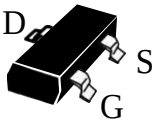
P-Channel High Density Trench MOSFET

Features:

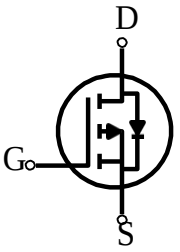
- Super high dense cell trench design for low RDS(on).
- Rugged and reliable.
- Surface Mount package.

SOT-523



PRODUCT SUMMARY

VDSS	ID	RDS(on) (m-ohm) Max
-20V	-2.3	150 @ VGS= 4.5V
	-1.8	200 @ VGS= 2.5V



MARKING： 21E

ABSOLUTE MAXIMUM RATINGS (T_A = 25 ℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		VDS	-20	V
Gate-Source Voltage		VGS	± 8	V
Drain Current-Continuous[a]@ TA= 25 ℃		ID	-2.3	A
-Pulse[b]		IDM	-8	A
Drain-Source Diode Forward Current[a]		IS	-0.75	A
Maximum Power Dissipation[a]	TA=25℃	PD	0.7	W
	TA=75℃		0.25	
Operating Junction and Storage Temperature Range		TJ,TSTG	- 55 to 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient[a]	RthJA	125	℃/W

Note
a. Surface Mounted on FR4 Board , t ≤ 10sec.
b. Pulse width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS (T_A = 25 ℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ[c]	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V , I_D = -250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20V , V_{GS} = 0V			-1	uA
Gate-Body Leakage	I_{GSS}	V_{GS} = ±8V , V_{DS} = 0V			-100	nA
ON CHARACTERISTICS[b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = -250uA	-0.45	-0.65	-0.95	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = -4.5V , I_D = -2.3A		125	150	m-ohm
		V_{GS} = -2.5V , I_D = -1.8A		170	200	m-ohm
DRAIN-SOURCE DIODE CHARACTERISTICS[b]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V , I_S = -0.75A			-1.2	V
DYNAMIC CHARACTERISTICS[c]						
Input Capacitance	C_{ISS}	V_{DS} = -15V , V_{GS} = 0V f = 1.0MHz		435		pF
Output Capacitance	C_{OSS}			121		pF
Reverse Transfer Capacitance	C_{RSS}			78		pF
SWITCHING CHARACTERISTICS[c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -10V , I_D= -1A V_{GEN} = -4.5V R_L = 6 ohm R_{GEN} = 6 ohm		9.5		ns
Rise Time	t_r			4.2		ns
Turn-Off Delay Time	$t_{D(OFF)}$			29.5		ns
Fall Time	t_f			13.7		ns
Total Gate Charge	Q_g	V_{DS} = -10V I_D = -2.3A V_{GS} = -4.5V		8.6		nC
Gate-Source Charge	Q_{gs}			1.7		nC
Gate-Drain Charge	Q_{gd}			1.2		nC

Note
b. Pulse Test Pulse width ≤ 300us , Duty Cycle ≤ 2% .
c. Guaranteed by design , not subject to production testing .

