

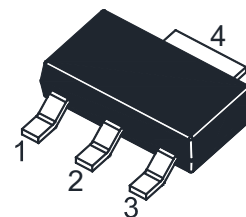
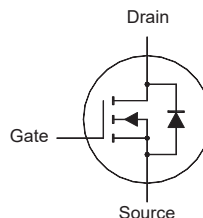
N-Channel Enhancement Mode MOSFET

Features

- Low threshold drive
- Halogen and Antimony Free(HAF),
RoHS compliant

Applications

- Switching applications
- DC-DC converters for Telecom and Computer



1.Gate 2.Drain 3.Source 4.Drain
SOT-223 Plastic Package

Key Parameters

Parameter	Value	Unit
BV _{DSS}	60	V
R _{DS(ON)} Max	78 @ V _{GS} = 10 V	mΩ
	100 @ V _{GS} = 4.5 V	
V _{GS(th)} typ	1.7	V
Q _g typ	4.3 @ V _{GS} = 4.5 V	nC

Absolute Maximum Ratings (at T_a = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	60	V
Gate-Source Voltage	V _{GS}	± 20	V
Drain Current	I _D	4	A
		2.9	
Peak Drain Current, Pulsed ¹⁾	I _{DM}	16	A
Single-Pulse Avalanche Current	I _{AS}	5.4	A
Single-Pulse Avalanche Energy ²⁾	E _{AS}	1.5	mJ
Power Dissipation	P _D	1.25	W
Operating Junction and Storage Temperature Range	T _j , T _{stg}	- 55 to + 150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance - Junction to Case	R _{θJC}	20	°C/W
Thermal Resistance - Junction to Ambient ³⁾ Steady State	R _{θJA}	100	°C/W

¹⁾ Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C.

²⁾ Limited by T_{J(MAX)}, starting T_J = 25 °C, L = 0.1 mH, R_g = 25 Ω, I_{AS} = 5.4 A, V_{GS} = 10 V.

³⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

Characteristics at T_a = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I _D = 250 μ A	BV _{DSS}	60	-	-	V
Drain-Source Leakage Current at V _{DS} = 48 V	I _{DSS}	-	-	1	μ A
Gate Leakage Current at V _{GS} = $\pm$ 20 V	I _{GSS}	-	-	$\pm$ 100	nA
Gate-Source Threshold Voltage at V _{DS} = V _{GS} , I _D = 250 μ A	V _{GS(th)}	1.2	-	2.5	V
Drain-Source On-State Resistance at V _{GS} = 10 V, I _D = 2 A at V _{GS} = 4.5 V, I _D = 1.5 A	R _{DS(on)}	- -	68 -	78 100	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at V _{DS} = 5 V, I _D = 2 A	g _{FS}	-	3.9	-	S
Gate Resistance at V _{DS} = 0 V, V _{GS} = 0 V, f = 1 MHz	R _g	-	0.9	-	Ω
Input Capacitance at V _{DS} = 30 V, V _{GS} = 0 V, f = 1 MHz	C _{iss}	-	446.6	-	pF
Output Capacitance at V _{DS} = 30 V, V _{GS} = 0 V, f = 1 MHz	C _{oss}	-	26	-	pF
Reverse Transfer Capacitance at V _{DS} = 30 V, V _{GS} = 0 V, f = 1 MHz	C _{rss}	-	5	-	pF
Gate Charge Total at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A at V _{DS} = 30 V, V _{GS} = 4.5 V, I _D = 3 A	Q _g	- -	8.1 4.3	- -	nC
Gate to Source Charge at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A	Q _{gs}	-	1.9	-	nC
Gate to Drain Charge at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A	Q _{gd}	-	1.9	-	nC
Turn-On Delay Time at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A, R _g = 4.7 Ω	t _{d(on)}	-	7	-	ns
Turn-On Rise Time at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A, R _g = 4.7 Ω	t _r	-	3	-	ns
Turn-Off Delay Time at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A, R _g = 4.7 Ω	t _{d(off)}	-	6	-	ns
Turn-Off Fall Time at V _{DS} = 30 V, V _{GS} = 10 V, I _D = 3 A, R _g = 4.7 Ω	t _f	-	2	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I _S = 4 A, V _{GS} = 0 V	V _{SD}	-	-	1.2	V
Body-Diode Continuous Current	I _S	-	-	4	A
Body-Diode Continuous Current, Pulsed	I _{SM}	-	-	16	A
Body Diode Reverse Recovery Time at I _S = 4 A, di/dt = 100 A / μ s	t _{rr}	-	8.4	-	ns
Body Diode Reverse Recovery Charge at I _S = 4 A, di/dt = 100 A / μ s	Q _{rr}	-	4.6	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

