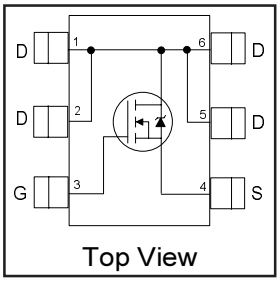
International
IOR Rectifier

IRLMS1902

HEXFET® Power MOSFET

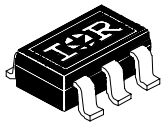
- Generation V Technology
- Micro6 Package Style
- Ultra Low Rds(on)
- N-Channel MOSFET



Top View

V_{DSS} = 20V

$R_{DS(on)}$ = 0.10Ω


Micro6

Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The Micro6 package with its customized leadframe produces a HEXFET power MOSFET with Rds(on) 60% less than a similar size SOT-23. This package is ideal for applications where printed circuit board space is at a premium. It's unique thermal design and $R_{DS(on)}$ reduction enables a current-handling increase of nearly 300% compared to the SOT-23.

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	3.2	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 4.5V	2.6	
I_{DM}	Pulsed Drain Current ①	18	
P_D @T_A = 25°C	Power Dissipation	1.7	W
	Linear Derating Factor	13	mW/°C
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	℃

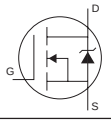
Thermal Resistance Ratings

	Parameter	Min.	Typ.	Max	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	—	75	°C/W

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.032	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.10	Ω	V_{GS} = 4.5V, I_D = 2.2A ③
		—	—	0.17		V_{GS} = 2.7V, I_D = 1.1A ③
$V_{GS(th)}$	Gate Threshold Voltage	0.70	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	3.2	—	—	S	V_{DS} = 10V, I_D = 1.1A
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	µA	V_{DS} = 16V, V_{GS} = 0V
		—	—	25		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 12V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -12V
Q_g	Total Gate Charge	—	4.7	7.0	nC	I_D = 2.2A
Q_{gs}	Gate-to-Source Charge	—	0.97	1.5		V_{DS} = 16V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	1.8	2.6		V_{GS} = 4.5V, See Fig. 6 and 9 ③
$t_{d(on)}$	Turn-On Delay Time	—	7.0	—	ns	V_{DD} = 10V
t_r	Rise Time	—	11	—		I_D = 2.2A
$t_{d(off)}$	Turn-Off Delay Time	—	12	—		R_G = 6.0Ω
t_f	Fall Time	—	4.0	—		R_D = 4.4Ω, See Fig. 10 ③
C_{iss}	Input Capacitance	—	300	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	120	—		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	—	50	—		f = 1.0MHz, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.7	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	18		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	T_J = 25°C, I_S = 2.2A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	—	40	60	ns	T_J = 25°C, I_F = 2.2A
Q_{rr}	Reverse RecoveryCharge	—	37	55	nC	di/dt = 100A/µs ②

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② I_{SD} ≤ 2.2A, di/dt ≤ 110A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

③ Pulse width ≤ 300µs; duty cycle ≤ 2%.

④ Surface mounted on FR-4 board, t ≤ 5sec.

