



P 沟道增强型场效应晶体管

P-CHANNEL MOSFET

FHU9540C/FHD9540C

主要参数 MAIN CHARACTERISTICS

ID	-35 A
VDSS	-100 V
Rdson-typ (@Vgs=10V)	32mΩ
Rdson-typ (@Vgs=4.5V)	36mΩ
Qg-typ	66nC

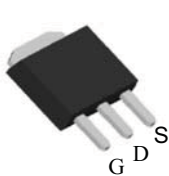
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 190pF)	Low Crss (typical 190pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
高抗 dv/dt 能力	Improved dv/dt capability
RoHS 产品	RoHS product

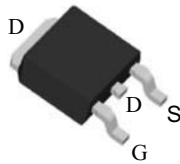
用途 APPLICATIONS

负载开关	Load switch
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封装形式 Package

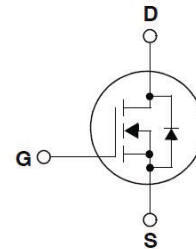


TO-251
FHU series



TO-252
FHD series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

项目 Parameter	符号 Symbol	数值 Value		单位 Unit
		FHU9540C	FHD9540C	
最高漏极-源极直流电压 Drain-Source Voltage	V _{DS}	-100		V
连续漏极电流* Drain Current -continuous *	I _D (T _C =25°C)	-35		A
	I _D (T _C =100°C)	-25		A
最大脉冲漏极电流 (注 1) Drain Current - pulse (note 1)	I _{DM}	-140		A
最高栅源电压 Gate-Source Voltage	V _{GS}	±20		V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E _{AS}	480		mJ
雪崩电流 (注 1) Avalanche Current (note 1)	I _{AR}	17		A
重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1)	E _{AR}	16		mJ
二极管反向恢复最大电压变化速率 (注 3) Peak Diode Recovery dv/dt (note 3)	dv/dt	5.0		V/ns
耗散功率 Power Dissipation	P _D (T _C =25°C)	105		W
	-Derate above 25°C	0.71		W/°C
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}	-55~+150		°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T _L	300		°C

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature

电特性 ELECTRICAL CHARACTERISTICS

项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
漏—源击穿电压 Drain-Source Voltage	BVDSS	$I_D = -250\mu A, V_{GS} = 0V$	-100	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BVDSS/\Delta T_J$	$I_D = -250\mu A$, referenced to 25°C	-	-0.1	-	V/°C
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	IDSS	$V_{DS} = -100V, V_{GS} = 0V, T_C = 25^\circ C$	-	-	-1	μA
		$V_{DS} = -80V, T_C = 125^\circ C$	-	-	-10	μA
栅极体漏电流 Gate-body leakage current	IGSS (F/R)	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.3	-1.95	-2.5	V
静态导通电阻 Static Drain-Source On-Resistance	RDS(ON)	$V_{GS} = -10V, I_D = -15A$	-	32	38	mΩ
		$V_{GS} = -4.5V, I_D = -10A$	-	36	45	
正向跨导 Forward Transconductance	gfs	$V_{DS} = -5V, I_D = -12A$ (note 4)	-	28	-	S
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	Rg	$f = 1.0MHz, V_{DS} OPEN$	-	1.5	-	Ω
输入电容 Input capacitance	Ciss	$V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz$	-	3100	-	pF
输出电容 Output capacitance	Coss		-	360	-	
反向传输电容 Reverse transfer capacitance	Crss		-	190	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	td(on)	$V_{DS} = -50V, I_D = -35A, R_G = 4.7\Omega, V_{GS} = -10V$ (note 4, 5)	-	15	-	ns
上升时间 Turn-On rise time	tr		-	17	-	ns
延迟时间 Turn-Off delay time	td(off)		-	31	-	ns
下降时间 Turn-Off Fall time	tf		-	53	-	ns
栅极电荷总量 Total Gate Charge	Qg	$V_{DS} = -80V, I_D = -35A, V_{GS} = -10V$ (note 4, 5)	-	66	-	nC
栅—源电荷 Gate-Source charge	Qgs		-	17	-	nC
栅—漏电荷 Gate-Drain charge	Qgd		-	23	-	nC
漏—源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current		IS	-	-	-35	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		ISM	-	-	-140	A
正向压降 Drain-Source Diode Forward Voltage	VSD	$V_{GS} = 0V, I_S = -35A$	-	-0.82	-1.3	V
反向恢复时间 Reverse recovery time	trr	$V_{GS} = 0V, I_S = -35A, dI_F/dt = 100A/\mu s$ (note 4)	-	52	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	96	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	最大值 Max	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	1.45	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	110	°C/W

