

General Description

The MA3007D is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The MA3007D meet the RoHS and Green Product requirement with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25$	Continuous Drain Current, $V_{GS} @ -10V^1$	-15.4	A
$I_D@T_C=100$	Continuous Drain Current, $V_{GS} @ -10V^1$	-9.7	A
$I_D@T_A=25$	Continuous Drain Current, $V_{GS} @ -10V^1$	-4.8	A
$I_D@T_A=70$	Continuous Drain Current, $V_{GS} @ -10V^1$	-3.8	A
I_{DM}	Pulsed Drain Current ²	-38	A
EAS	Single Pulse Avalanche Energy ³	37	mJ
I_{AS}	Avalanche Current	15	A
$P_D@T_C=25$	Total Power Dissipation ⁴	20.8	W
$P_D@T_A=25$	Total Power Dissipation ⁴	2.02	W
T_{STG}	Storage Temperature Range	-55 to 150	
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	6	/W

Electrical Characteristics ($T_J=25$, unless otherwise noted)

Product Summary

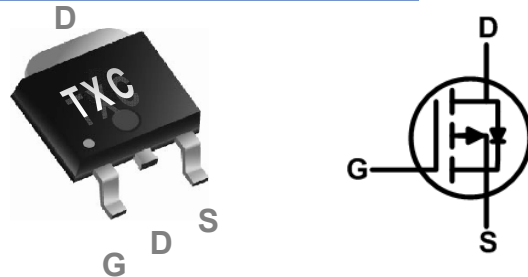


BVDSS	RDSON	ID
-30V	62mΩ	-15.4A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

TO252 Pin Configuration



P-Ch 30V Fast Switching MOSFETs

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
BV_{DSS}/T_J	BVDSS Temperature Coefficient	Reference to 25 , $I_D=-1mA$	---	-0.02	---	V/
$R_{DS(on)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-10A$	---	50	62	mΩ
		$V_{GS}=-4.5V, I_D=-8A$	---	85	110	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.5	V
$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.32	---	mV/
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V, T_J=25$	---	---	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=55$	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-10A$	---	8.2	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	24	48	Ω
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-10A$	---	5.22	---	nC
Q_{gs}	Gate-Source Charge		---	1.25	---	
Q_{gd}	Gate-Drain Charge		---	2.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	18.4	---	ns
T_r	Rise Time		---	11.4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	39.4	---	
T_f	Fall Time		---	5.2	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	463	---	pF
C_{oss}	Output Capacitance		---	82	---	
C_{rss}	Reverse Transfer Capacitance		---	68	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy ⁵	$V_{DD}=25V, L=0.1mH, I_{AS}=6A$	6	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V, \text{Force Current}$	---	---	-15.4	A
I_{SM}	Pulsed Source Current ^{2,6}		---	---	-38	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25$	---	---	-1	V

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-15A$
- The power dissipation is limited by 150 junction temperature
- The Min. value is 100% EAS tested guarantee.
- The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

