

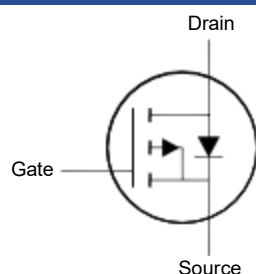
Descriptions

The CTCS50P10BD is P-Channel Enhancement Mode MOSFET, TO-263 plastic package.

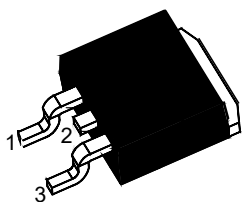
Features

- Low On-Resistance
- Surface-mounted package

Equivalent Circuit



Pinning



1.Gate 2.Drain 3.Source
TO-263 Plastic Package

Marking

Model	CTCS50P10BD
Marking	50P10

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$-I_D$	38	A
$T_C = 25^\circ\text{C}$		24	
$T_C = 100^\circ\text{C}$			
Peak Drain Current, Pulsed ¹⁾	$-I_{DM}$	100	A
Single Pulse Avalanche Current	$-I_{AS}$	21	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	110	mJ
Total Power Dissipation	P_{tot}	125	W
$T_C = 25^\circ\text{C}$			
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient ³⁾	$R_{\theta JA}$	35	$^\circ\text{C/W}$

¹⁾ Pulse Test: Pulse Width $\leq 100 \mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_J(\text{MAX}) = 150^\circ\text{C}$..

²⁾ Limited by $T_J(\text{MAX})$, starting $T_J = 25^\circ\text{C}$, $L = 0.5 \text{ mH}$, $R_g = 25 \Omega$, $-I_{AS} = 21 \text{ A}$, $V_{GS} = 10 \text{ V}$.

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

Electrical Characteristics(Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $-I_D = 250 \mu A$	$-BV_{DSS}$	100	-	-	V
Drain-Source Leakage Current at $-V_{DS} = 100 V$	$-I_{DSS}$	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20 V$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $-I_D = 250 \mu A$	$-V_{GS(th)}$	1	-	2.6	V
Drain-Source On-State Resistance at $-V_{GS} = 10 V$, $-I_D = 12 A$ at $-V_{GS} = 4.5 V$, $-I_D = 10 A$	$R_{DS(on)}$	- -	39 -	50 56	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $-V_{DS} = 5 V$, $-I_D = 12 A$	g_{FS}	-	28	-	S
Gate Resistance at $V_{GS} = 0 V$, $V_{DS} = 0 V$, $f = 1 MHz$	R_g	-	9	-	Ω
Input Capacitance at $-V_{DS} = 50 V$, $V_{GS} = 0 V$, $f = 1 MHz$	C_{iss}	-	1262	-	pF
Output Capacitance at $-V_{DS} = 50 V$, $V_{GS} = 0 V$, $f = 1 MHz$	C_{oss}	-	236	-	pF
Reverse Transfer Capacitance at $-V_{DS} = 50 V$, $V_{GS} = 0 V$, $f = 1 MHz$	C_{rss}	-	11.6	-	pF
Total Gate Charge at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$ at $-V_{DS} = 50 V$, $-V_{GS} = 4.5 V$, $-I_D = 20 A$	Q_g	- -	22 10.4	- -	nC
Gate-Source Charge at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$	Q_{gs}	-	5.4	-	nC
Gate-Drain Charge at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$	Q_{gd}	-	5	-	nC
Turn-On Delay Time at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$, $R_g = 3.3 \Omega$	$t_{d(on)}$	-	9	-	ns
Turn-On Rise Time at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$, $R_g = 3.3 \Omega$	t_r	-	32	-	ns
Turn-Off Delay Time at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$, $R_g = 3.3 \Omega$	$t_{d(off)}$	-	19.7	-	ns
Turn-Off Fall Time at $-V_{DS} = 50 V$, $-V_{GS} = 10 V$, $-I_D = 20 A$, $R_g = 3.3 \Omega$	t_f	-	6.5	-	ns

