



# YJD40P03B

## P-Channel Enhancement Mode Field Effect Transistor

### Product Summary

$V_{DS}$	-30 V
$I_D$	-40 A
$R_{DS(ON)}$ ( at $V_{GS}=-10V$ )	14 m
$R_{DS(ON)}$ ( at $V_{GS}=-4.5V$ )	22 m
100% EAS Tested	
100% $V_{DS}$ Tested	

### General Description

Trench Power LV MOSFET technology  
High density cell design for Low  $R_{DS(ON)}$   
High Speed switching

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Epoxy Meets UL 94 V-0 Flammability Rating  
Halogen Free

### Applications

Battery protection  
Load switch  
Power management

### Absolute Maximum Ratings ( $T_A=25$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	-30	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_A=25^{\circ}C$	$I_D$	-10	A
	$T_A=100^{\circ}C$		-6.3	
	$T_C=25^{\circ}C$		-40	
	$T_C=100^{\circ}C$		-25	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	-120	A
Avalanche energy <sup>B</sup>		EAS	49	mJ
Total Power Dissipation <sup>C</sup>	$T_A=25^{\circ}C$	$P_D$	2.5	W
	$T_A=100^{\circ}C$		1	
	$T_C=25^{\circ}C$		83	
	$T_C=100^{\circ}C$		33	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 +150	$^{\circ}C$

### Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient <sup>D</sup>	Steady-State	R	40	50	$^{\circ}C/W$
Thermal Resistance Junction-to-Case	Steady-State	R	1.2	1.5	

### Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD40P03B	F1/F2	YJD40P03B	2500	/	25000	13 reel



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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-$	-30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	
		$V_{DS}=-30V, V_{GS}=0V, T_J=150^\circ C$	-	-	-100	
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-$	-1	-1.5	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$	-	10.5	14	
		$V_{GS}=-4.5V, I_D=-20A$	-	16	22	
Diode Forward Voltage	$V_{SD}$	$I_S=-20A, V_{GS}=0V$	-	-0.9	-1.3	V
Gate resistance	$R_G$	$f=1MHz$	-	14	-	
Maximum Body-Diode Continuous Current	$I_S$		-	-	-40	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	-	1220	-	pF
Output Capacitance	$C_{oss}$		-	170	-	
Reverse Transfer Capacitance	$C_{rss}$		-	160	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=-10V, V_{DS}=-15V, I_D=-10A$	-	24	-	nC
Gate-Source Charge	$Q_{gs}$		-	2	-	
Gate-Drain Charge	$Q_{gd}$		-	6	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=-10A, di/dt=100A/us$	-	11	-	nC
Reverse Recovery Time	$t_{rr}$		-	35	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=-10V, V_{DD}=-15V, I_D=-10A$ $R_{GEN}=2.5$	-	11	-	ns
Turn-on Rise Time	$t_r$		-	4	-	
Turn-off Delay Time	$t_{D(off)}$		-	70	-	
Turn-off fall Time	$t_f$		-	50	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B.  $T_J=25^\circ C, V_{DD}=-25V, V_G=-10V, R_G=0.5mH, I_{AS}=-14A$ .

C.  $P_d$  is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

D. The value of  $R_{\theta j-c}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with  $T_A=25^\circ C$ . The maximum allowed junction temperature of 150. The value in any given application depends on the user's specific board design.



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## Typical Electrical and Thermal Characteristics Diagrams