P-Ch 30V Fast Switching MOSFETs

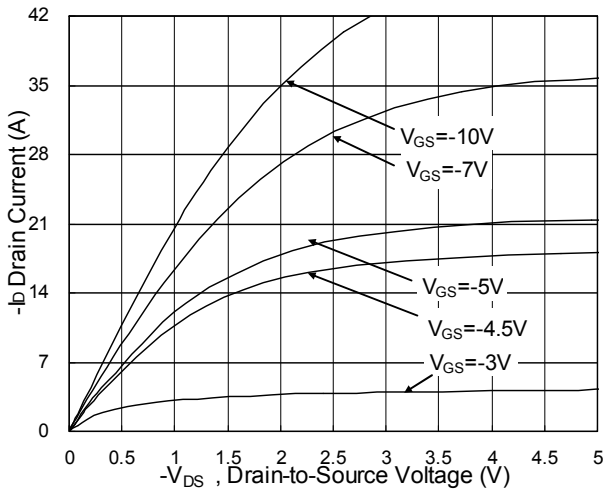


Fig.1 Typical Output Characteristics

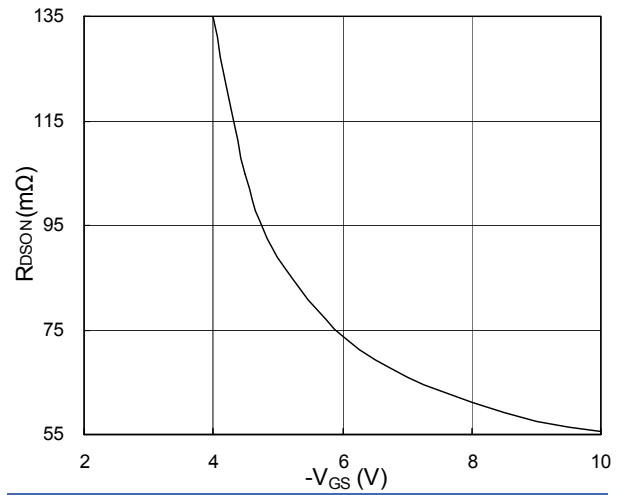


Fig.2 On-Resistance vs. G-S Voltage

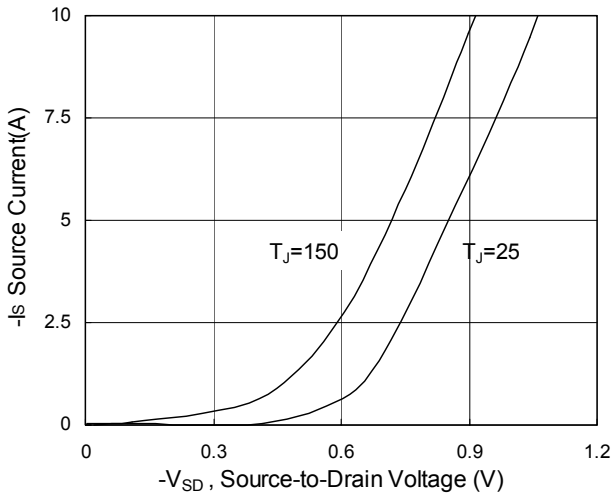