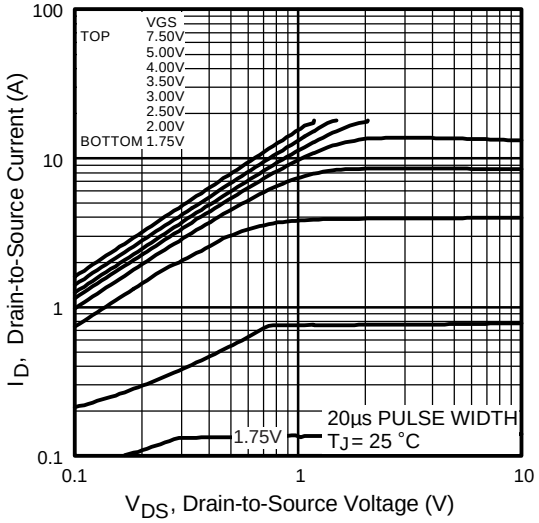


Fig 1. Typical Output Characteristics

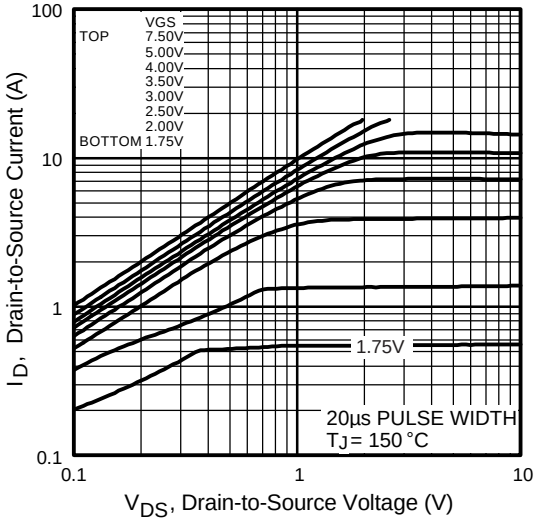


Fig 2. Typical Output Characteristics

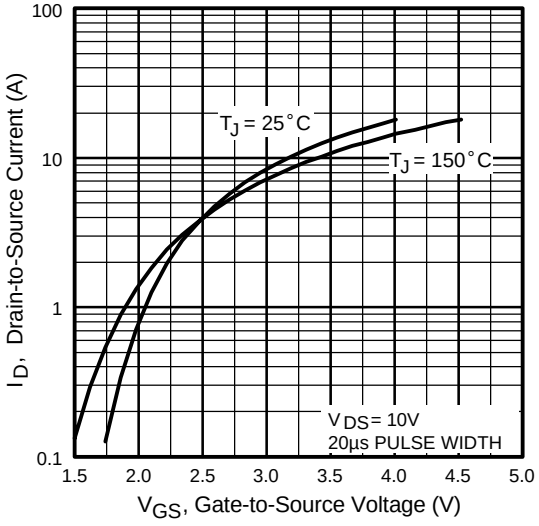


Fig 3. Typical Transfer Characteristics

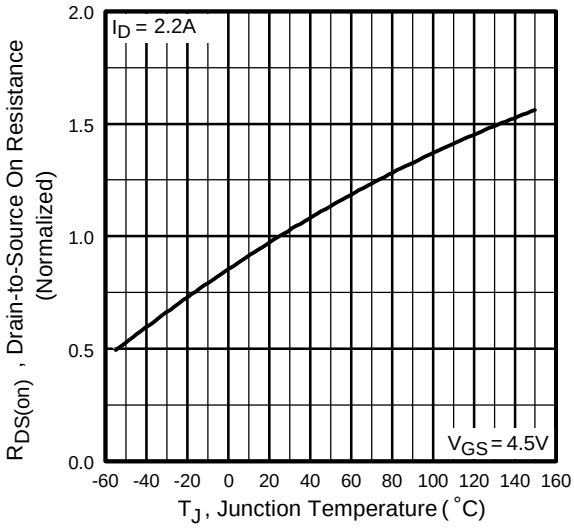


Fig 4. Normalized On-Resistance Vs. Temperature

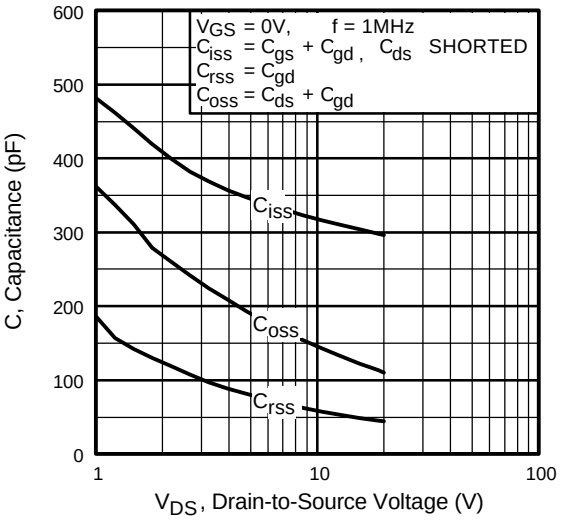


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