注释:

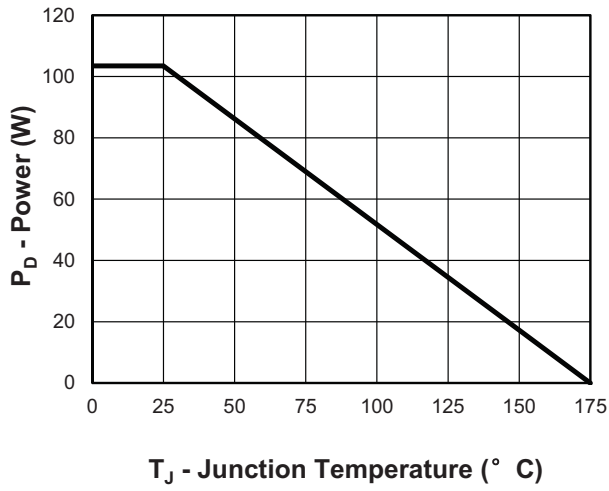
- 1: 脉冲宽度由最高结温限制
- 2: L=1mH, I_{AS}=-17A, V_{DD}=-48V, R_G=25 Ω, 起始结温 T_J=25°C
- 3: I_{SD} ≤25A, di/dt ≤300A/μs, V_{DD} ≤BV_{DSS}, 起始结温 T_J=25°C
- 4: 脉冲测试: 脉冲宽度 ≤300μs, 占空比 ≤2%
- 5: 基本与工作温度无关

Notes:

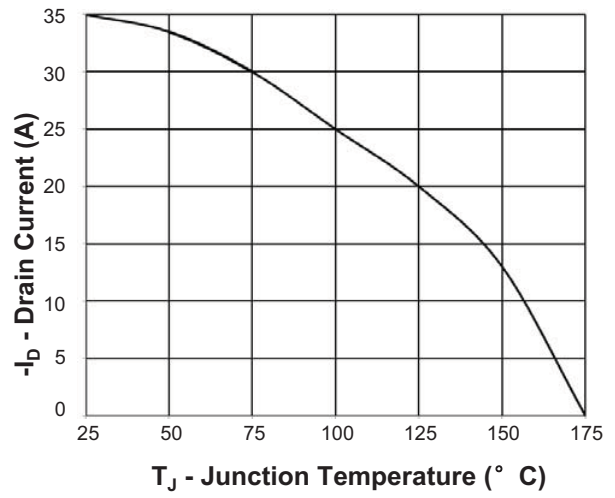
- 1: Pulse width limited by maximum junction temperature
- 2: L=1mH, I_{AS}=-17A, V_{DD}=-48V, R_G=25 Ω, Starting T_J=25°C
- 3: I_{SD} ≤25A, di/dt ≤300A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
- 5: Essentially independent of operating temperature