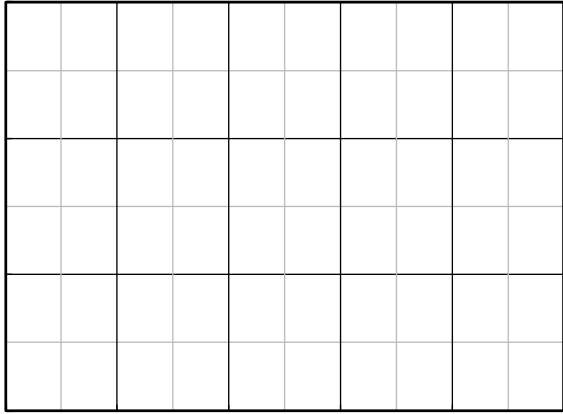


Figure 1. Output Characteristics

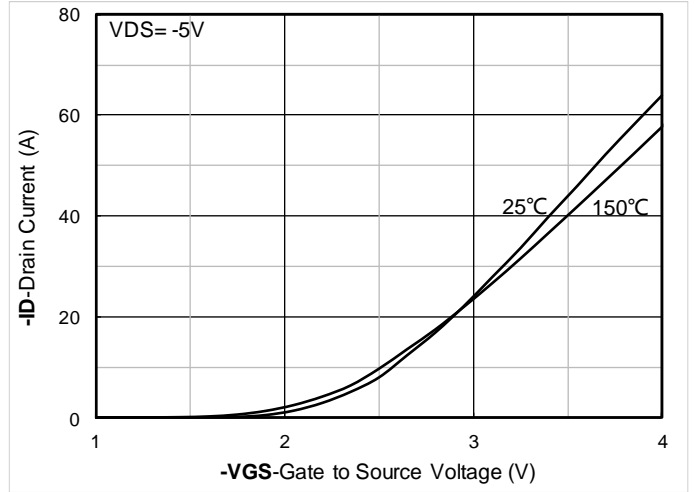


Figure 2. Transfer Characteristics

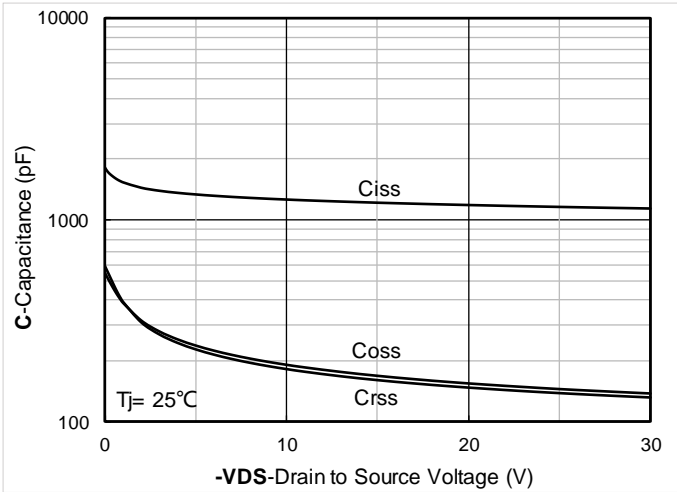


Figure 3. Capacitance Characteristics

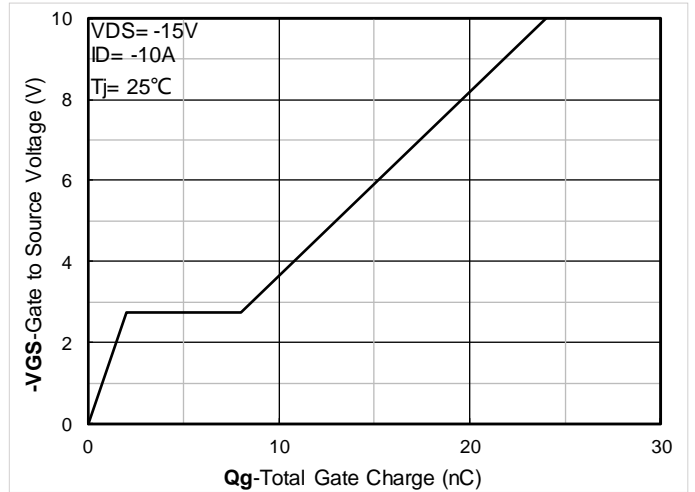


Figure 4. Gate Charge

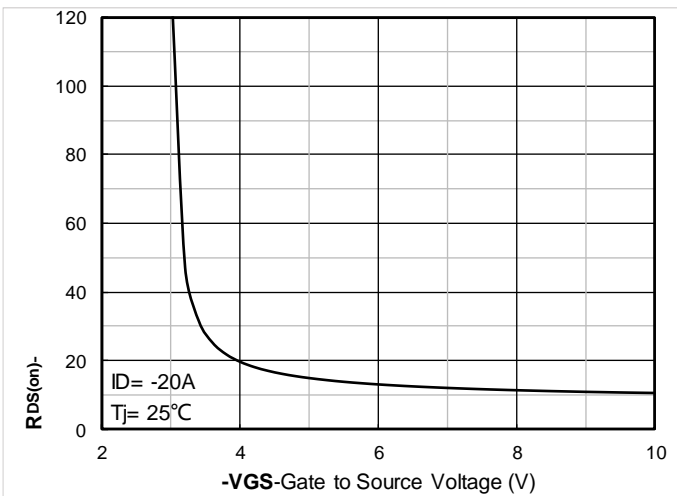


Figure 5. On-Resistance vs Gate to Source Voltage

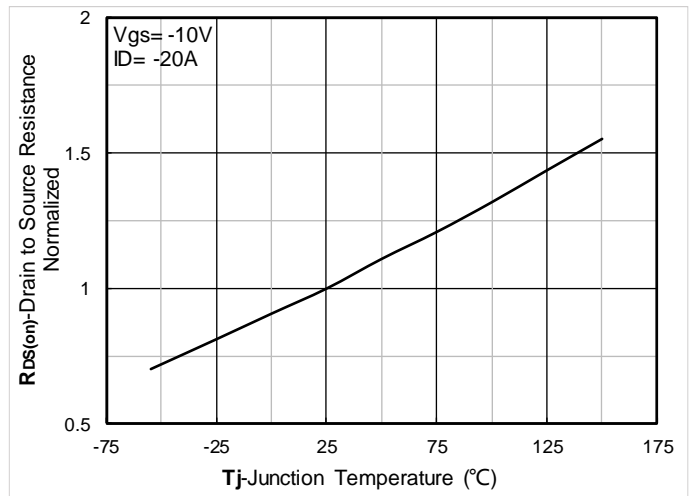


Figure 6. Normalized On-Resistance

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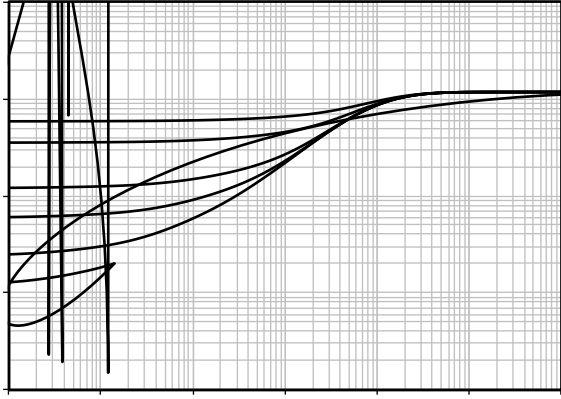


Figure 13. Maximum Transient Thermal Impedance

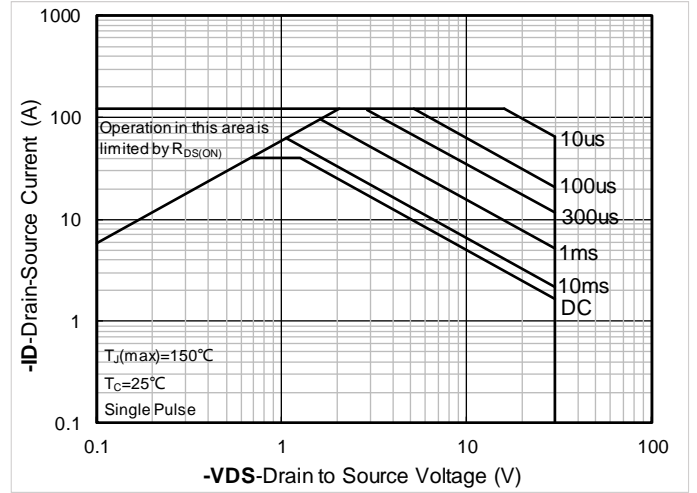
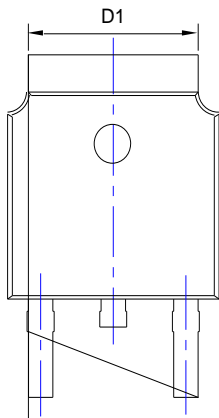


Figure 14. Safe Operation Area

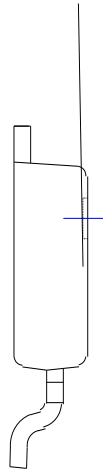


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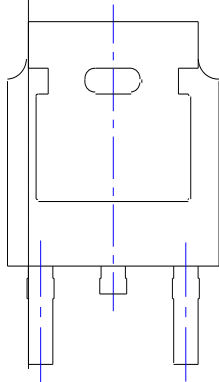
## TO-252-B Package information



TOP VIEW



SIDE VIEW



BOTTOM VIEW

SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS				
	INCHES				
	MIN.	NOM.			
A1	0.000				
A2	0.087	0.091			
A3	0.035	0.039			
b	0.026	0.030			
c	0.018	0.020			
D	0.256	0.260			
D1					
D2	0.181	0.189			
E	0.390	0.398			
E1	0.236	0.240			

**NOTE:**

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

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