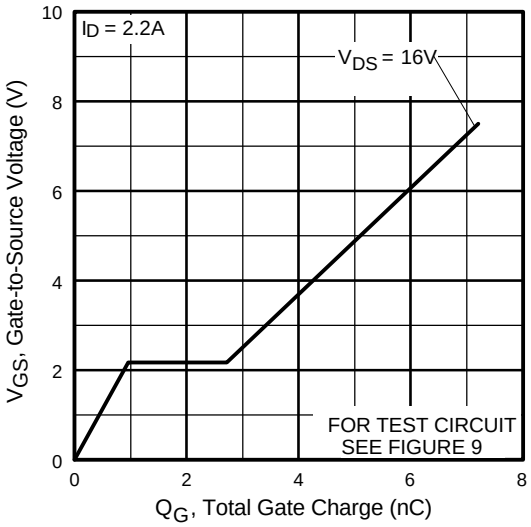


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

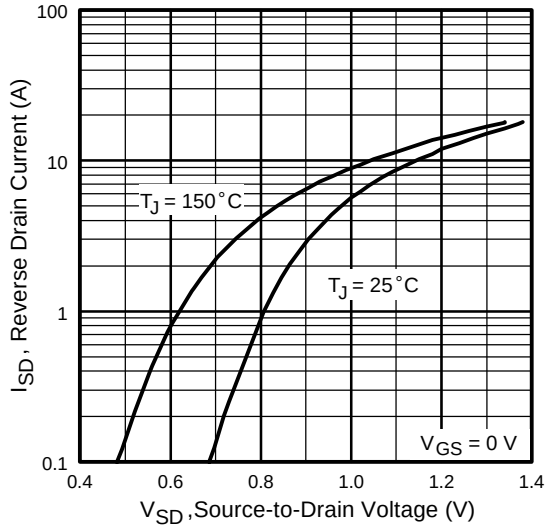


Fig 7. Typical Source-Drain Diode Forward Voltage

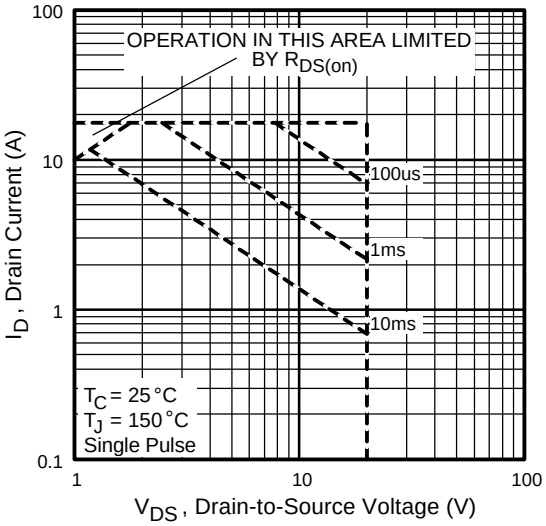


Fig 8. Maximum Safe Operating Area

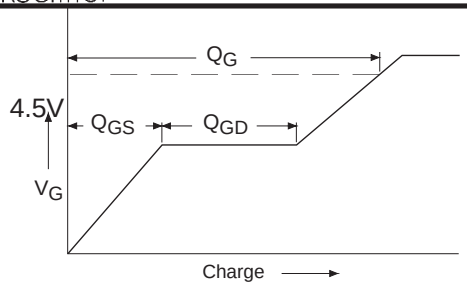


Fig 9a. Basic Gate Charge Waveform

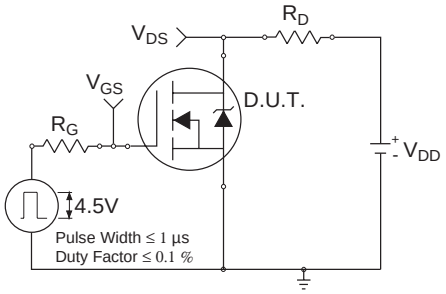