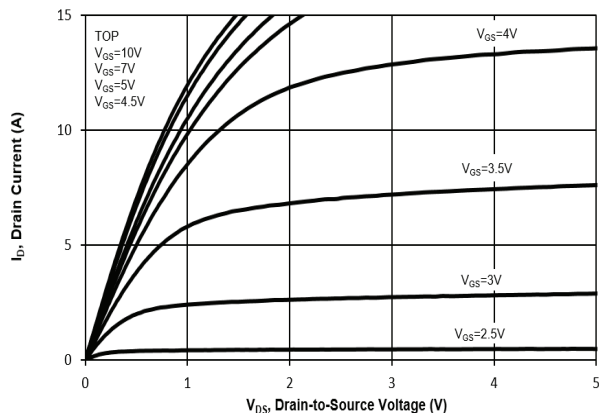


Fig. 2 Typical Transfer Characteristics

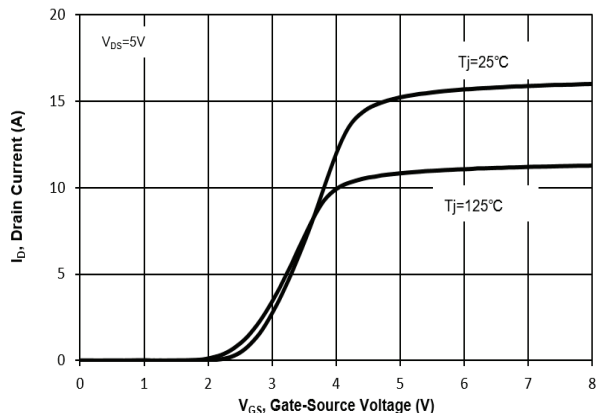


Fig. 3 On-Resistance vs. Drain Current

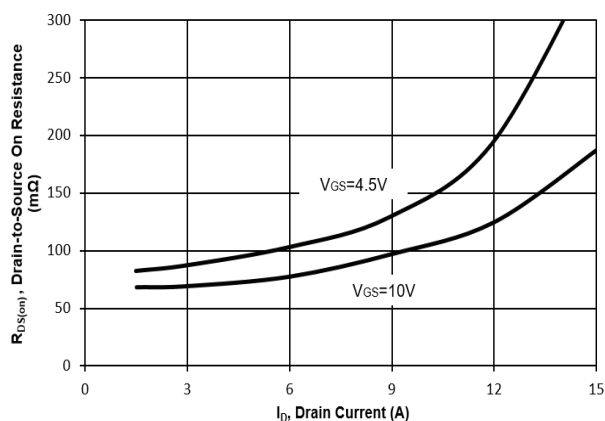


Fig. 4 On-Resistance vs. Gate to Source Voltage

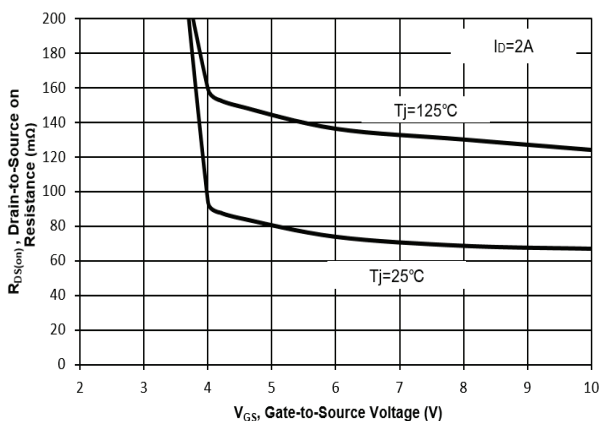


Fig. 5 On-Resistance vs. T_J

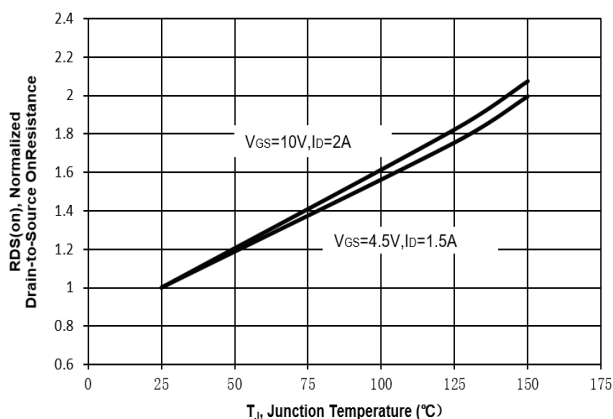
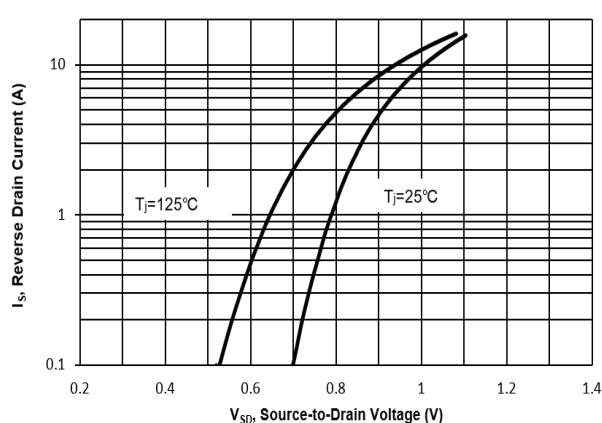


