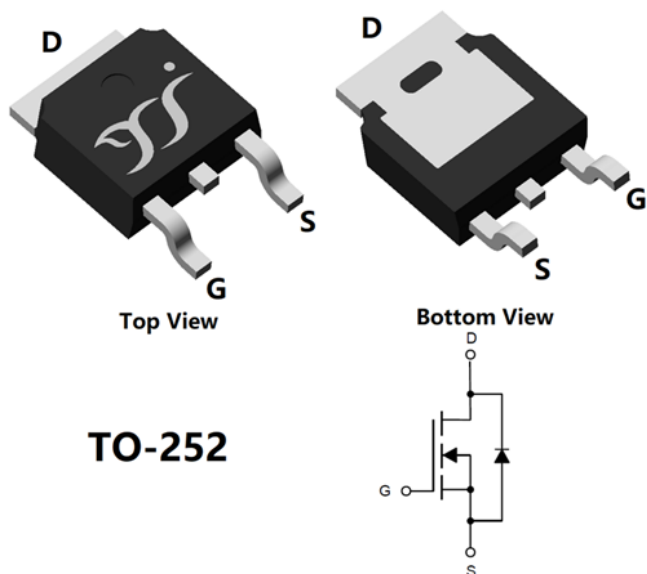


N-Channel Enhancement Mode Field Effect Transistor



TO-252

Product Summary

- V_{DS} 650V
- I_D 6.5A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<580m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Super Junction High Voltage MOSFET technology
- Ultra Low Gate Charge Cause Lower Driving Requirement
- Low On-resistance and Low Conduction Loss
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Switching Mode Power Supplies (SMPS)
- PWM Motor Controls
- LED Lighting
- Adapter

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V_{DS}	-	650	V
Gate-source Voltage			V_{GS}	-30	30	
Continuous Drain Current (Note 1,2)	Steady-State	$T_A=25^{\circ}C, V_{GS}=10V$	I_D	-	1.27	A
		$T_A=100^{\circ}C, V_{GS}=10V$		-	0.8	
Continuous Drain Current (Note 1,3)	Steady-State	$T_C=25^{\circ}C, V_{GS}=10V$		-	6.5	
		$T_C=100^{\circ}C, V_{GS}=10V$		-	4.1	
Pulsed Drain Current	$T_C=25^{\circ}C, t_p \leq 10\mu s$		I_{DM}	-	16	
Maximum Body-Diode Continuous Current	$T_C=25^{\circ}C$		I_S		6.5	
Maximum Body-Diode Pulsed Current	$T_C=25^{\circ}C, t_p \leq 10\mu s$		I_{SM}	-	16	
Avalanche Energy (non-repetitive)	$T_J=25^{\circ}C, V_G=10V, R_G=25\Omega, L=30mH, I_{AS}=3A$		EAS	-	135	mJ
Total Power Dissipation (Note 1,2)	Steady-State	$T_A=25^{\circ}C$	P_D	-	2.5	W
		$T_A=100^{\circ}C$		-	1	
Total Power Dissipation (Note 1,3)	Steady-State	$T_C=25^{\circ}C$		-	65	
		$T_C=100^{\circ}C$		-	26	
MOSFET dv/dt Ruggedness	$T_J=25^{\circ}C, V_{DS}=0 \dots 400V, I_D \leq 4A, R_g=0\Omega$		dv/dt	-	70	V/ns
Reverse Diode dv/dt	$T_J=25^{\circ}C, V_{DS}=0 \dots 400V, I_D \leq 4A, di/dt=100A/us$		dv/dt	-	87	
Maximum Diode Commutation Speed	$T_J=25^{\circ}C, V_{DS}=0 \dots 400V, I_D \leq 4A, R_g=0\Omega$		dif/dt	-	2200	A/us
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 (Note 2)	Steady-State	$R_{\theta JA}$	-	50	$^{\circ}C/W$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	1.9	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD580D65CH	F2	YJD580D65CH	2500	/	25000	13" reel



