

Descriptions

The CTCS016N10YF is N-Channel Enhancement Mode MOSFET, TOLL plastic package.

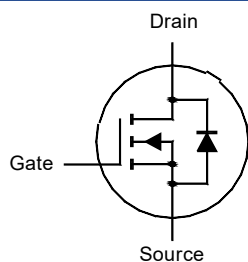
Features

- Low $R_{DS(ON)}$

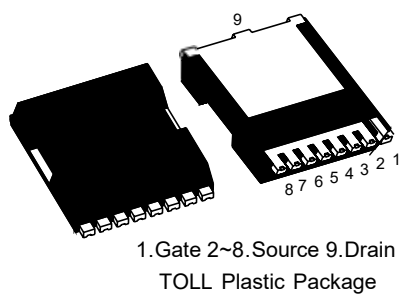
Applications

- Load Switch
- Power Management
- PWM Application

Equivalent Circuit



Pinning



1.Gate 2~8.Source 9.Drain
TOLL Plastic Package

Marking

Model	CTCS016N10YF
Marking	016N10

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	351 248	A
		$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	
Peak Drain Current, Pulsed ¹⁾	I_{DM}	1400	A
Single Pulse Avalanche Current	I_{AS}	77.7	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	1509	mJ
Total Power Dissipation	P_{tot}	333	W
		$T_C = 25^\circ\text{C}$	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.45	$^\circ\text{C/W}$
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 $T_{J(MAX)} = 175^\circ\text{C}$.

²⁾ Limited by $T_{J(MAX)}$, starting $T_J = 25^\circ\text{C}$, $L = 0.5 \text{ mH}$, $R_g = 25 \Omega$, $I_{AS} = 77.7 \text{ A}$, $V_{GS} = 10 \text{ V}$.

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 $V_{DS} = V_{GS}$, $I_D = 250 \mu A$	$V_{GS(th)}$	2.4	-	3.6	V
Drain-Source On-State Resistance at $V_{GS} = 10 V$, $I_D = 30 A$	$R_{DS(on)}$	-	1.2	1.6	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5 V$, $I_D = 30 A$	g_{fs}	-	141	-	S
Gate resistance at $V_{GS} = 0 V$, $V_{DS} = 50 V$, $f = 1 MHz$	R_g	-	0.6	-	Ω
Input Capacitance at $V_{GS} = 0 V$, $V_{DS} = 50 V$, $f = 1 MHz$	C_{iss}	-	9734	-	pF
Output Capacitance at $V_{GS} = 0 V$, $V_{DS} = 50 V$, $f = 1 MHz$	C_{oss}	-	3165	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0 V$, $V_{DS} = 50 V$, $f = 1 MHz$	C_{rss}	-	37	-	pF
Gate charge total at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$	Q_g	-	150	-	nC
Gate to Source Charge at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$	Q_{gs}	-	45.5	-	nC
Gate to Drain Charge at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$	Q_{gd}	-	38	-	nC
Turn-On Delay Time at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$, $R_g = 3.3 \Omega$	$t_{d(on)}$	-	56	-	ns
Turn-On Rise Time at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$, $R_g = 3.3 \Omega$	t_r	-	80	-	ns
Turn-Off Delay Time at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$, $R_g = 3.3 \Omega$	$t_{d(off)}$	-	34	-	ns
Turn-Off Fall Time at $V_{DS} = 50 V$, $V_{GS} = 10 V$, $I_D = 100 A$, $R_g = 3.3 \Omega$	t_f	-	17	-	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	-	-	351	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	1400	A
Body Diode Reverse Recovery Time at $I_S = 100\text{ A}$, $di/dt = 100\text{ A} / \mu\text{s}$	t_{rr}	-	180	-	ns
Body Diode Reverse Recovery Charge at $I_S = 100\text{ A}$, $di/dt = 100\text{ A} / \mu\text{s}$	Q_{rr}	-	335	-	nC