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

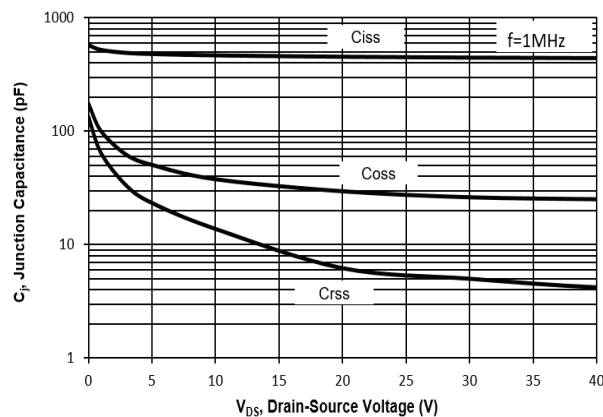


Fig. 8 Drain-Source Leakage Current vs. T_j

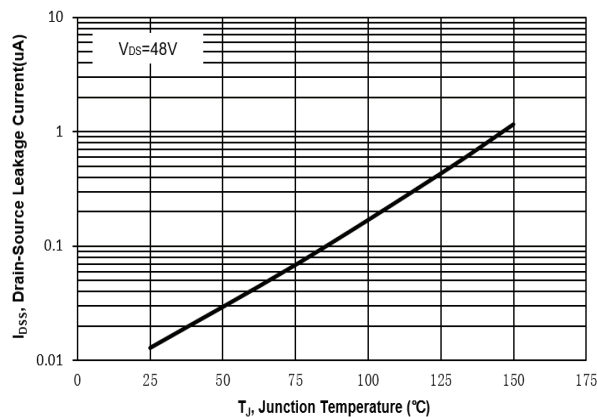


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