YJD580D65CH

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA, T _J =25℃	650	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _J =25℃	-	-	1	μA
		V _{DS} =650V, V _{GS} =0V, T _J =150℃	-	-	100	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V, T _J =25℃	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA, T _J =25℃	2.6	3.4	4.2	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =4A, T _J =25℃	-	500	580	mΩ
		V _{GS} =10V, I _D =4A, T _J =150℃	-	1335	1550	
Diode Forward Voltage	V _{SD}	I _S =4A, V _{GS} =0V, T _J =25℃	-	0.84	1.2	V
Gate Resistance	R _G	f=1MHz, T _J =25℃	-	5.5	-	Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =400V, V _{GS} =0V, f=1MHz, T _J =25℃	-	400	-	pF
Output Capacitance	C _{oss}		-	12.9	-	
Reverse Transfer Capacitance	C _{rss}		-	1.9	-	
Effective Output capacitance, Energy Related	C _{o(er)}	V _{DS} =0...400V, V _{GS} =0V, f=1MHz, T _J =25℃	-	20	-	
Effective Output Capacitance, Time Related	C _{o(tr)}		-	113	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =400V, I _D =4A, T _J =25℃	-	13.2	-	nC
Gate-Source Charge	Q _{gs}		-	2.3	-	
Gate-Drain Charge	Q _{gd}		-	7.1	-	
Reverse Recovery Charge	Q _{rr}	I _F =4A, di/dt=100A/μs, V _{GS} =0V, V _R =400V, T _J =25℃	-	1440	-	nC
Reverse Recovery Time	t _{rr}		-	171	-	ns
Peak Reverse Recovery Current	I _{rrm}		-	17.2	-	A
Turn-on Delay Time	t _{D(on)}	V _{GS} =13V, V _{DS} =400V, I _D =4A, R _{GEN} =3Ω, T _J =25℃	-	20	-	ns
Turn-on Rise Time	t _r		-	20	-	
Turn-off Delay Time	t _{D(off)}		-	22.5	-	
Turn-off Fall Time	t _f		-	48	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).