Fig 10a. Switching Time Test Circuit

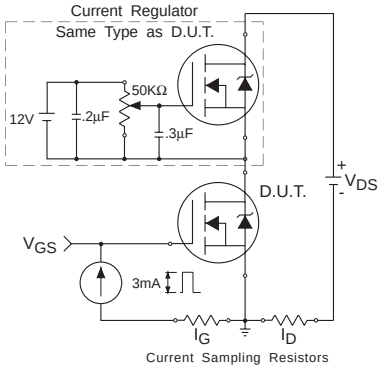


Fig 9b. Gate Charge Test Circuit

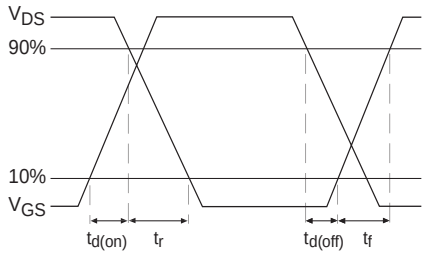


Fig 10b. Switching Time Waveforms

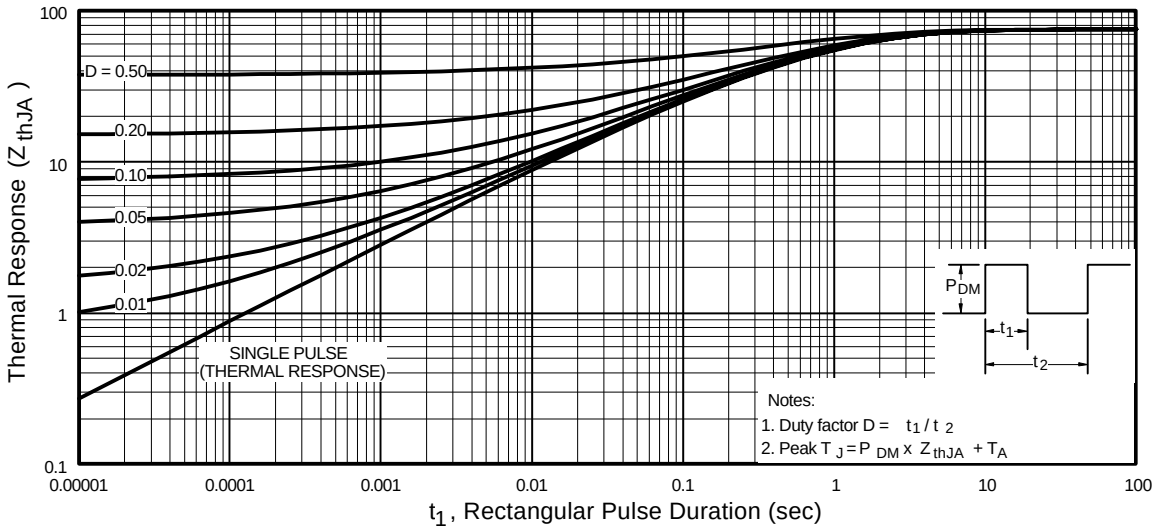
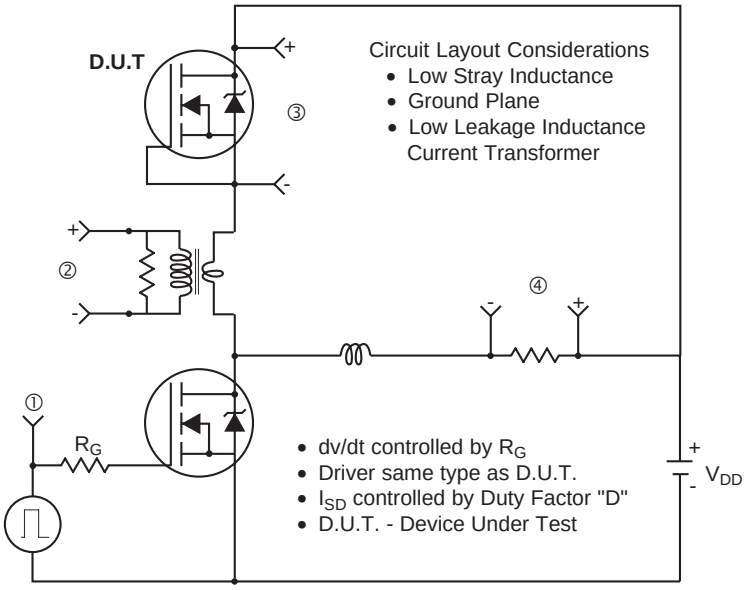
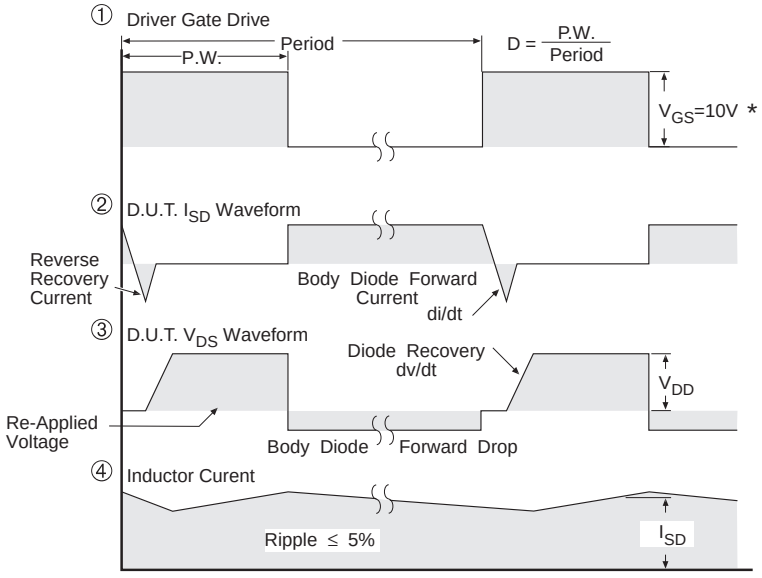


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Peak Diode Recovery dv/dt Test Circuit