Electrical Characteristics(Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $-I_S = 1\text{ A}$, $V_{GS} = 0\text{ V}$	$-V_{SD}$	-	-	1.2	V
Body-Diode Continuous Current	$-I_S$	-	-	38	A
Body-Diode Continuous Current, Pulsed	$-I_{SM}$	-	-	100	A
Body Diode Reverse Recovery Time at $-I_S = 20\text{ A}$, $di/dt = 100\text{ A} / \mu\text{s}$	t_{rr}	-	50	-	ns
Body Diode Reverse Recovery Charge at $-I_S = 20\text{ A}$, $di/dt = 100\text{ A} / \mu\text{s}$	Q_{rr}	-	133	-	nC

Electrical Characteristic Curve

Fig. 1 Typical Output Characteristics

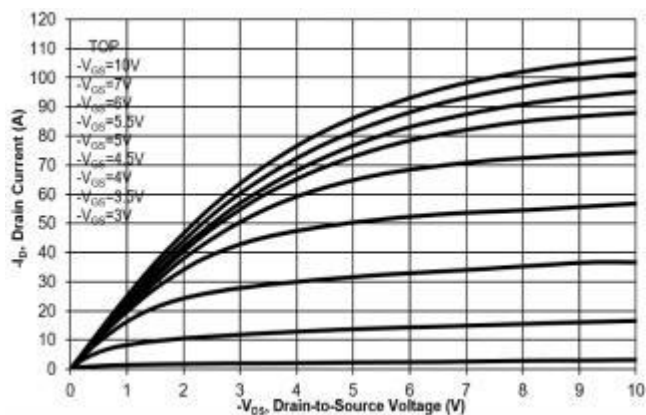


Fig. 2 Typical Transfer Characteristics

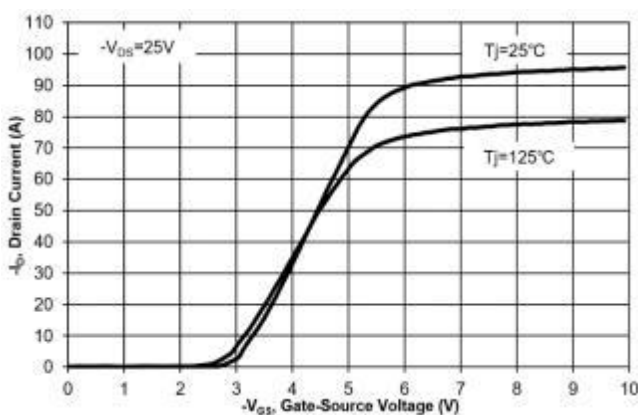


Fig. 3 on-Resistance vs. Drain Current

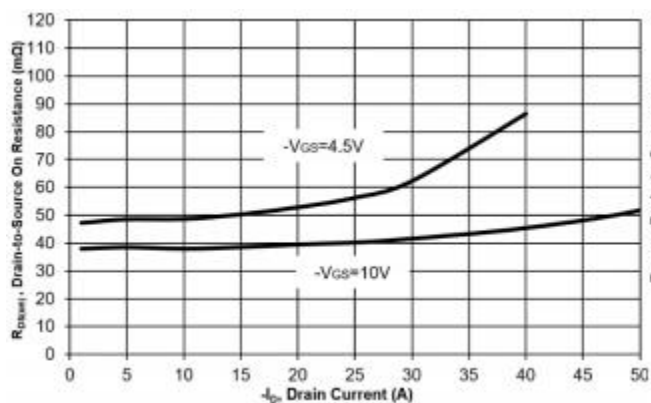


Fig. 4 on-Resistance vs. Gate to Source Voltage

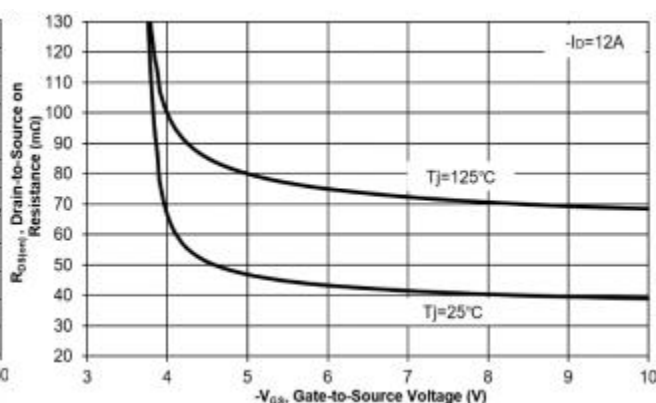


Fig. 5 on-Resistance vs. Tj

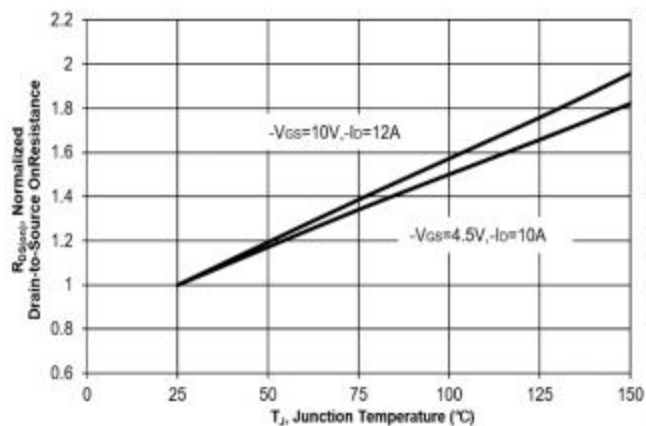
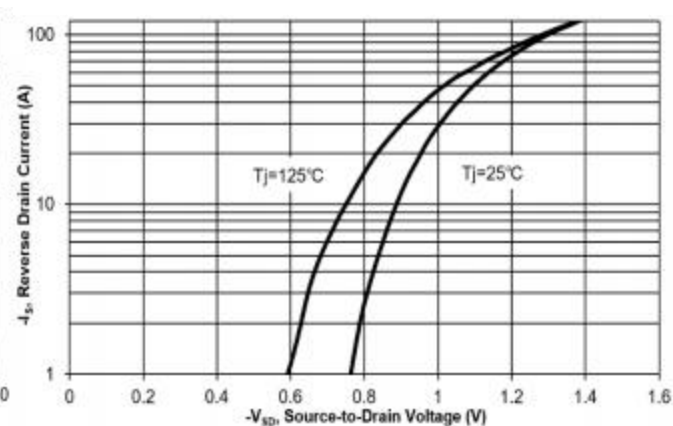