Typical Characteristics

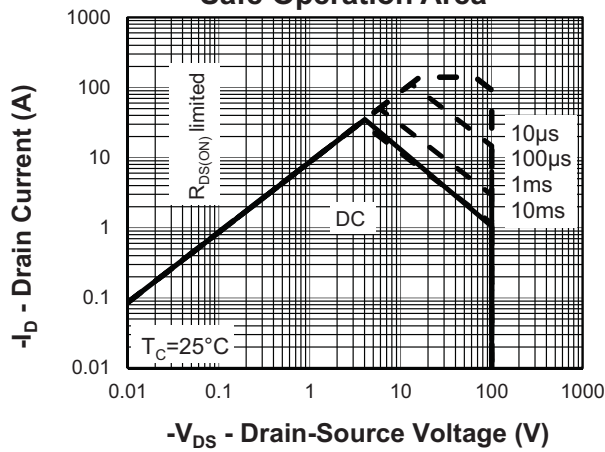
Power Dissipation



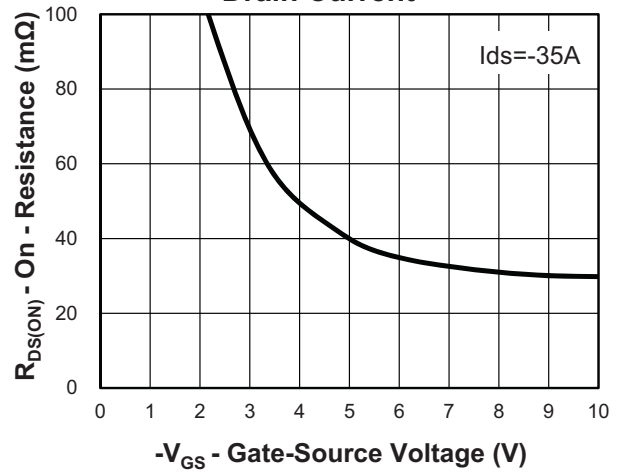
Drain Current



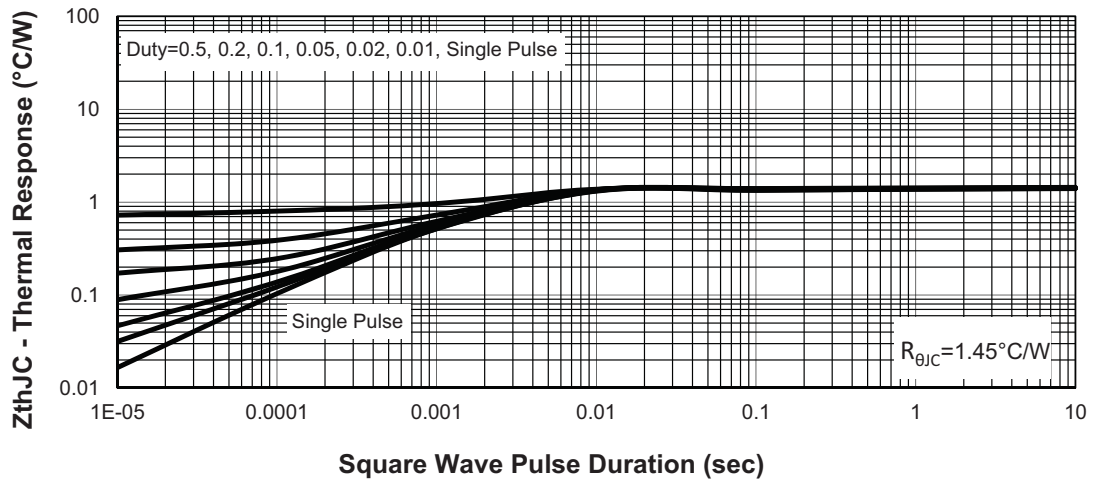
Safe Operation Area



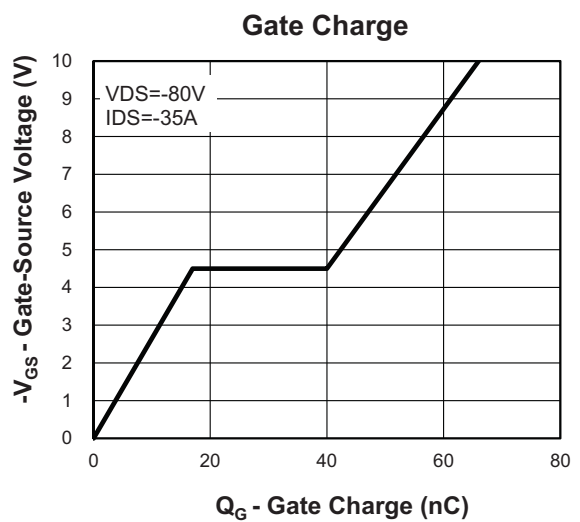