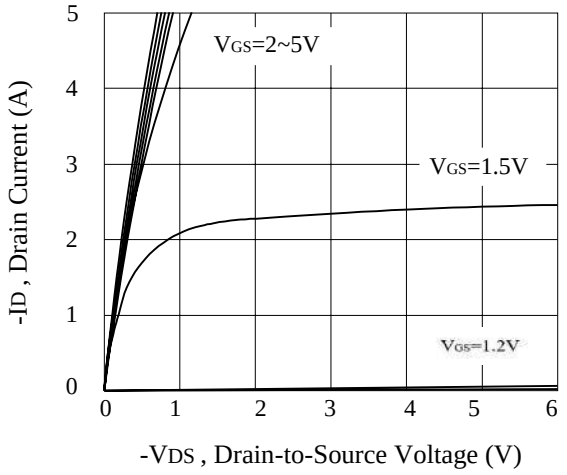


Figure 1. Output Characteristics

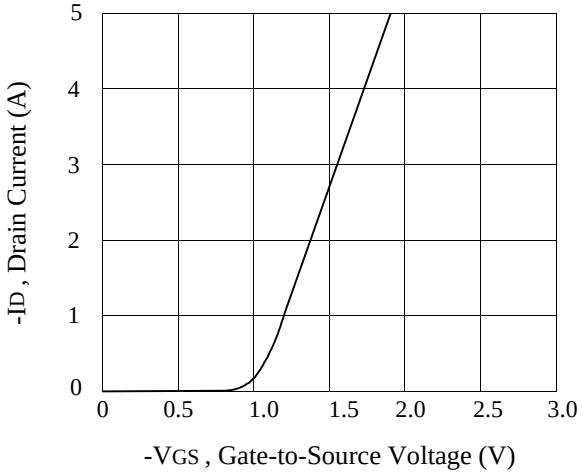


Figure 2. Transfer Characteristics

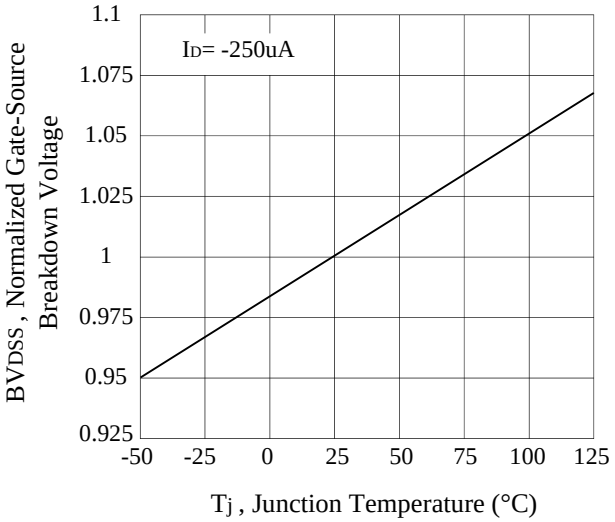


Figure 3. Breakdown Voltage Variation with Temperature

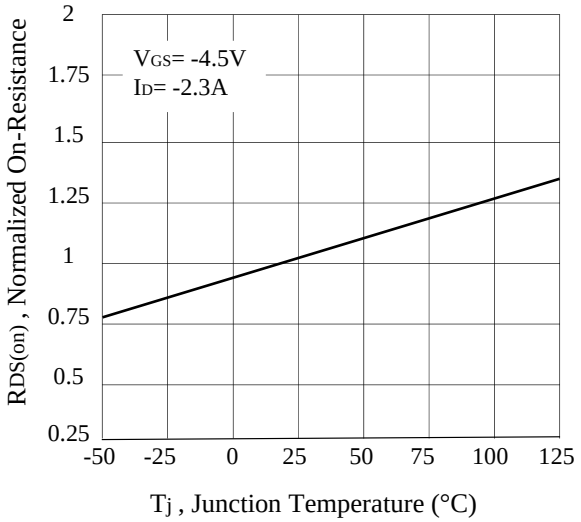