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristic Curve

Fig. 7 Typical Junction Capacitance

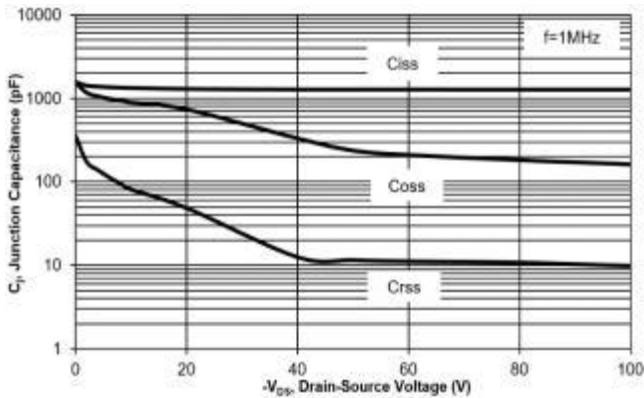


Fig. 8 Drain-Source Leakage Current vs. T_J

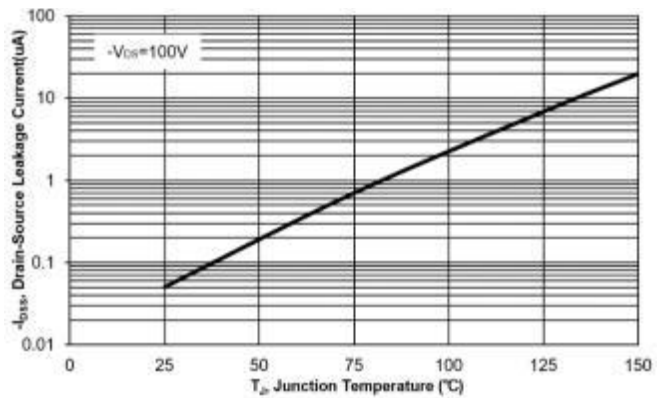


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

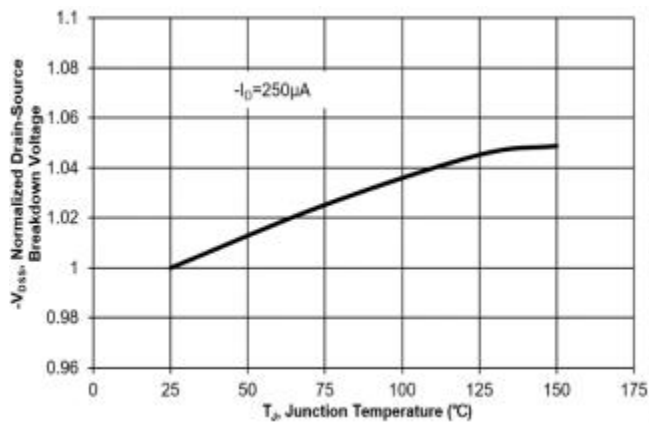


Fig. 10 Gate Threshold Variation vs. T_J

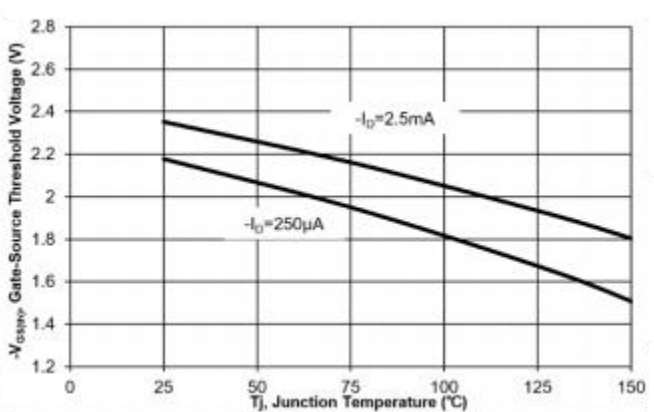


Fig. 11 Gate Charge

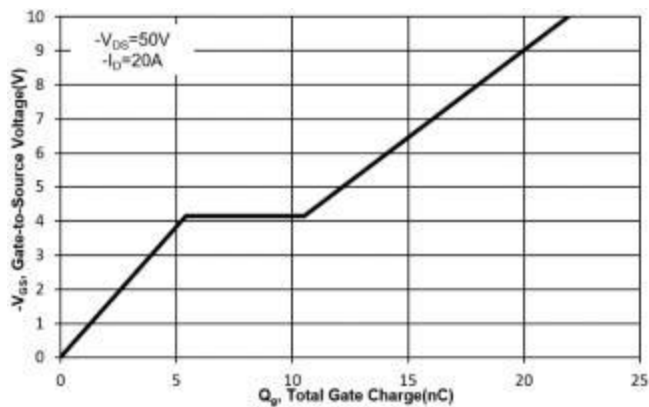
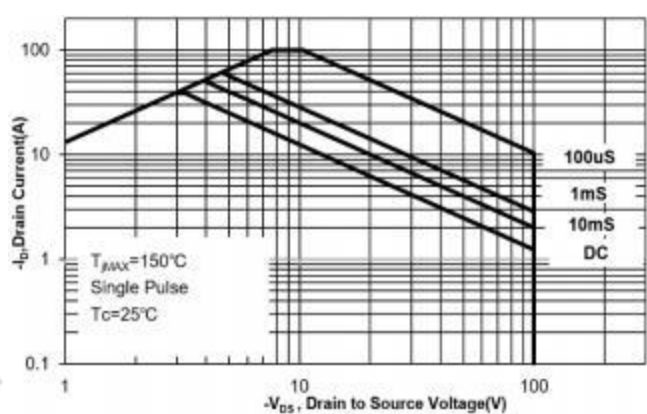