Electrical Characteristic Curve

Fig. 1 Typical Output Characteristics

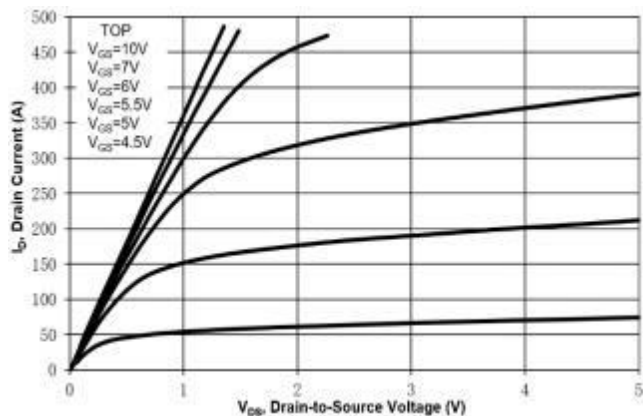


Fig. 2 Typical Transfer Characteristics

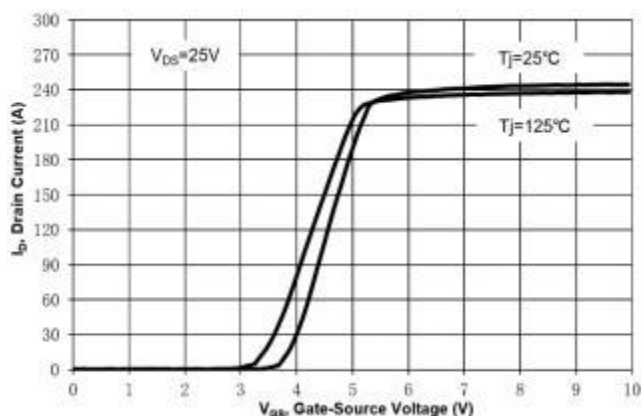


Fig. 3 on-Resistance vs. Drain Current

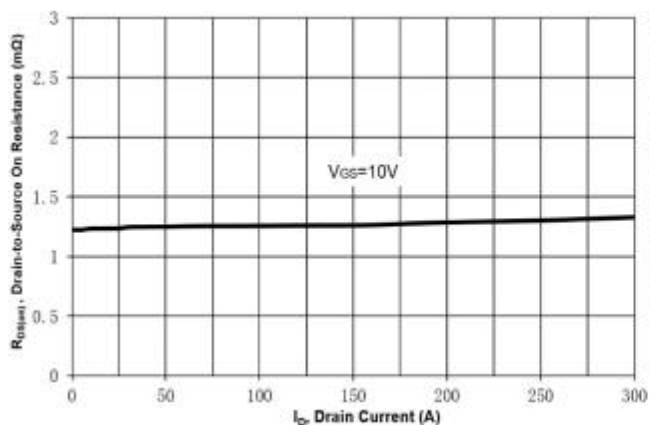


Fig. 4 on-Resistance vs. Gate to Source Voltage

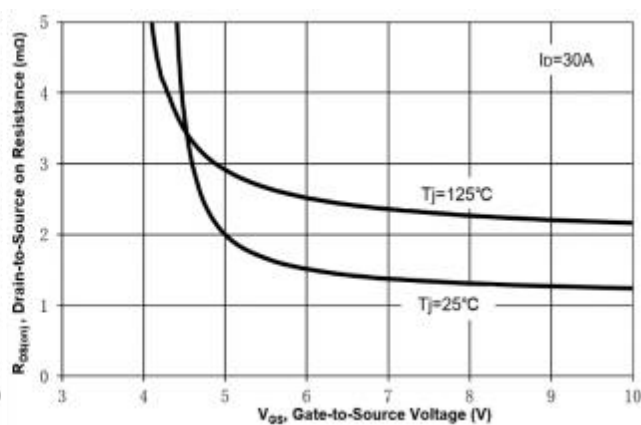


Fig. 5 on-Resistance vs. T_J

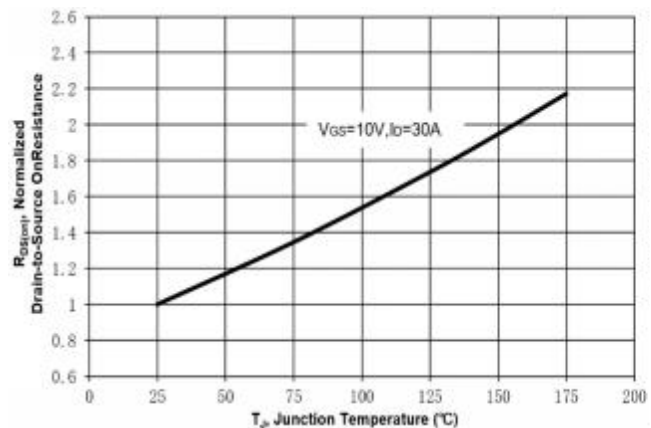
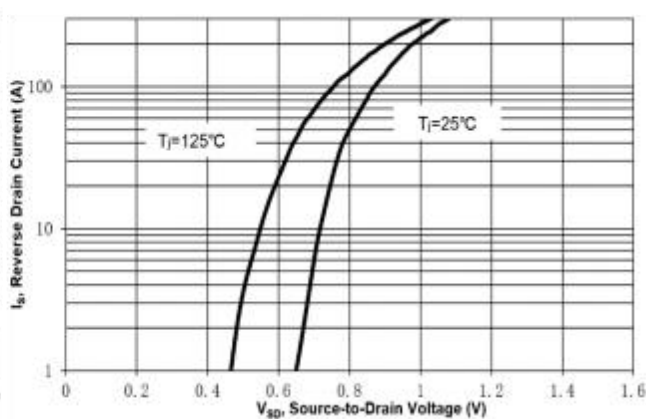