Figure 4. On-Resistance Variation with Temperature

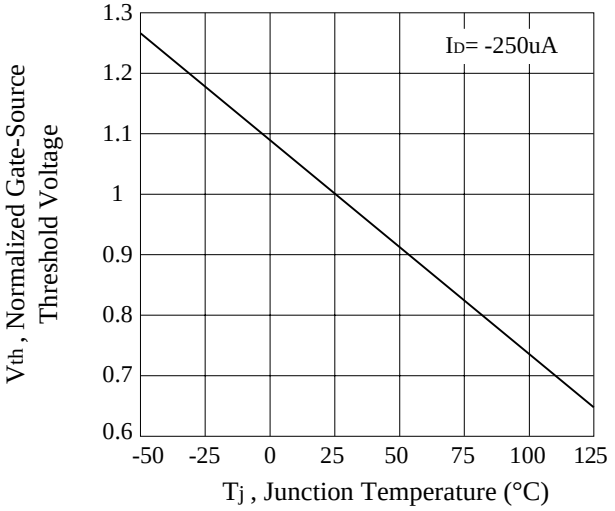


Figure 5. Gate Threshold Variation with Temperature

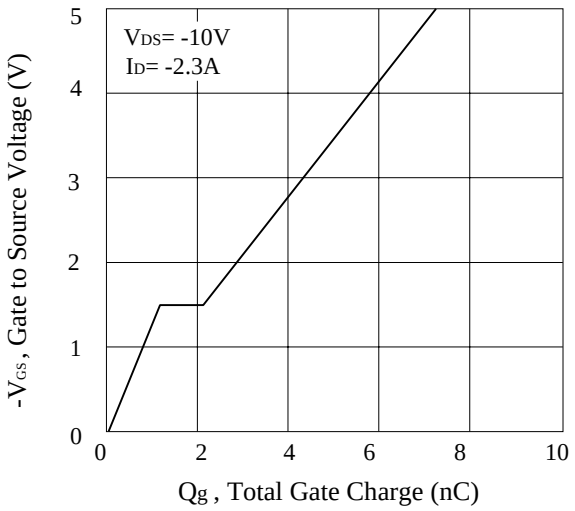


Figure 6. Gate Charge

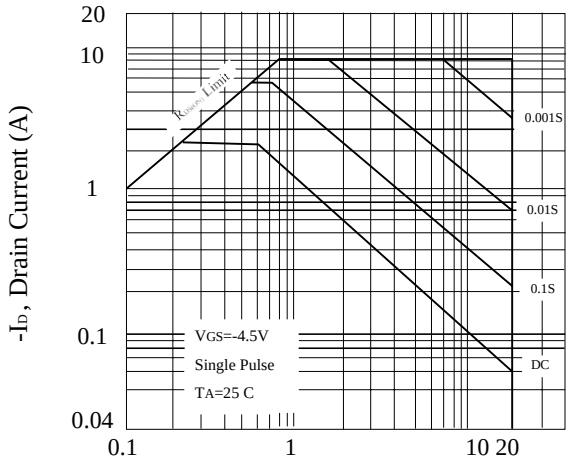


Figure 7. Maximum Safe Operating Area

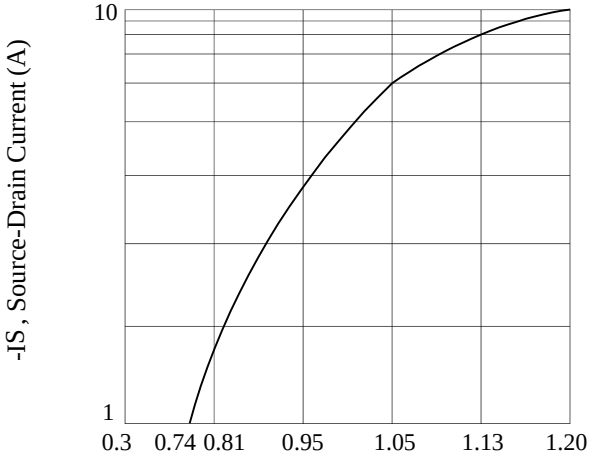