Fig. 12 Safe Operation Area



Electrical Characteristic Curve

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

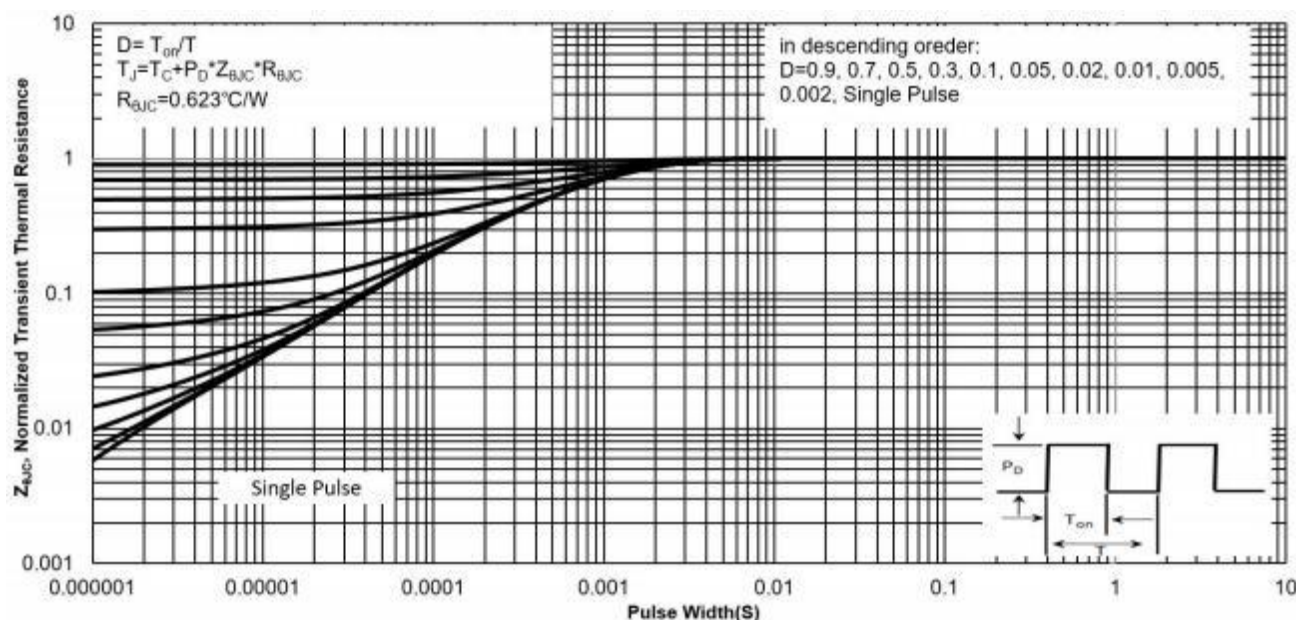
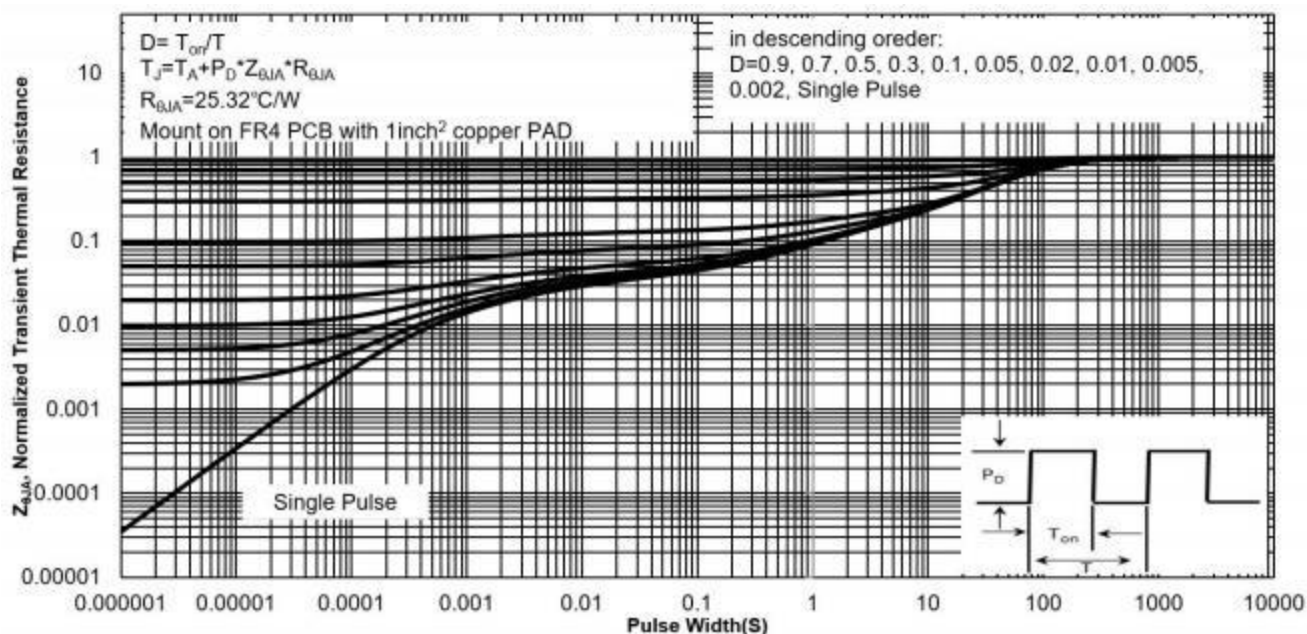
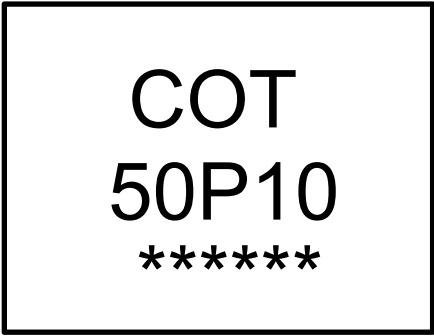


