

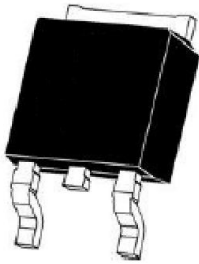
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	1100mΩ@10V	4A

Feature

- New technology for high voltage device
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements

Package

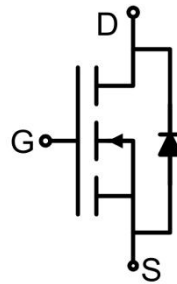


TO-252AB

Application

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)

Circuit diagram



Marking



Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	I_D	4	A
Continuous Drain Current($T_c=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	2.5	A
Pulsed Drain Current ¹⁾	I_{DM}	16	A
Power Dissipation	P_D	41	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy ²⁾	E_{AS}	27	mJ
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	650			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	3		4	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2A$		950	1100	m Ω
Dynamic characteristics³⁾						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1\text{MHz}$		304		pF
Output Capacitance	C_{oss}			18		
Reverse Transfer Capacitance	C_{rss}			0.6		
Total Gate Charge	Q_g	$V_{DS} = 480V, V_{GS} = 10V, I_D = 4A$		8.8		nC
Gate-Source Charge	Q_{gs}			2.3		
Gate-Drain Charge	Q_{gd}			4		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 380V, I_D = 2.5A, V_{GS} = 10V, R_G = 5\Omega$		8		nS
Turn-on rise time	t_r			4		
Turn-off delay time	$t_{d(off)}$			52		
Turn-off fall time	t_f			9		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				4	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0V, I_{SD} = 4A, T_J = 25^\circ\text{C}$			1.2	V
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 2A, di/dt = 100A/\mu\text{s}$		200		nS
Reverse Recovery Charge	Q_{rr}			0.6		μC

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) $T_J = 25^\circ\text{C}, V_{DS} = 50V, V_G = 10V, R_G = 25\Omega$.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1. Safe operating area