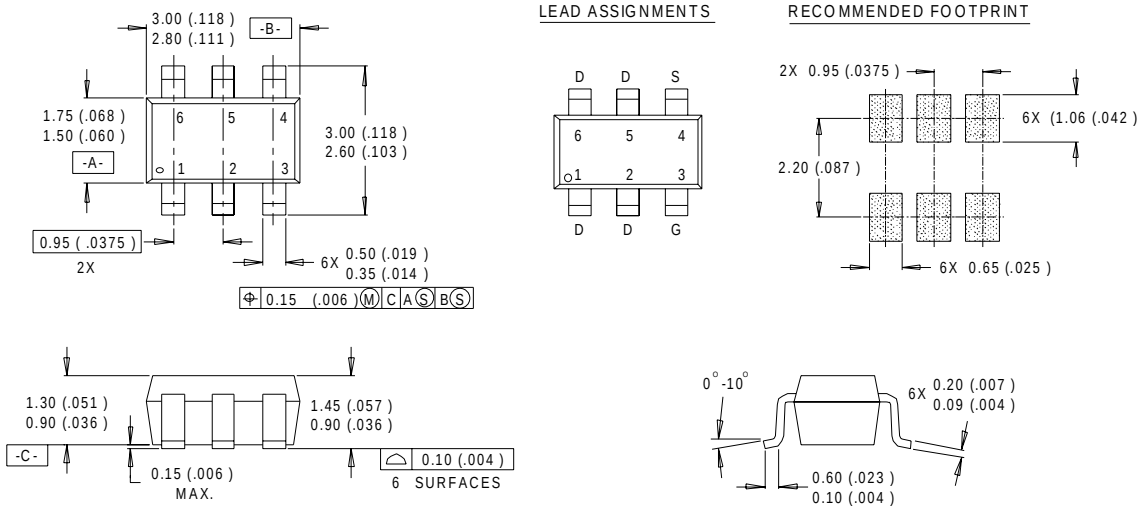


* V_{GS} = 5V for Logic Level Devices

Fig 12. For N-Channel HEXFETS

Package Outline

Micro6 Outline

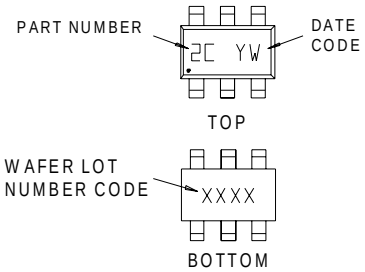


NOTES :
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).

Part Marking Information

Micro6

EXAMPLE : THIS IS AN IRLMS6702



PART NUMBER EXAMPLES:
2A = IRLMS1902
2B = IRLMS1503
2C = IRLMS6702
2D = IRLMS5703

DATE CODE EXAMPLES:
YWW = 9603 = 6C
YWW = 9632 = FF

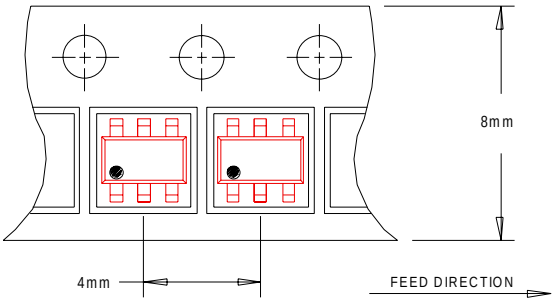
YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
2004	4	04	D
2005	5		
1996	6		
1997	7		
1998	8		
1999	9		
2000	0	24	X
		25	Y
		26	Z

YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
1996	F		
1997	G		
1998	H		
1999	J		
2000	K	50	X
		51	Y
		52	Z

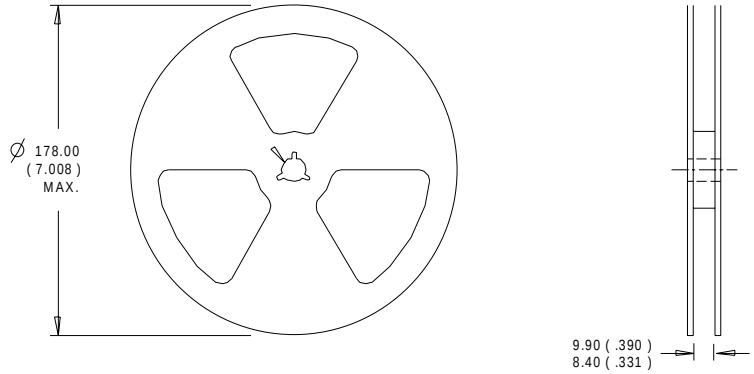
WORK WEEK = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDER YEAR
WORK WEEK = (27-52) IF PRECEDED BY A LETTER

Tape & Reel Information

Micro6



NOTES :
1. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

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IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111
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