Fig.3 Forward Characteristics of Reverse

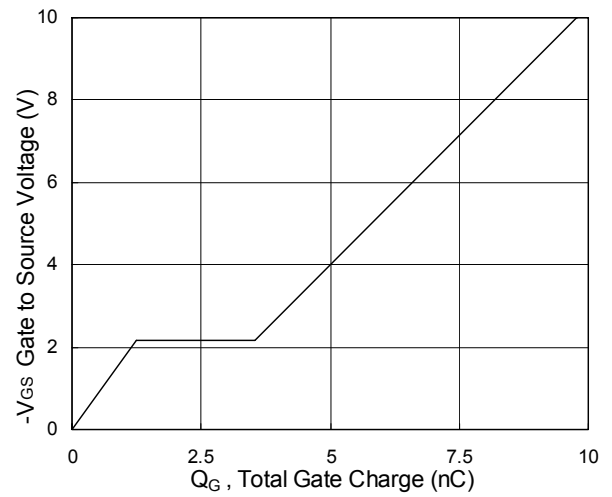


Fig.4 Gate-Charge Characteristics

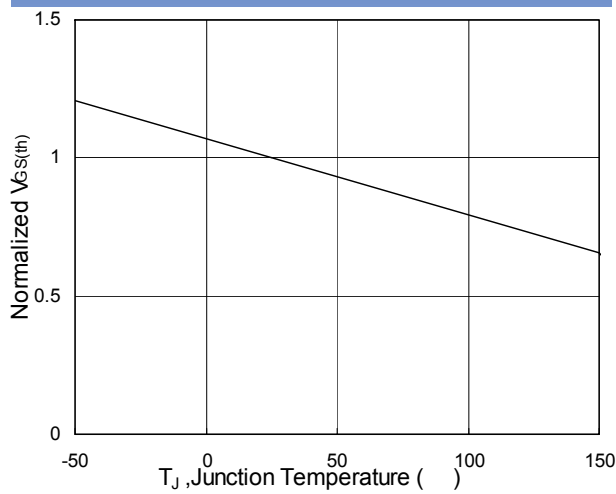


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

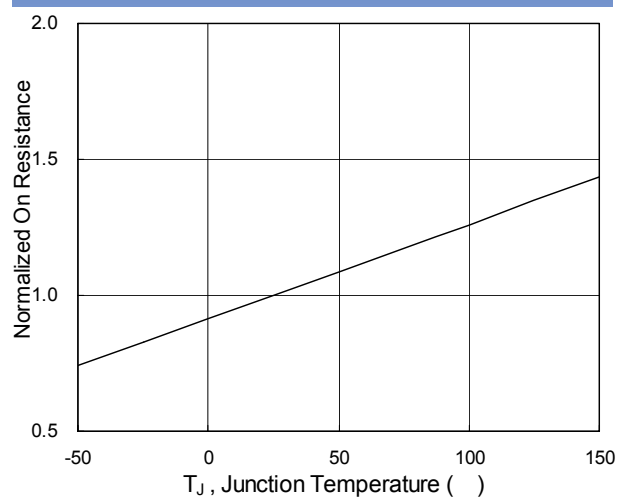