Fig. 14 Normalized Maximum Transient Thermal Impedance($z_{\theta JA}$)



Marking instructions



Note:
COT: Company Code
50P10: Product Type Code
*****: Lot No. Code, code change with Lot No

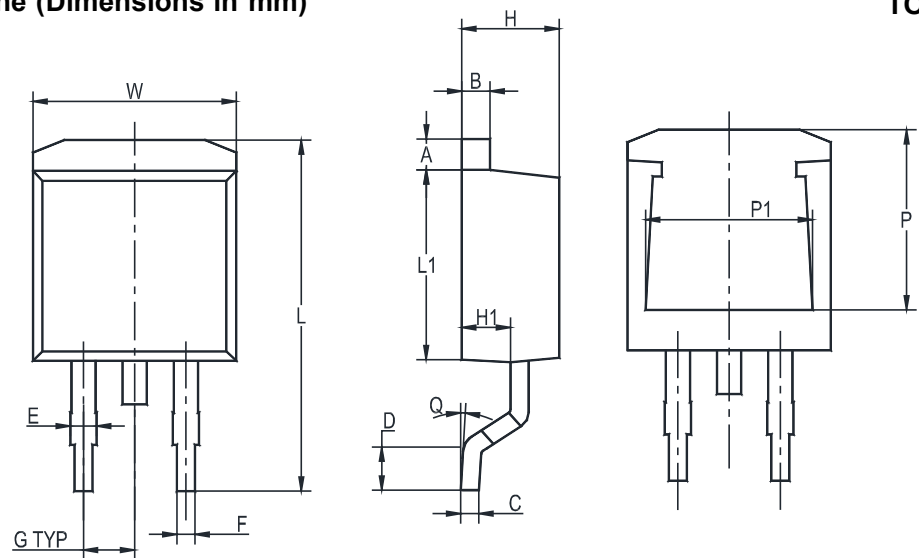
Packaging SPEC.

Package	Reel Quantity	Box Quantity	Carton Quantity	Delivery Mode
TO-263	0.8 K / Reel	0.8 K / Box	4K pcs / Carton	Reel

Package Outline Dimensions

Package Outline (Dimensions in mm)

TO-263



UNIT	A	B	C	D	E	F	G	W	H	H1	L	L1	Q	P	P1
mm	1.5	1.5	0.5	2.60	1.6	0.94	2.54	10.5	4.8	2.9	16.5	8.7	8°	7.6	8.2
	1.1	1.1	0.3	2.15	1.1	0.68	TYP	9.6	4.4	2.5	14.5	8.2	MAX	7.1	7.4

Recommended Soldering Footprint