■ Typical Electrical and Thermal Characteristics Diagrams

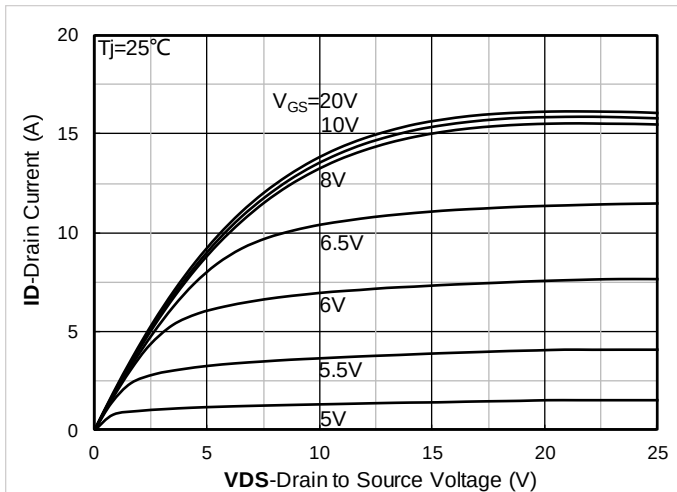


Figure 1. Output Characteristics; typical values

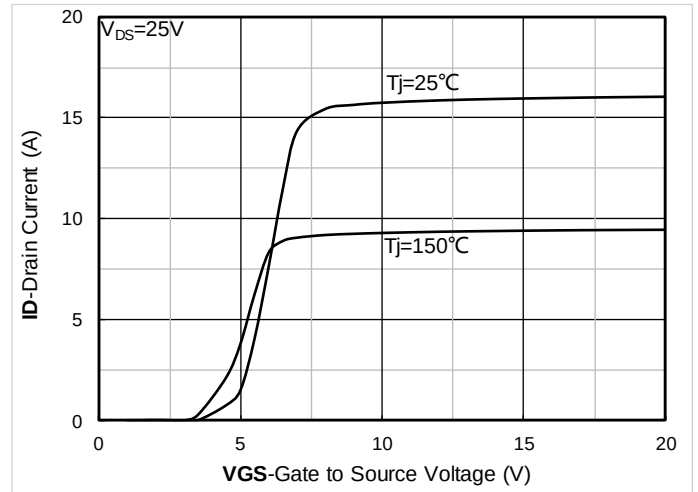


Figure 2. Transfer Characteristics; typical values

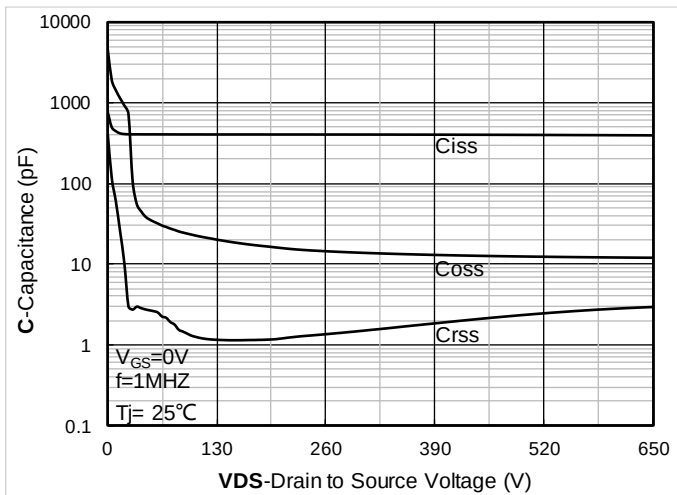


Figure 3. Capacitance Characteristics; typical values

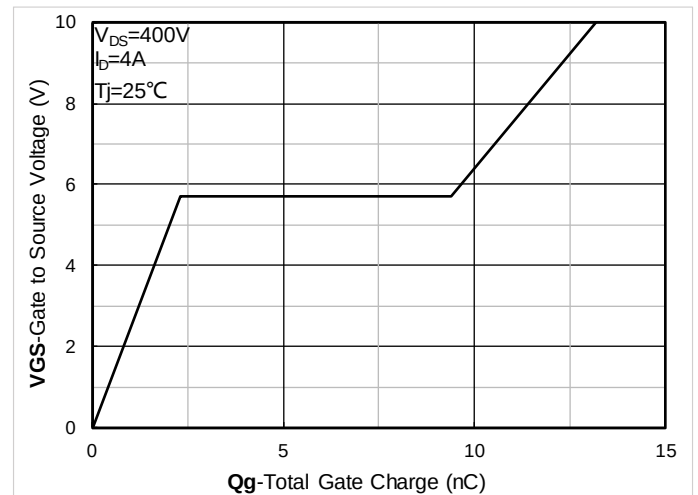