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

P-Ch 30V Fast Switching MOSFETs

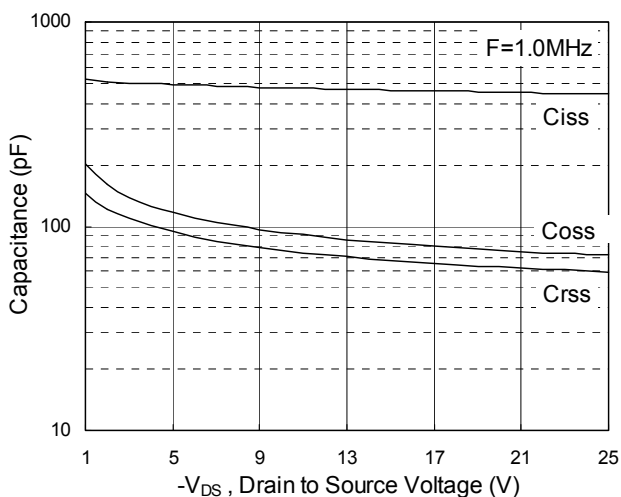


Fig.7 Capacitance

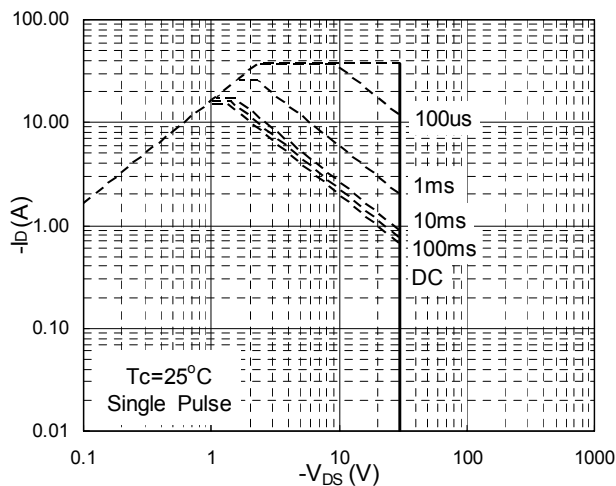


Fig.8 Safe Operating Area