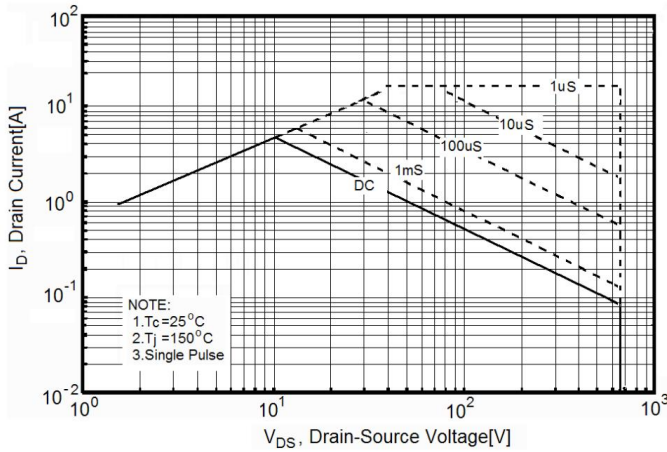


Figure2. Source-Drain Diode Forward Voltage

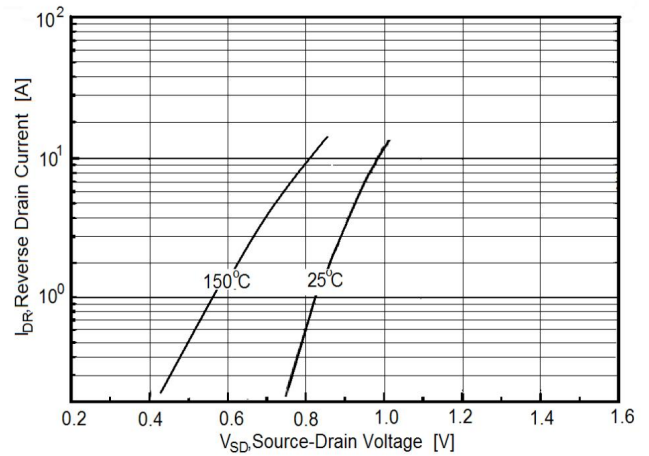


Figure3. Output characteristics

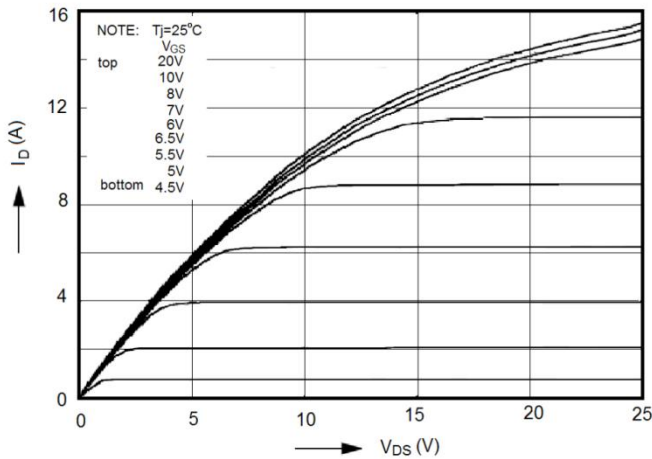


Figure4. Transfer characteristics

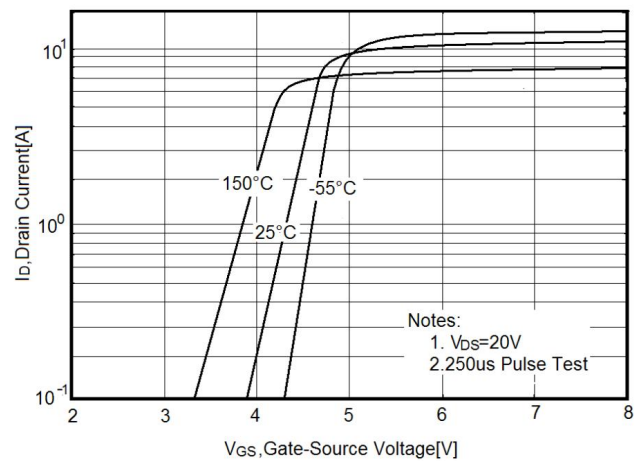


Figure5. Static drain-source on resistance

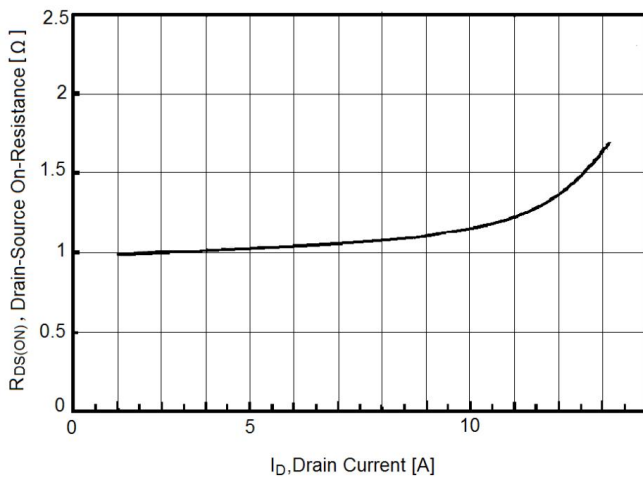
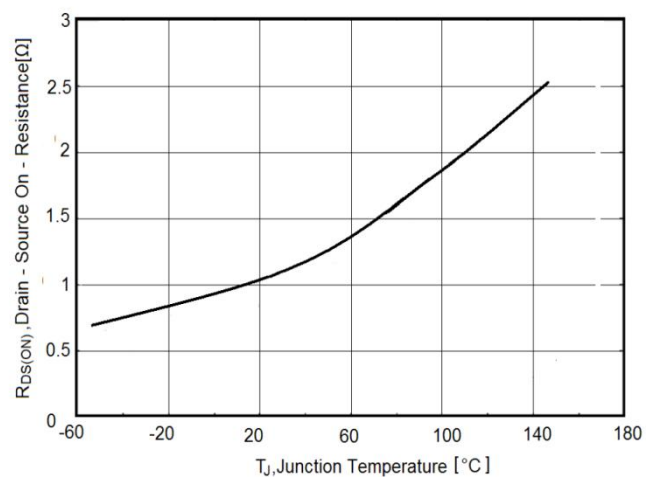