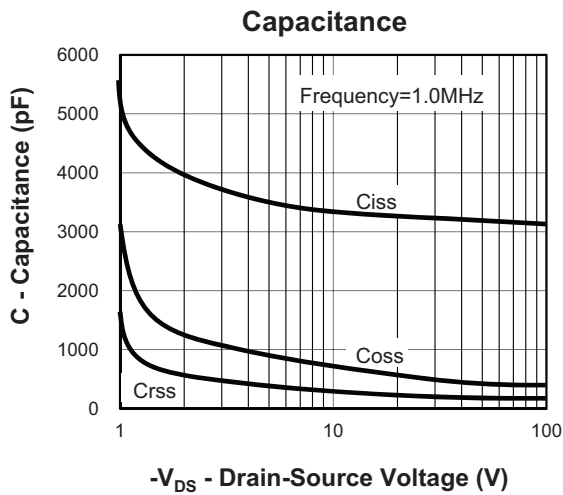
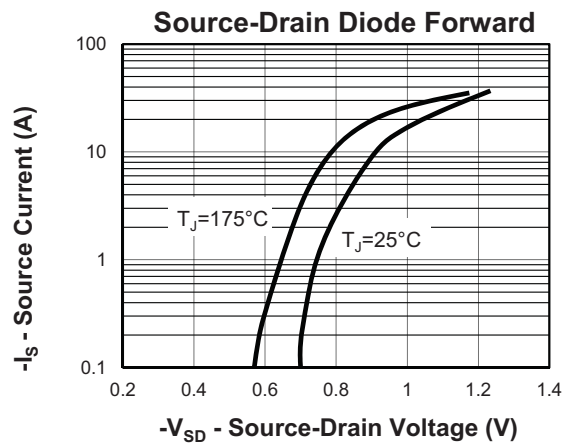
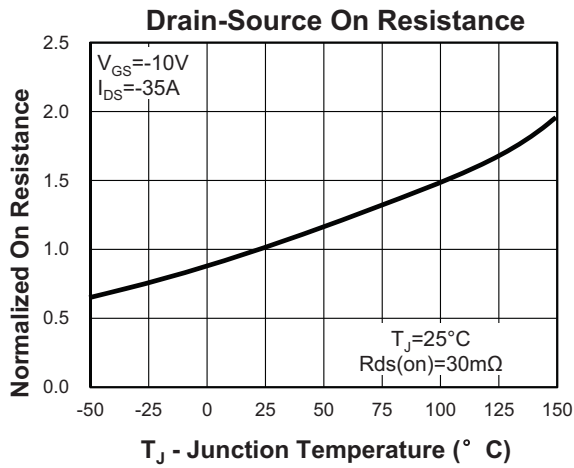
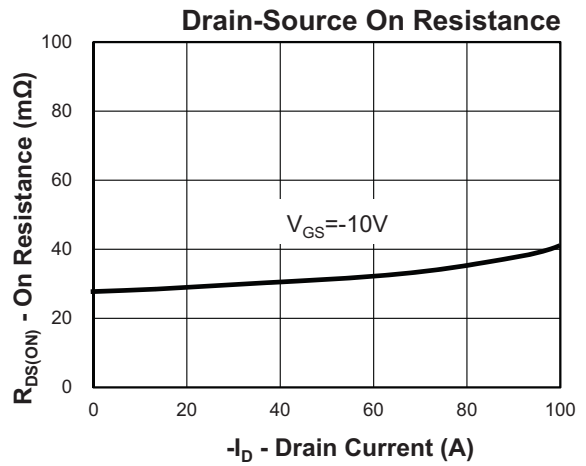
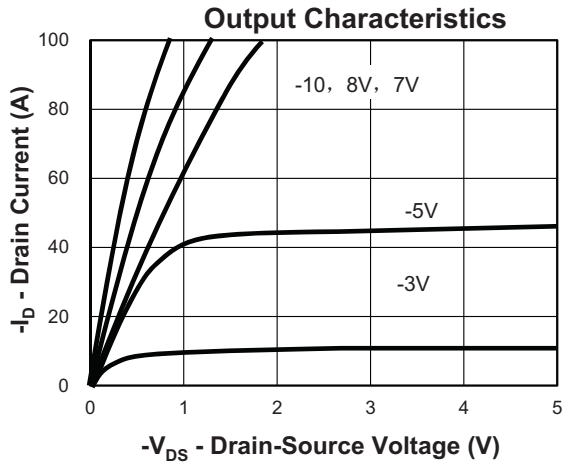
Drain Current