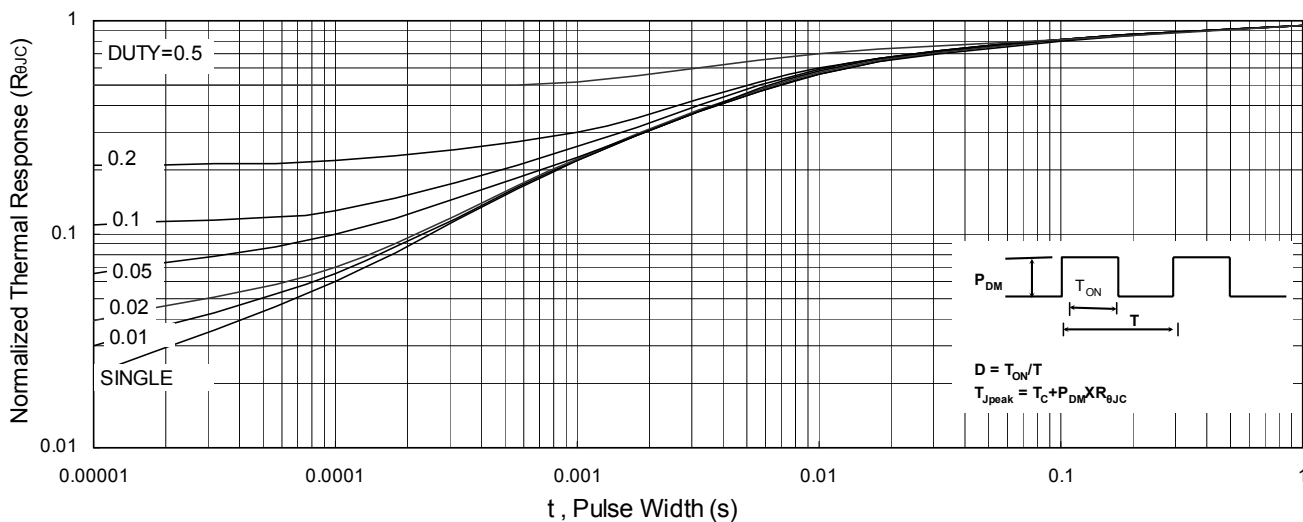


Fig.9 Normalized Maximum Transient Thermal Impedance

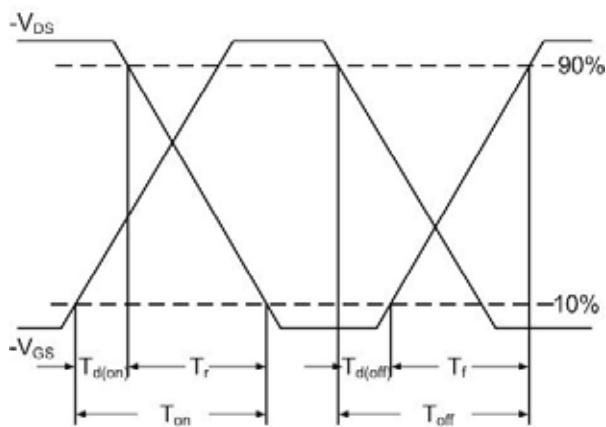


Fig.10 Switching Time Waveform

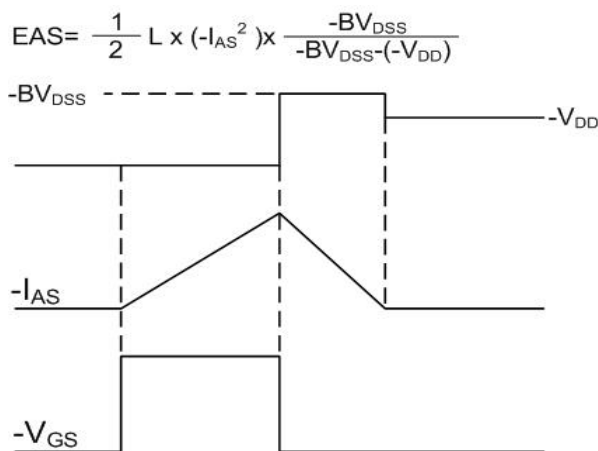
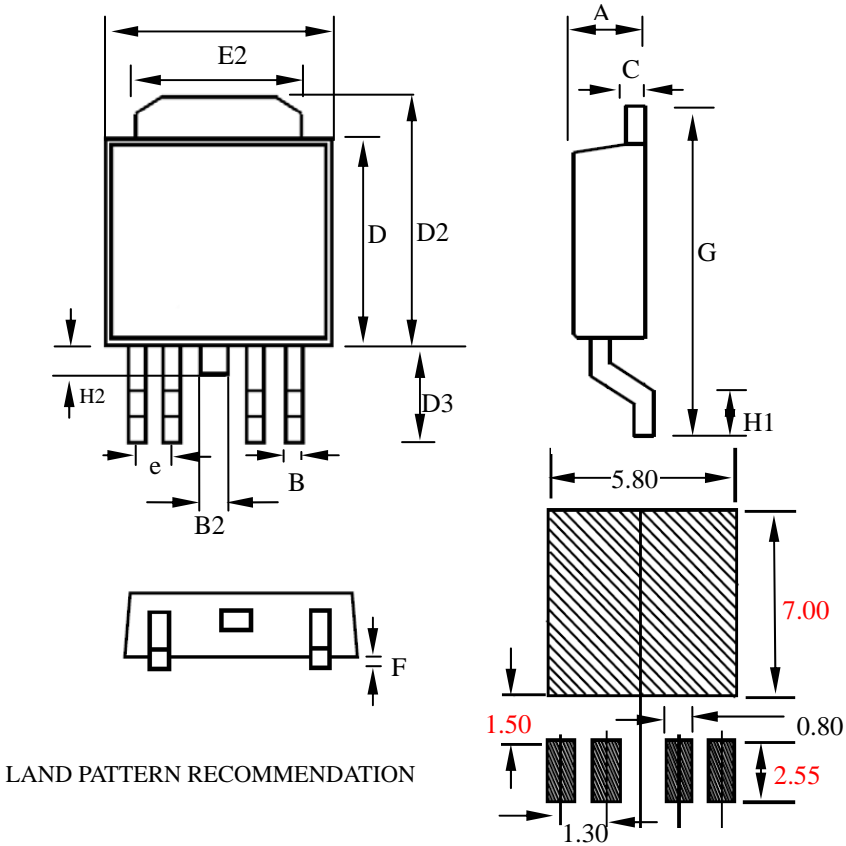