Figure 8. Body Diode Forward Voltage Variation with Source Current

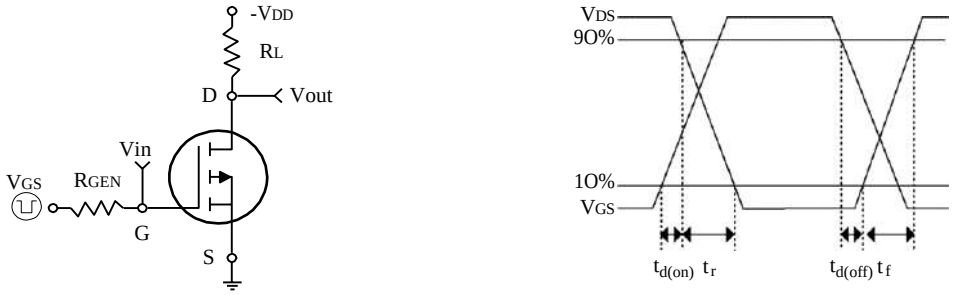


Figure 9. Switching Test Circuit and Switching Waveforms

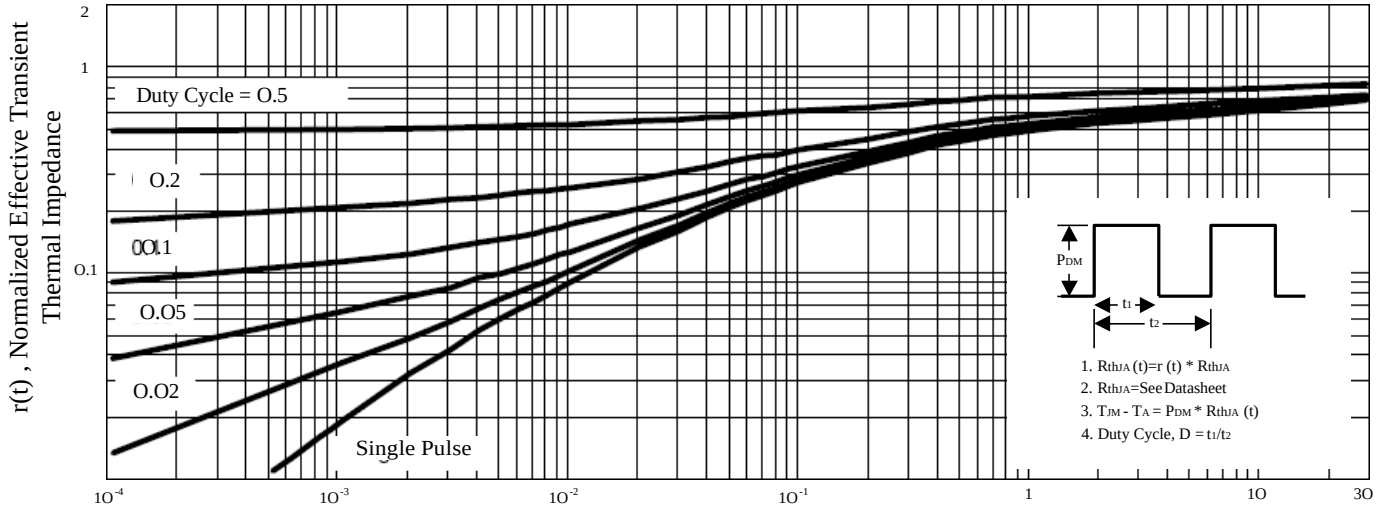
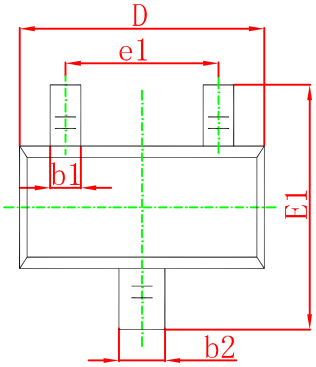
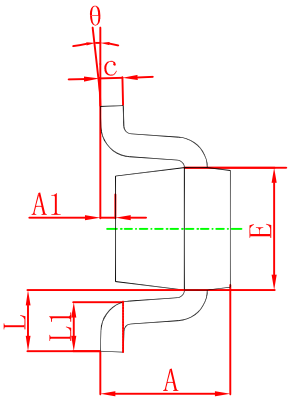
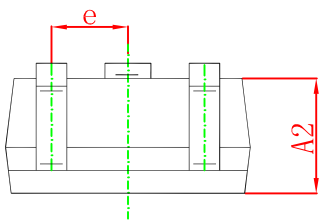