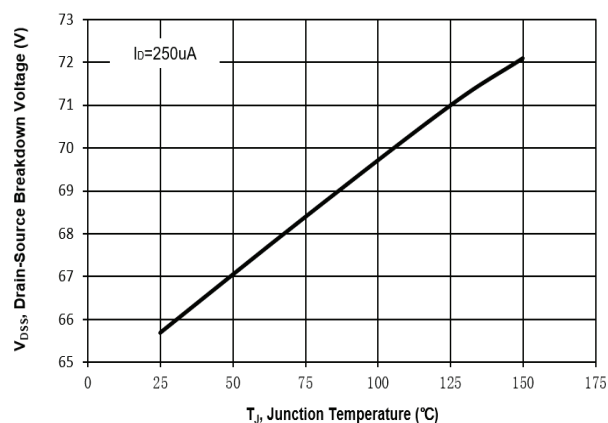


Fig. 10 Gate Threshold Variation vs. T_j

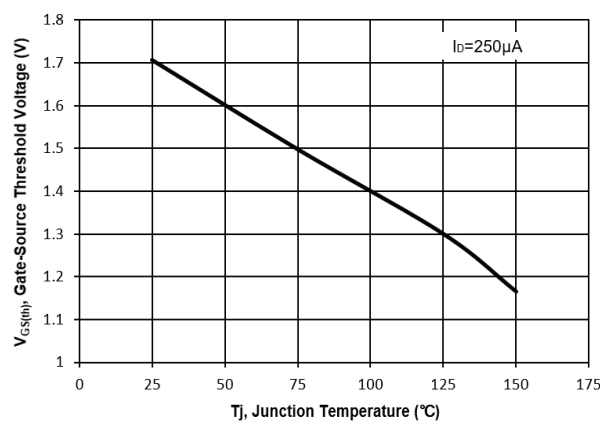


Fig. 11 Gate Charge

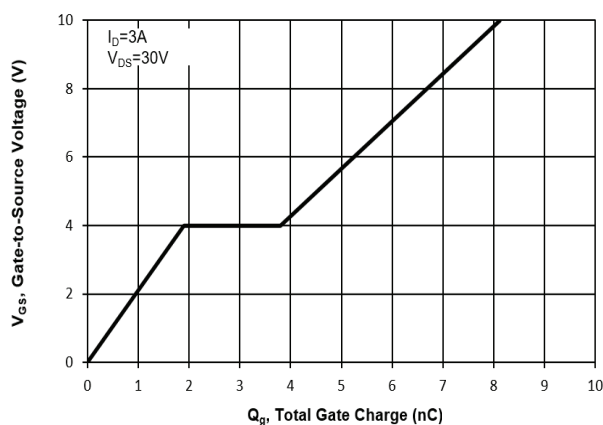
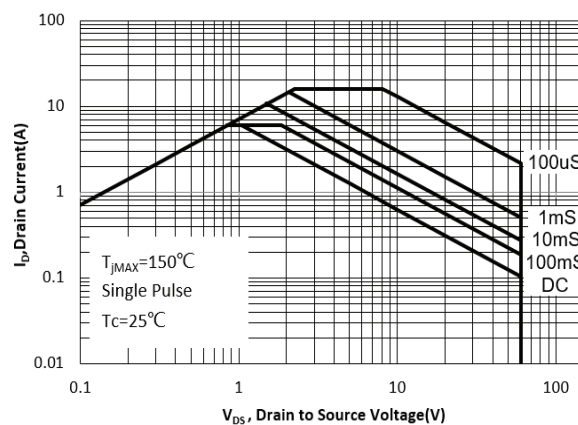
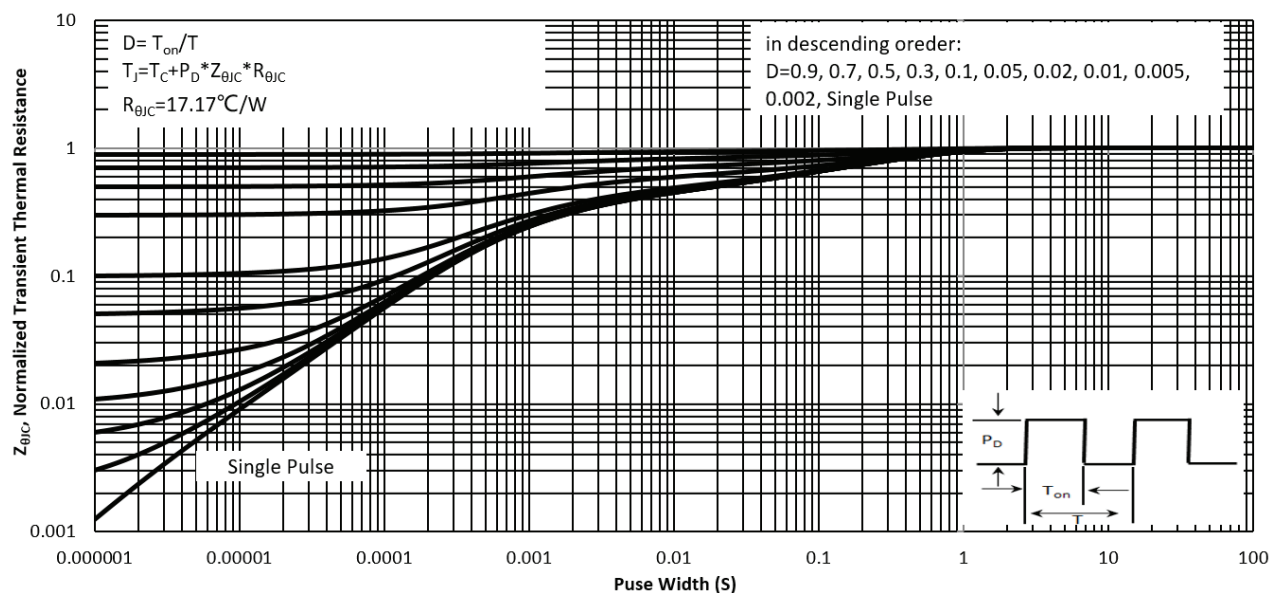