Figure 4. Gate Charge; typical values

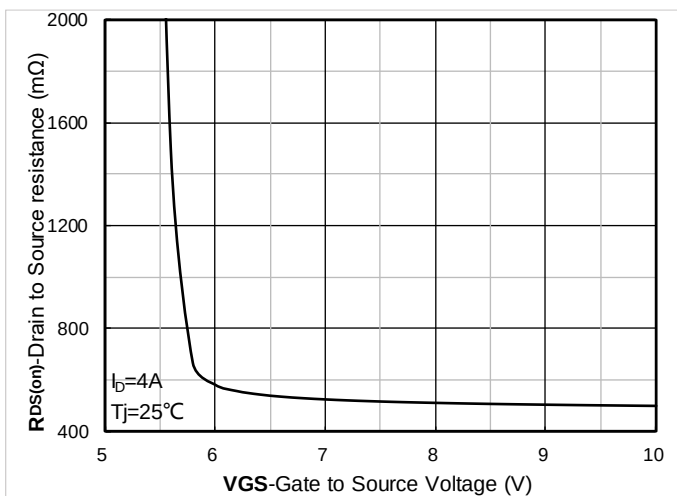


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

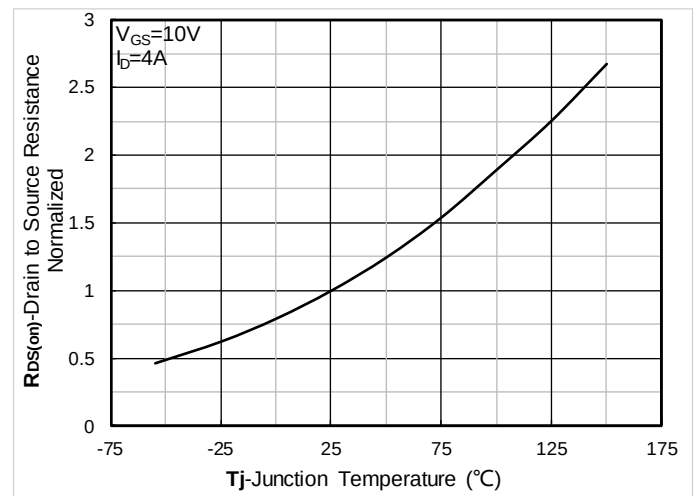


Figure 6. Normalized On-Resistance

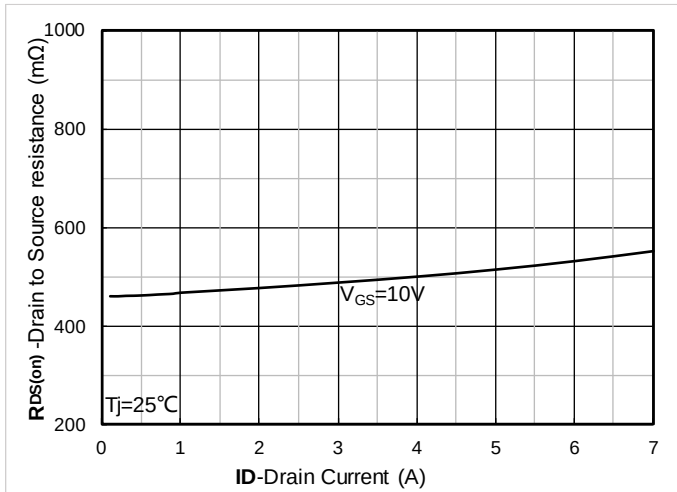


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

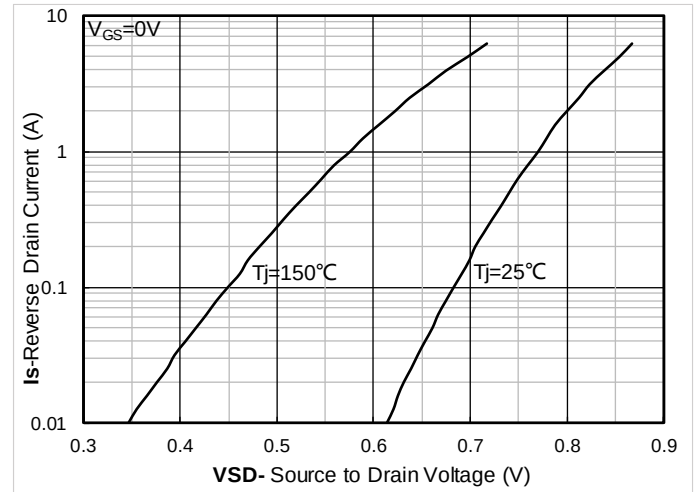


