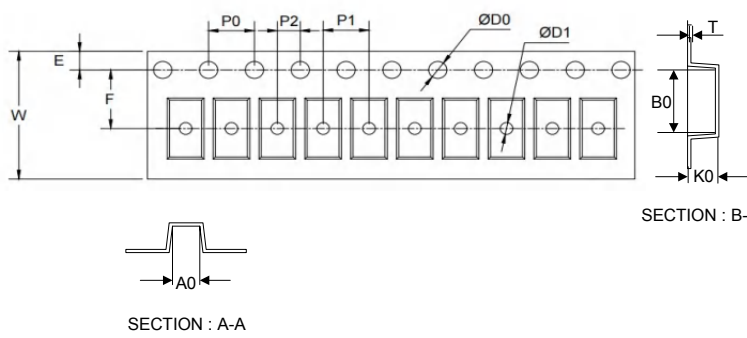
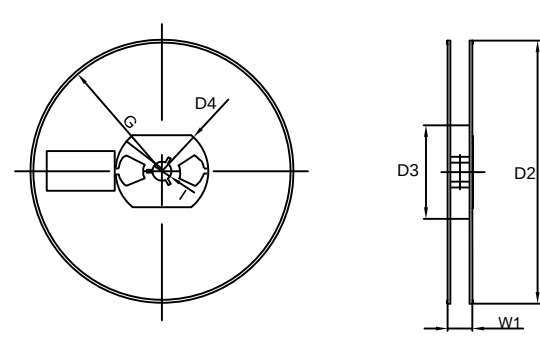


SOT-23 mechanical data

UNIT		A	C	D	E	H _E	e	M	L	L ₁	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

Tape & reel specification

Tape		Symbol	Dimension (mm)
 SECTION : A-A SECTION : B-B		P0	4.00±0.10
		P1	4.00±0.10
		P2	2.00±0.10
		D0	1.55±0.10
		D1	1.05±0.10
		E	1.55±0.10
		F	3.60±0.10
		W	8.00±0.10
		A0	3.80±0.20
		B0	3.25±0.20
		K0	1.45±0.10
		T	0.25±0.05
		D2	178.0±3.0
		D3	55Min.
		D4	R24.0±3.0
7" Reel		G	R82.0±3.0
		I	13.0±2.0
		W1	11.0±3.0
		Quantity: 3000PCS	