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristic Curve

Fig. 7 Typical Junction Capacitance

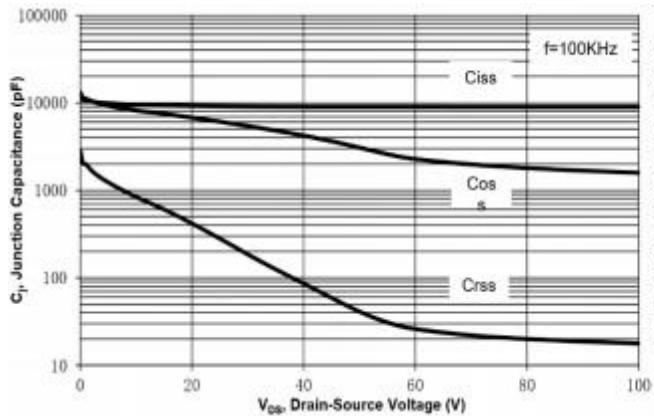


Fig. 8 Drain-Source Leakage Current vs. T_j

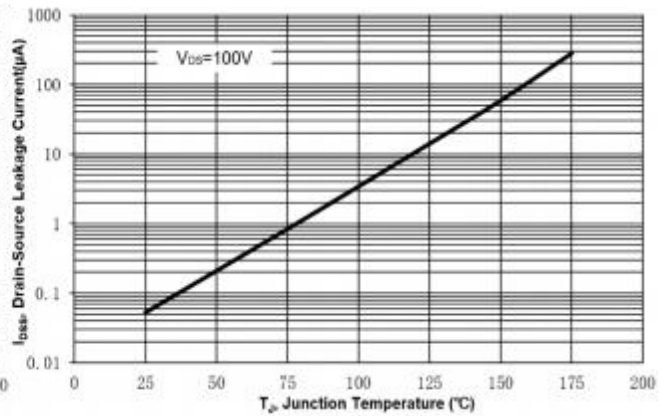


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

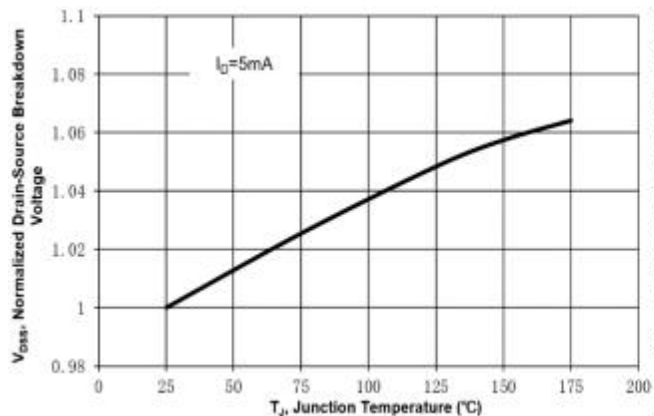


Fig. 10 Gate Threshold Variation vs. T_j

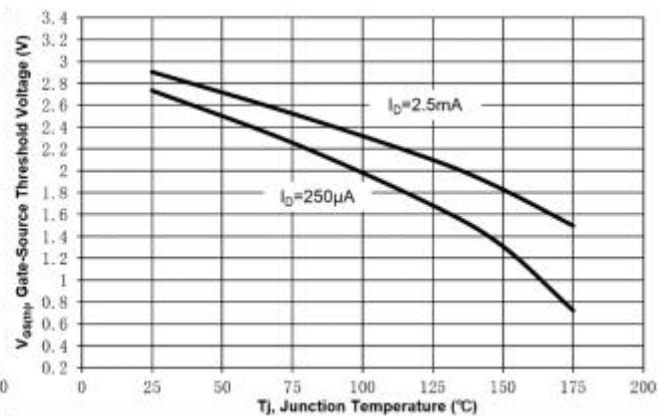