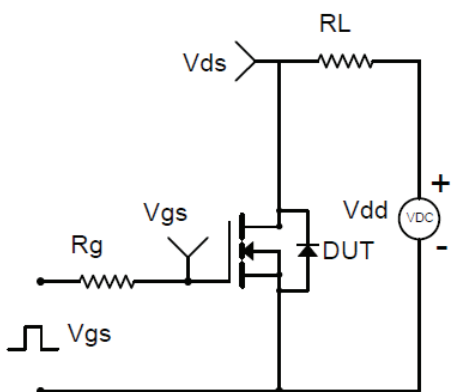
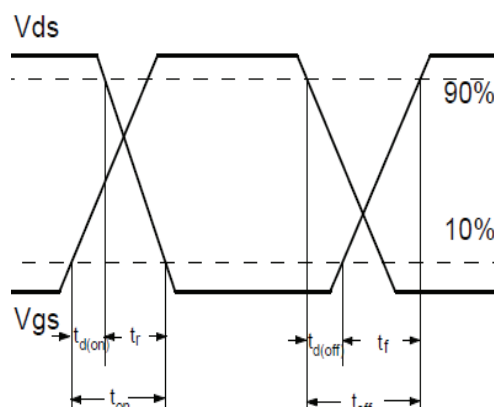
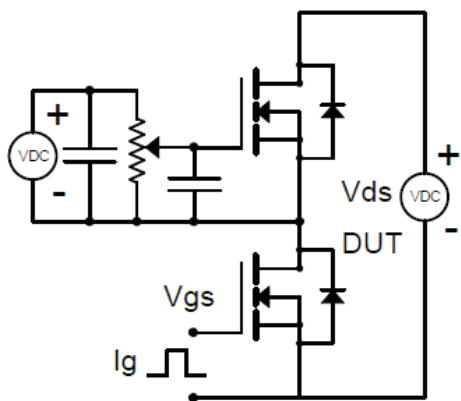
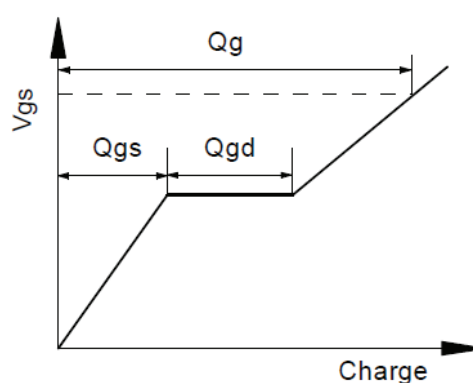
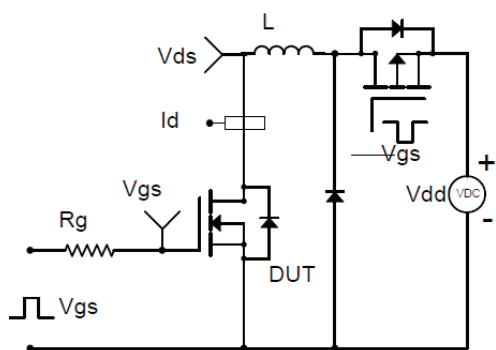
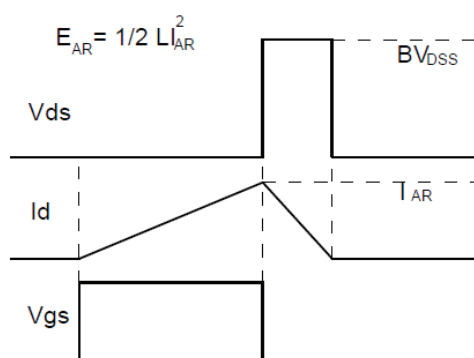
Fig. 12 Safe Operation Area