Figure6. $R_{DS(ON)}$ vs Junction Temperature



Typical Characteristics

Figure7. BV_{DSS} vs Junction Temperature

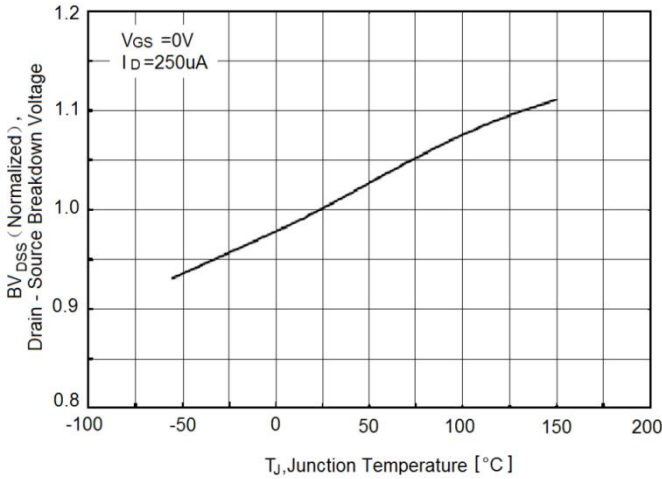


Figure8. Maximum I_D vs Junction Temperature

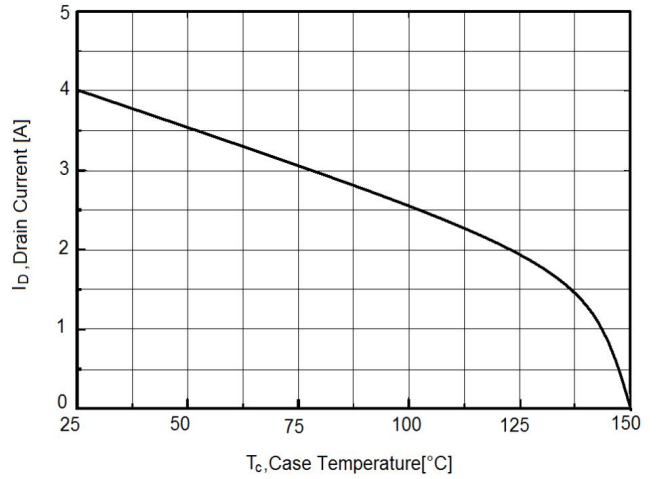


Figure9. Gate charge waveforms

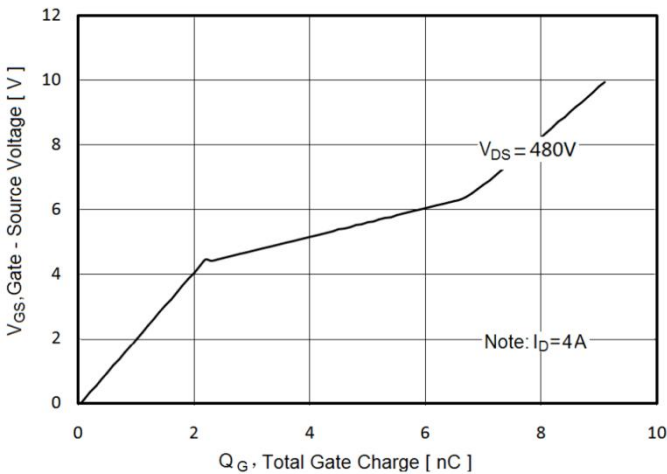


Figure10. Capacitance

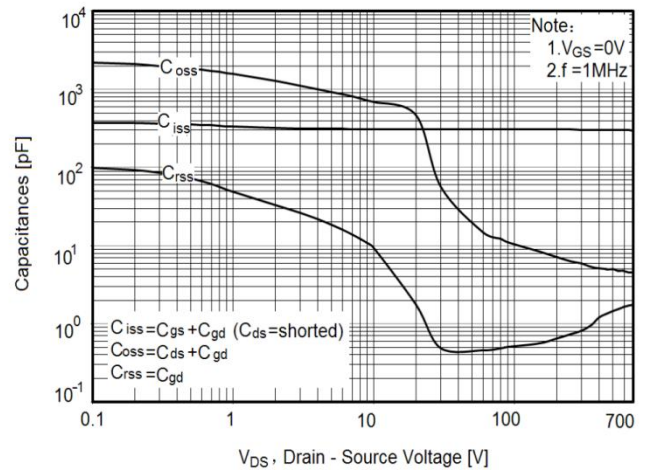
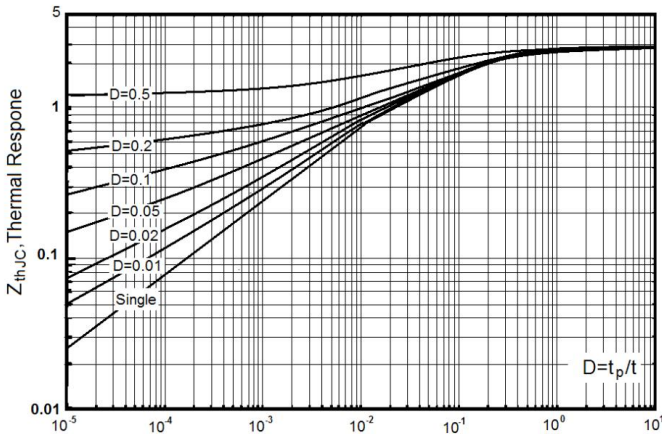
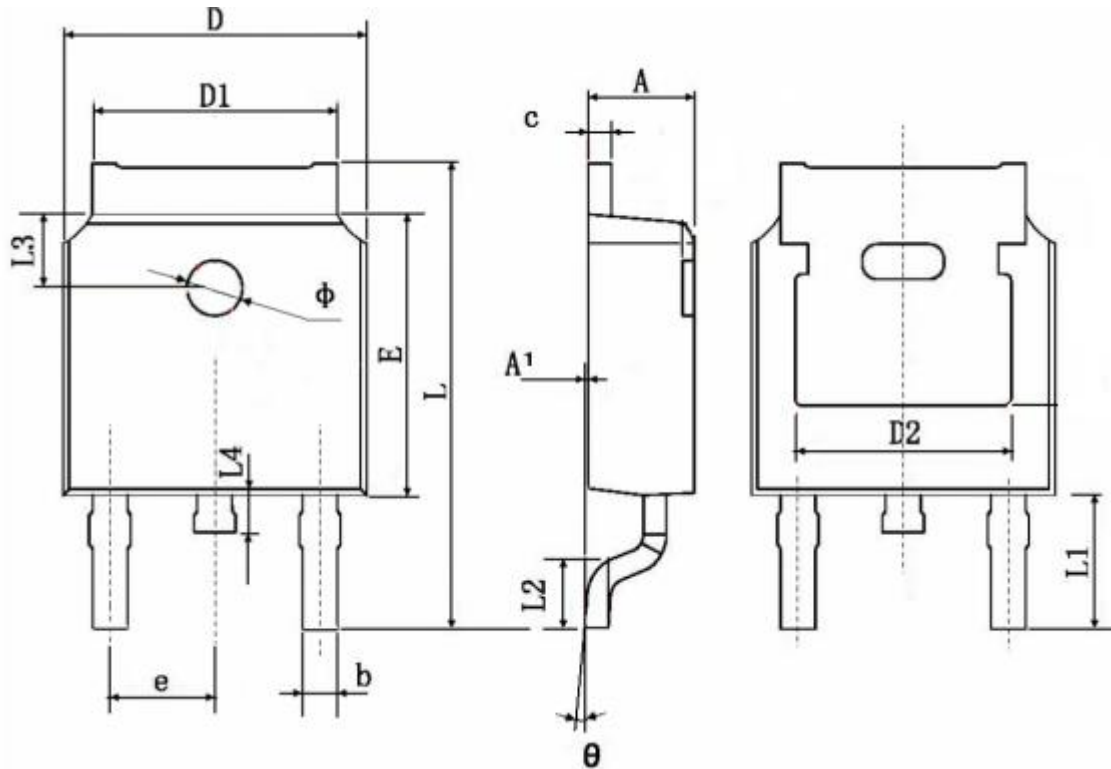


Figure11. Transient Thermal Impedance



TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.130	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.600	0.018	0.024
D	6.500	6.700	0.256	0.264
D1	5.100	5.500	0.201	0.217
D2	4.830 REF		0.190 REF	
E	6.000	6.200	0.236	0.244
e	2.190	2.390	0.086	0.094
L	9.800	10.500	0.386	0.413
L1	2.900 REF		0.114 REF	
L2	1.400	1.800	0.055	0.070
L3	1.800 REF		0.071 REF	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.400	0.043	0.055
θ	0°	8°	0°	8°