Fig. 11 Gate Charge

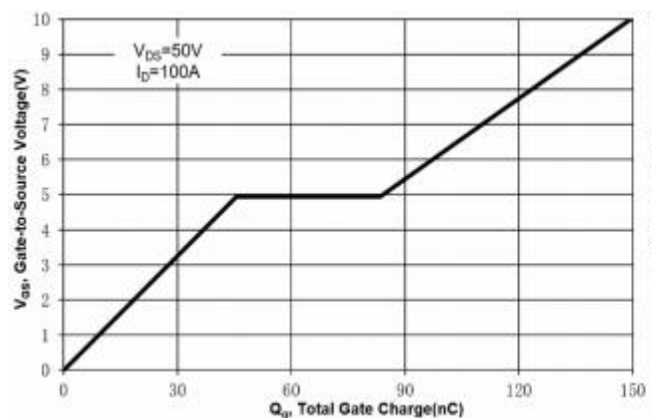
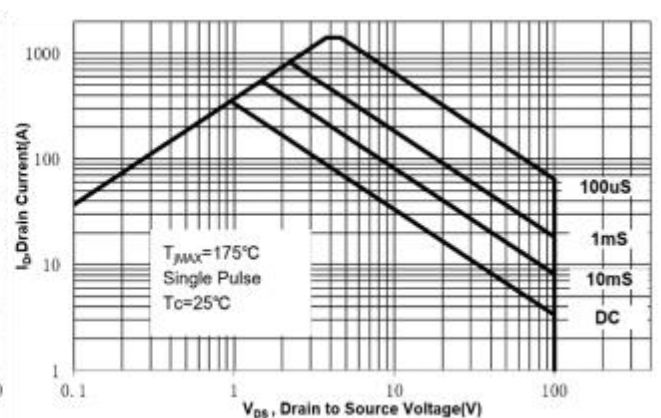
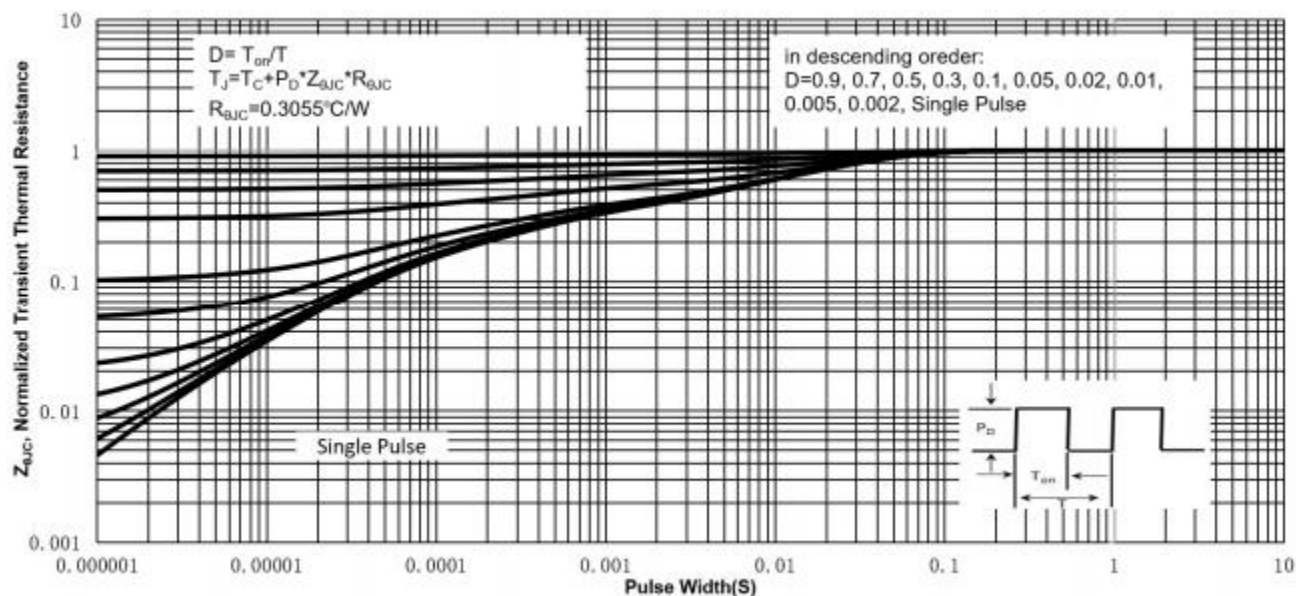
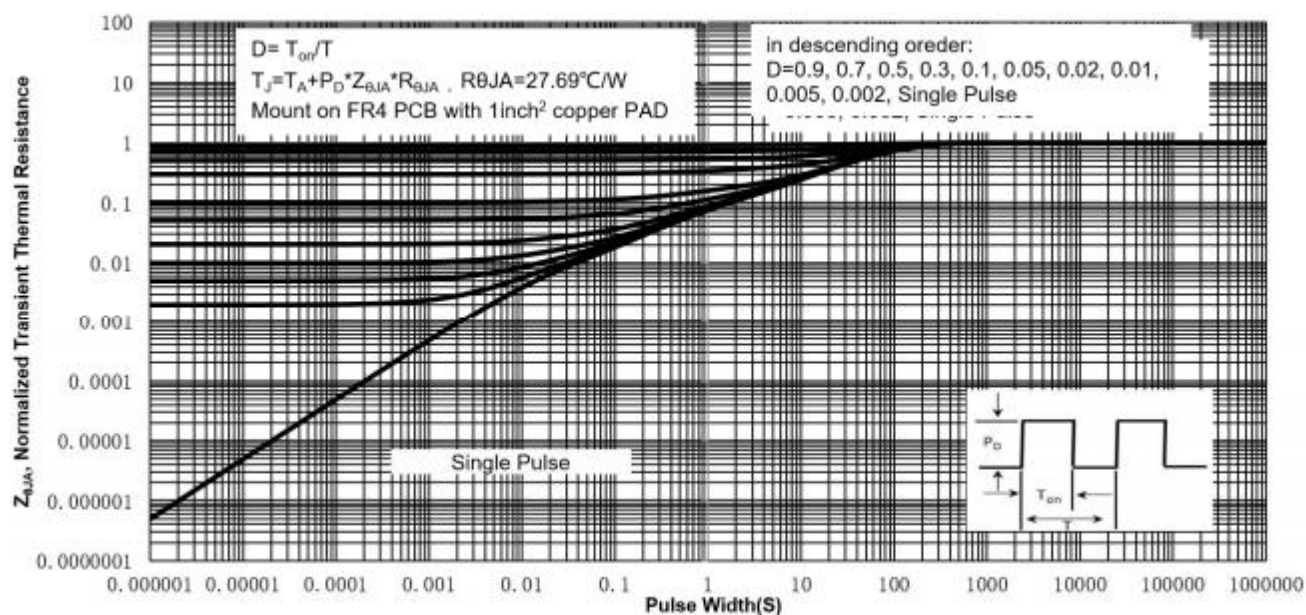