Fig.11 Unclamped Inductive Switching Waveform

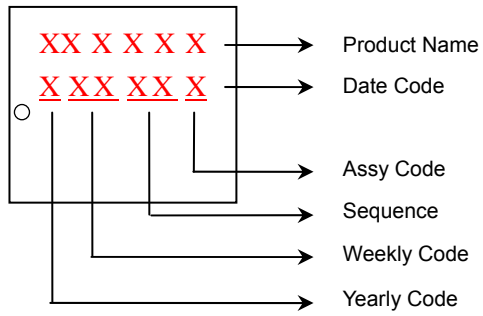


P-Ch 30V Fast Switching MOSFETs



LAND PATTERN RECOMMENDATION

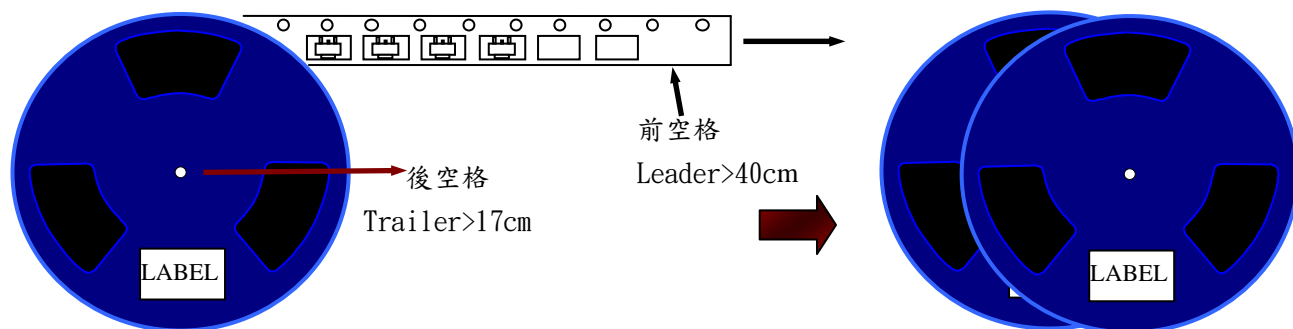
MARKING



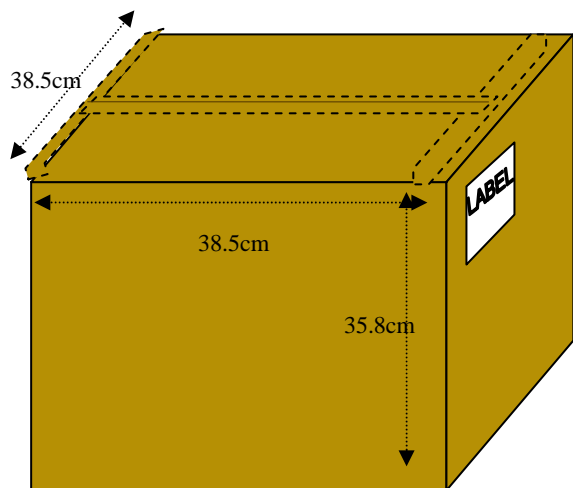
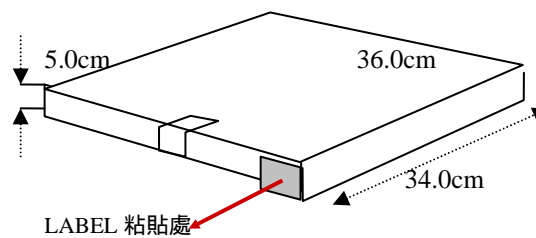
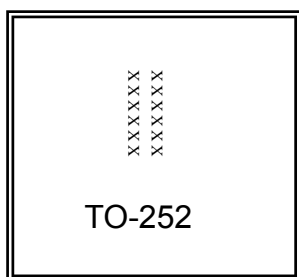
SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.10	--	2.50	0.083	--	0.098
B	0.30	--	0.70	0.012	--	0.028
B2	0.40	--	0.80	0.016	--	0.031
C	0.40	--	0.60	0.016	--	0.024
D	5.30	--	5.70	0.209	--	0.224
D2	6.70	--	7.30	0.264	--	0.287
D3	2.20	--	3.00	0.087	--	0.118
E	6.30	--	6.70	0.248	--	0.264
E2	4.80	--	5.20	0.189	--	0.205
F	0.00	--	0.30	0.000	--	0.012
G	9.20	--	9.80	0.362	--	0.386
H1	0.90	--	1.50	0.035	--	0.059
H2	0.50	--	1.10	0.020	--	0.043
e	1.20	--	1.40	0.047	--	0.055

- Note:
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
 2. CONTROLLING DIMENSION IS MILLIMETER CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACTLY..

Tape & Reel 繞卷及裝箱方式



產品正印及方向 - (辨識點為左上時, Tape 圓孔在上方)



封裝形態 PKG TYPE	一卷數量 Immediate Quantity	中箱數量 Intermediate Quantity	外箱裝置/數量 Carton Quantity
TO-252(-4L)	3000pcs	6000pcs	30K
	Reel (13")	Box(2 reels)	Carton(5 Box)