Figure 8. Forward characteristics of reverse diode; typical values

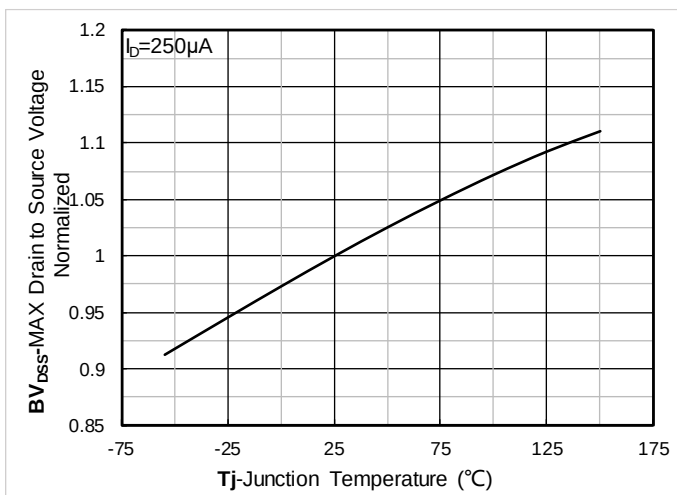


Figure 9. Normalized breakdown voltage

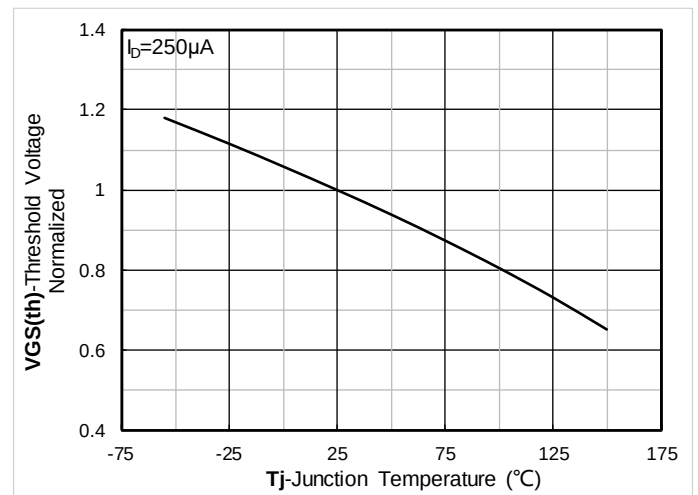


Figure 10. Normalized Threshold voltage

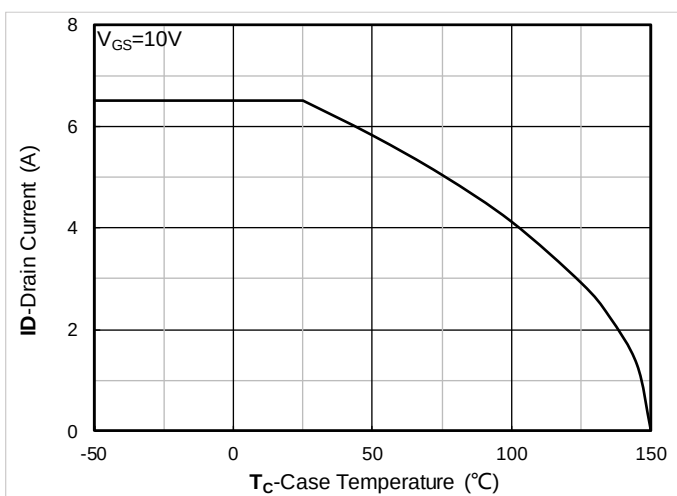


Figure 11. Current dissipation

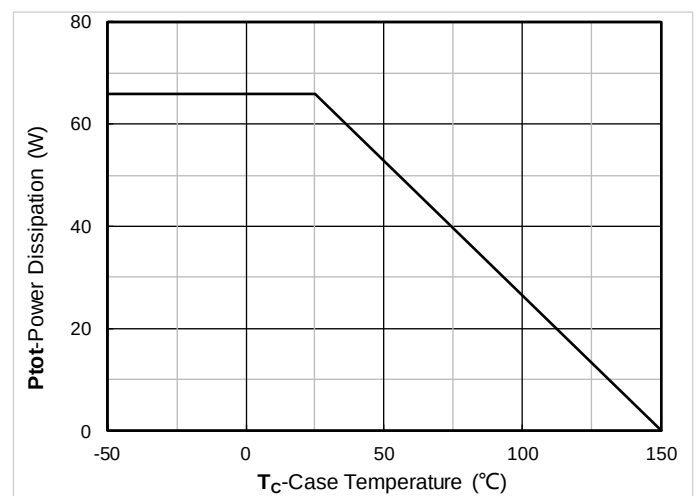