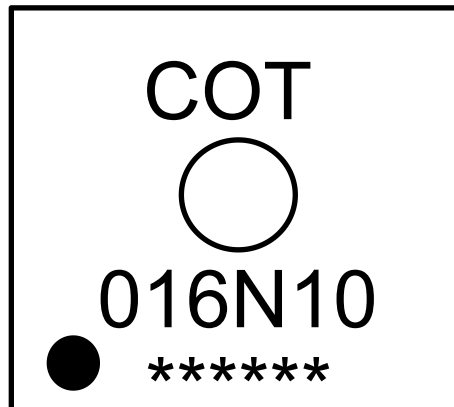
Fig. 12 Safe Operation Area



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

016N10:

Product Type Code

*****:

Lot No. Code, code change with Lot No

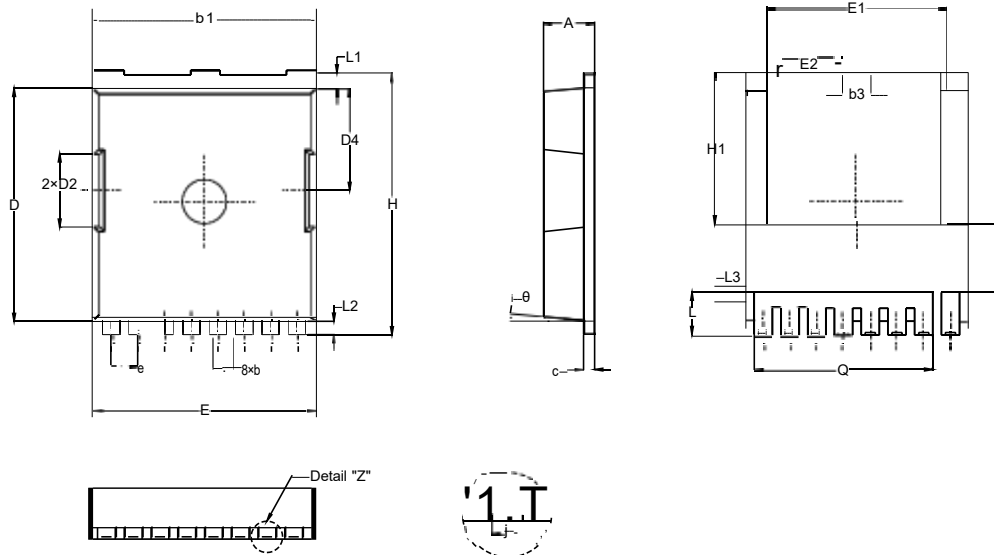
Packaging SPEC.

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
TOLL	24	12 ± 0.1	0.472 ± 0.004	300	13	2,000

Package Outline Dimensions

Package Outline (Dimensions in mm)

TOLL



SYMBOL	A	b	b1	b3	c	D	D2	D4	E	E1	e	H	H1	j
MIN	2.20	0.65	9.70	1.15	0.40	10.28	3.20	4.45	9.80	7.90	1.20	11.48	6.95	0.35
NOM	2.30	0.75	9.80	1.25	0.50	10.38	3.30	4.55	9.90	8.10	BSC	11.68	REF	REF
MAX	2.40	0.90	9.90	1.35	0.60	10.48	3.40	4.65	10.00	8.30		11.88		

SYMBOL	k	L	L1	L2	L3	N	Q	E2	Θ
MIN	3.0	1.35	0.50	0.50	0.25	8	8	2.8	10°
NOM	REF	1.55	0.70	0.60	0.45		REF	3.0	REF
MAX		1.75	0.90	0.70	0.65			3.2	

Recommended Soldering Footprint