Electrical Characteristics Curves

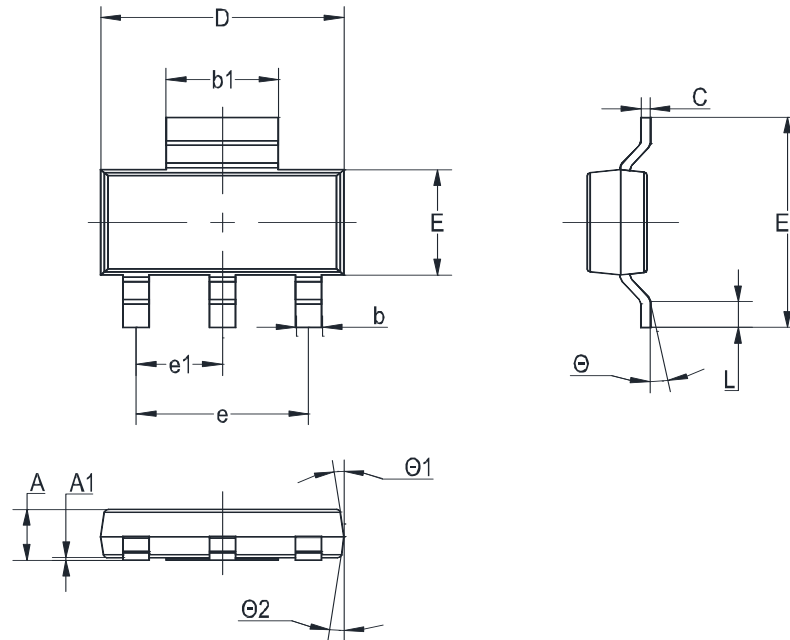
Fig.13 Normalized Maximum Transient Thermal Impedance($z_{\theta JC}$)



Test Circuits
Fig.1-1 Switching times test circuit

Fig.1-2 Switching Waveform

Fig.2-1 Gate charge test circuit

Fig.2-2 Gate charge waveform

Fig.3-1 Avalanche test circuit

Fig.3-2 Avalanche waveform


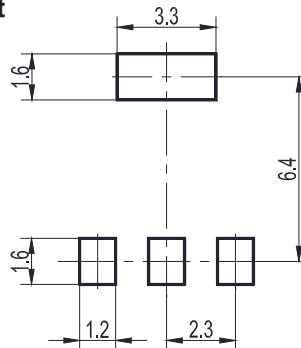
Package Outline (Dimensions in mm)

SOT-223



Unit	A	A1	b	b1	C	D	E	E1	e	e1	L	Θ	Θ1	Θ2
mm	1.8 1.5	0.1 MAX	0.8 0.6	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	7.3 6.7	4.6 TYP	2.3 TYP	1.1 0.7	10° 0°	7° 0°	7° 0°

Recommended Soldering Footprint



Packing information

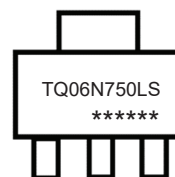
Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-223	12	8 ± 0.1	0.315 ± 0.004	330	13	3,000

Marking information

" TQ06N750LS " = Part No.

" ***** " = Date Code Marking

Font type: Arial



Disclaimer: Our company reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability, anytime without notice.