Figure 12. Power dissipation

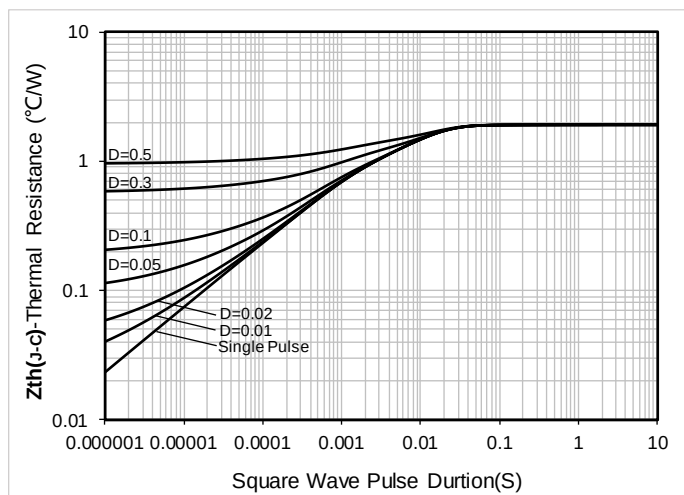


Figure 13. Maximum Transient Thermal Impedance

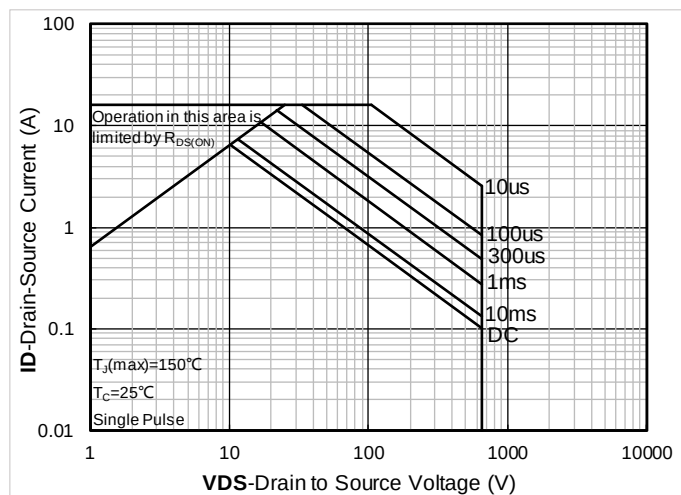


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

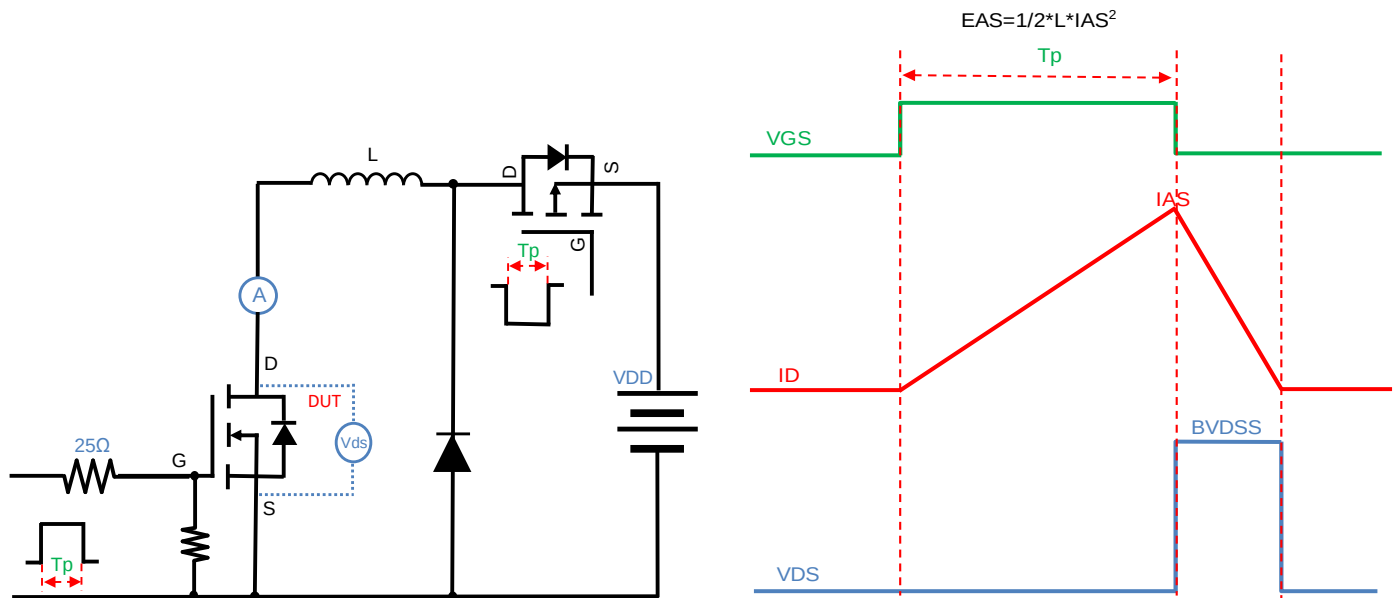


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

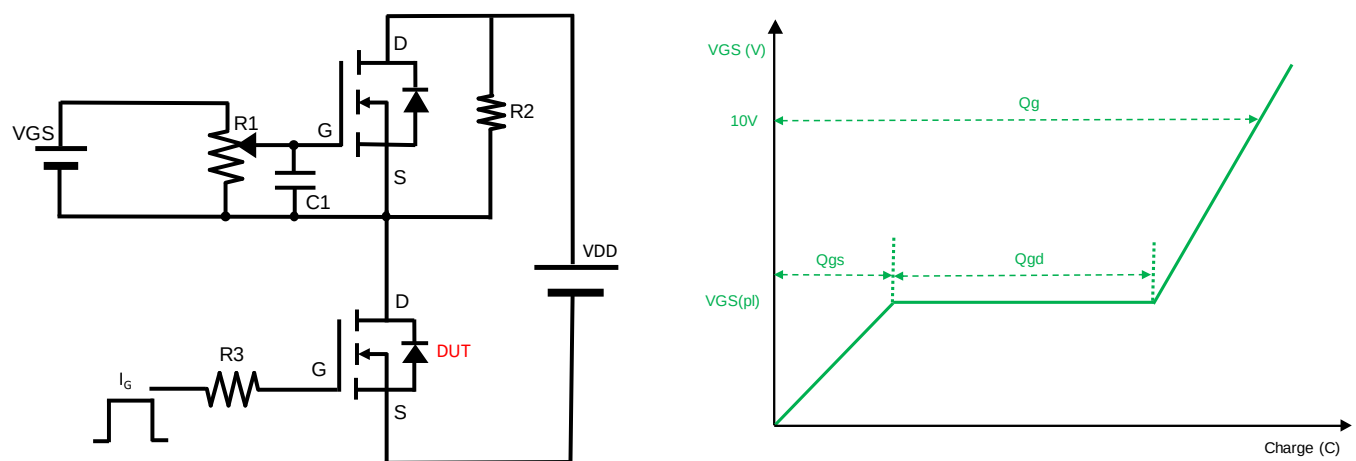