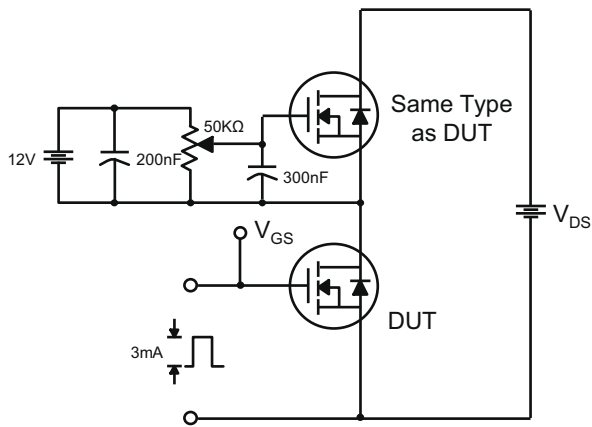


Thermal Transient Impedance

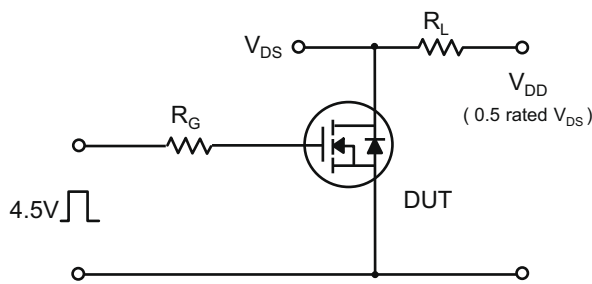


Typical Characteristics

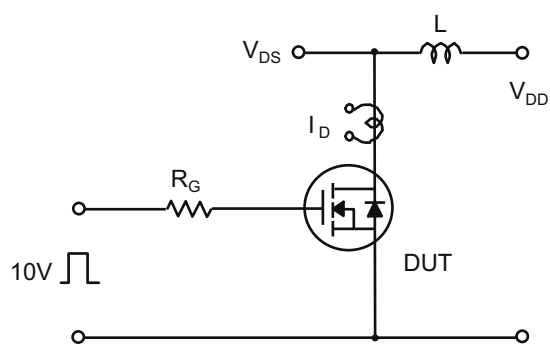




Gate Charge Test Circuit & Waveform

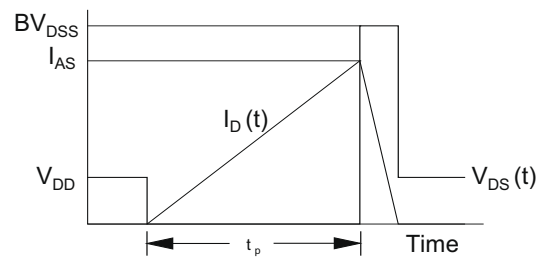


Resistive Switching Test Circuit & Waveforms

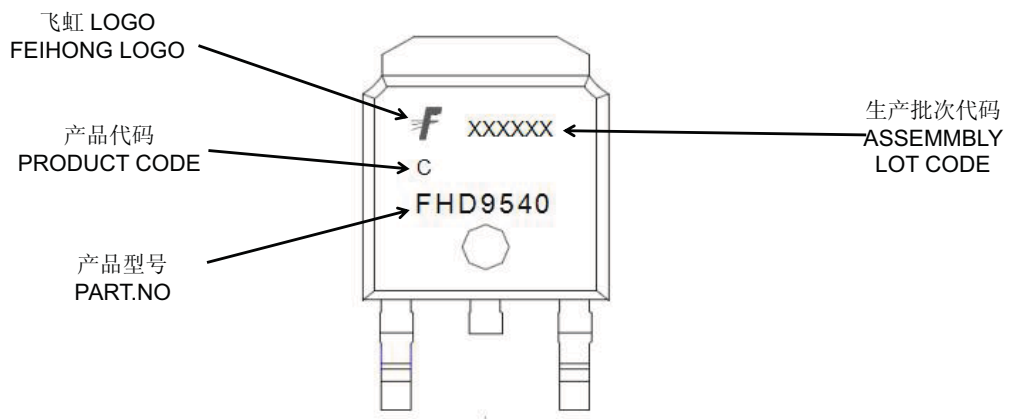
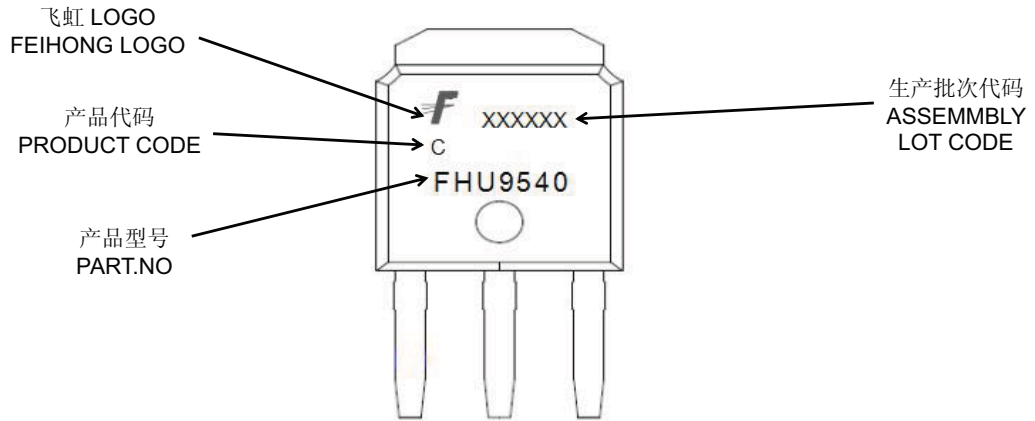