Figure 10. Normalized Thermal Transient Impedance Curve

SOT-523 Package Outline Dimensions

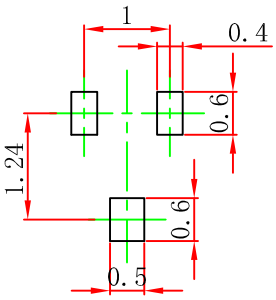






Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT-523 Suggested Pad Layout

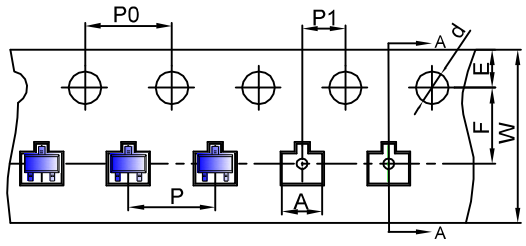


Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

SOT-523 Tape and Reel

SOT-523 Tape and reel

SOT-523 Embossed Carrier Tape

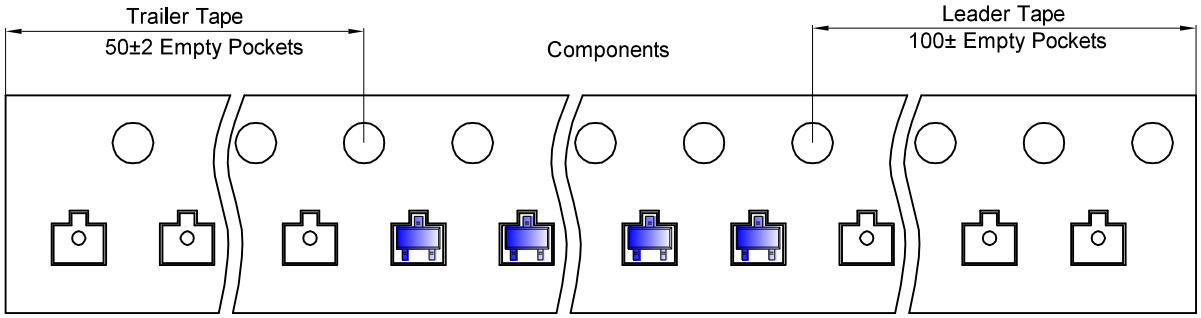


Packaging Description:

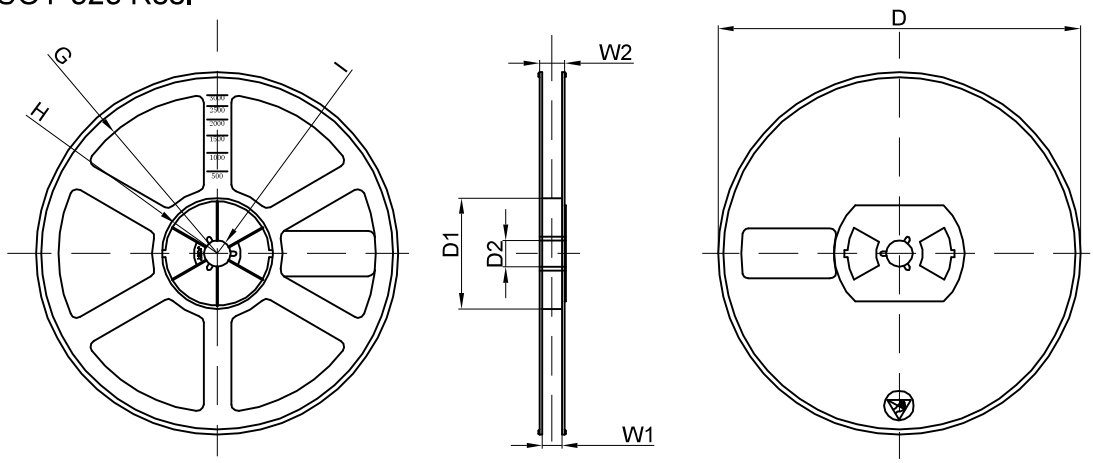
SOT-523 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-523	1.85	1.85	0.875	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-523 Tape Leader and Trailer



SOT-523 Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	30,000 pcs	203×203×195	120,000 pcs	438×438×220	