Figure B. Gate Charge Test Circuit & Waveform

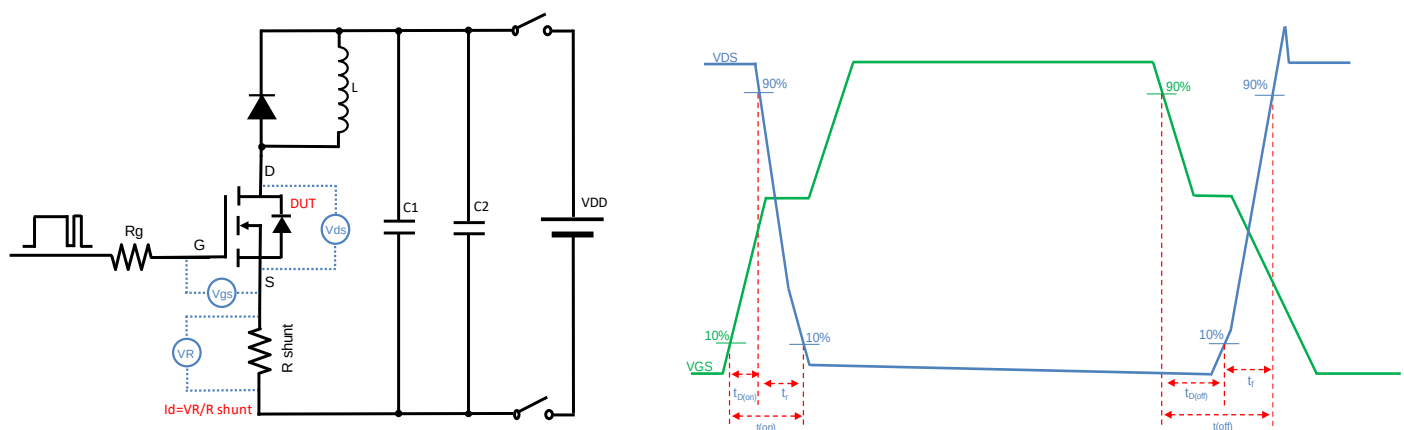


Figure C. Resistive Switching Test Circuit & Waveform

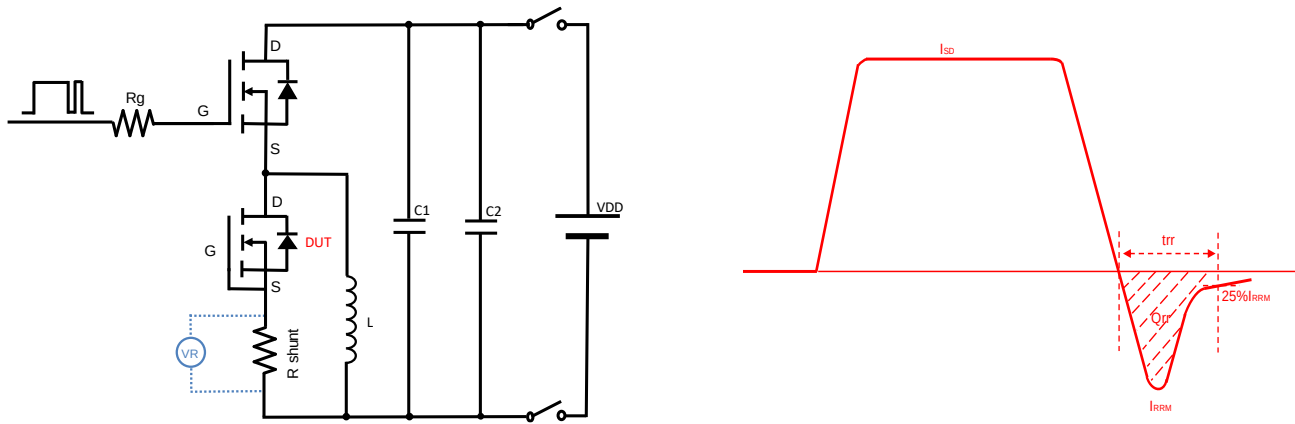
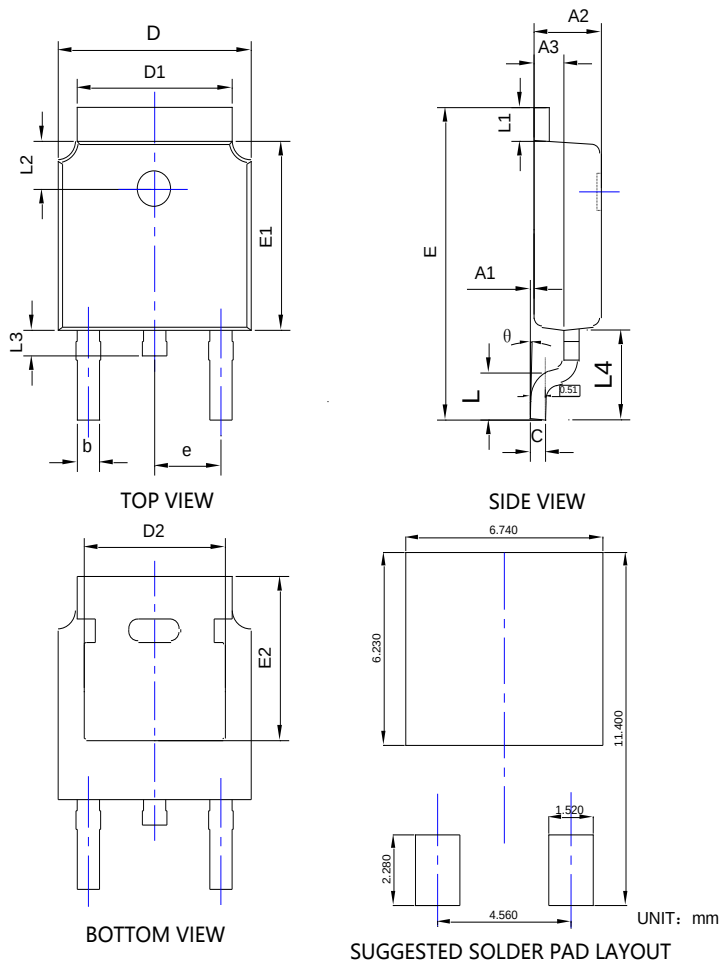


Figure D. Diode Recovery Test Circuit & Waveform



YJD580D65CH

■ TO-252-B Package information

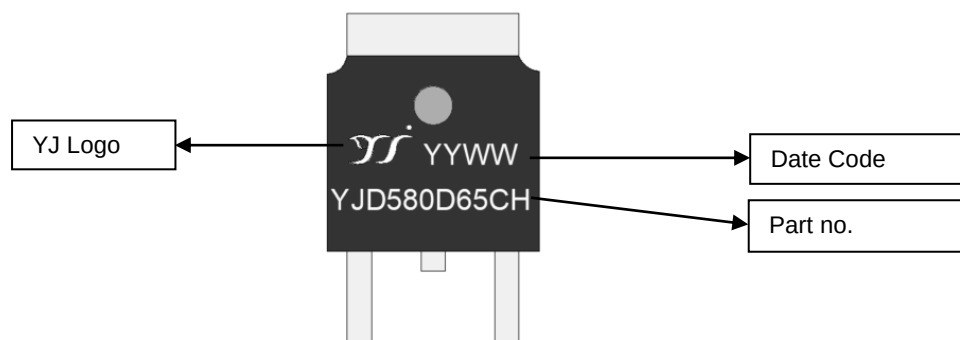


SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.024	0.031	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

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.

■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. YJD580D65CH is part no., YYWW is date code, "YY" is year, "WW" is week
4. Body color: Black



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