Unclamped Inductive Switching Test Circuit & Waveforms

$$E_{AS} = \frac{1}{2} L_L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



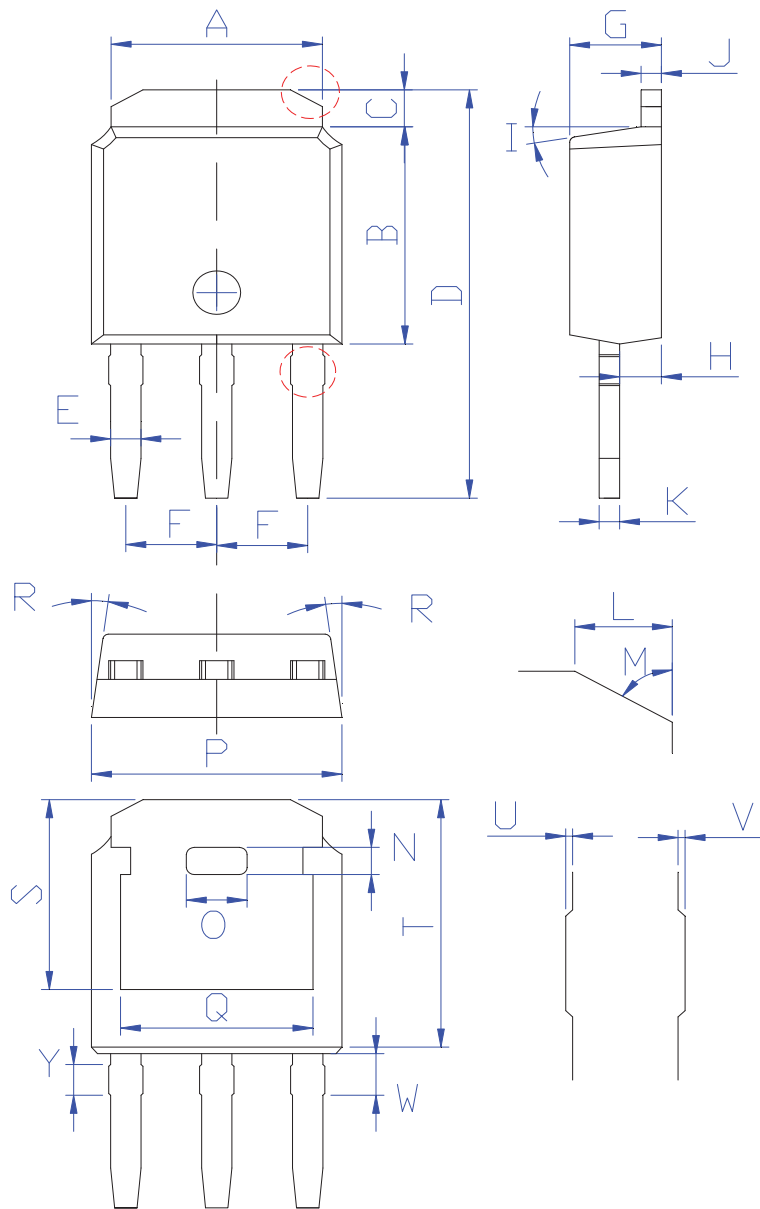
印记 Marking:



外形尺寸:

Package Dimension:

TO-251



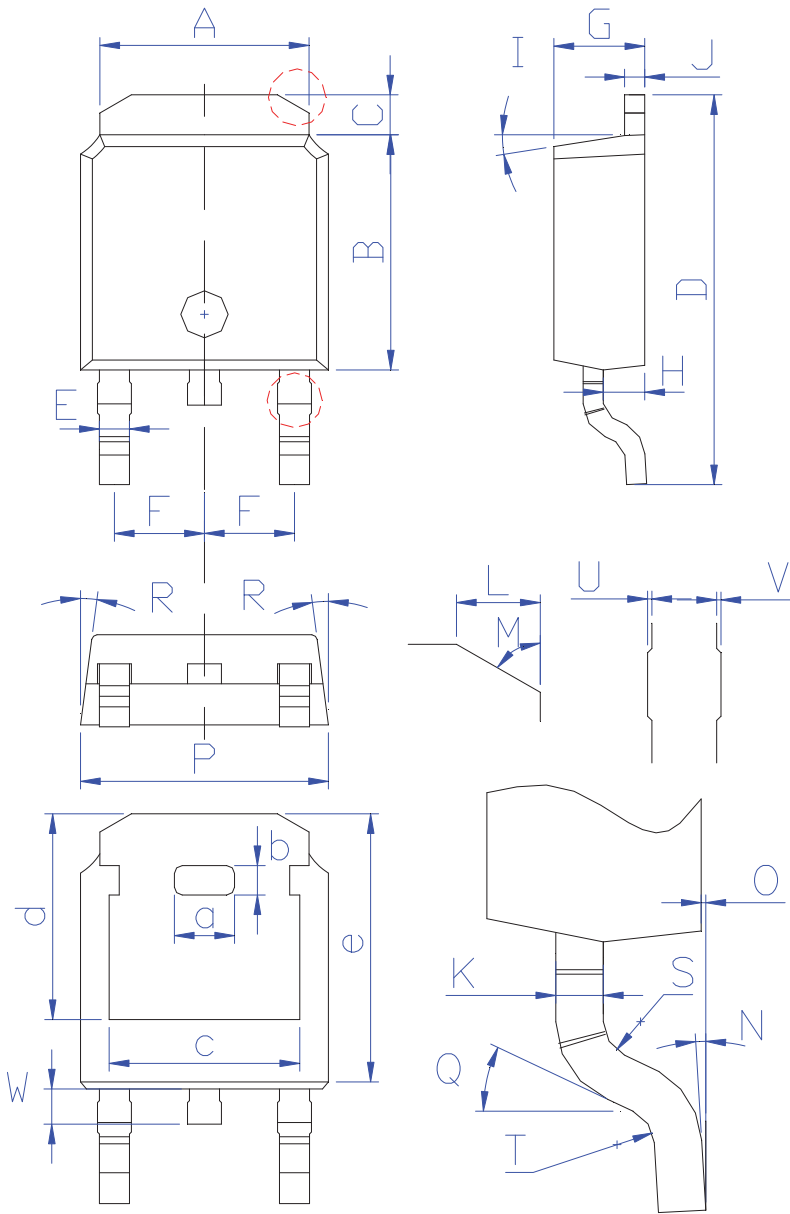
DIM	MILLIMETERS
A	5.34±0.30
B	6.00±0.30
C	1.05±0.30
D	11.31±0.30
E	0.76±0.15
F	2.28±0.15
G	2.30±0.30
H	1.06±0.30
I	(4-10)°
J	0.51±0.15
K	0.52±0.15
L	0.80±0.30
M	60°
N	0.75±0.30
O	1.80±0.30
P	6.60±0.30
Q	4.85±0.30
R	(4-8.5)°
S	5.30±0.30
T	6.90±0.30
U	0.05±0.05
V	0.05±0.05
W	1.15±0.25
Y	0.85±0.25

(Unit: mm)

外形尺寸:

Package Dimension:

TO-252



DIM	MILLIMETERS
A	5.34 ± 0.30
B	6.00 ± 0.30
C	1.05 ± 0.30
D	9.95 ± 0.30
E	0.76 ± 0.15
F	2.28 ± 0.15
G	2.30 ± 0.30
H	1.06 ± 0.30
I	$(4-10)^\circ$
J	0.51 ± 0.15
K	0.52 ± 0.15
L	0.80 ± 0.30
M	60°
N	$(0-10)^\circ$
O	0.05 ± 0.05
P	6.60 ± 0.30
Q	25°
R	$(4-8.5)^\circ$
S	R0.40
T	R0.40
U	0.05 ± 0.05
V	0.05 ± 0.05
W	0.90 ± 0.30
a	1.80 ± 0.30
b	0.75 ± 0.30
c	4.85 ± 0.30
d	5.30 ± 0.30
e	6.90 ± 0.30

(Units: mm)

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