

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-30V	14mΩ@-10V	-40A
	22mΩ@-4.5V	

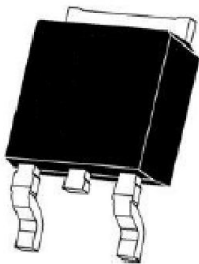
### Feature

- Trench Power LV MOSFET technology
- High density cell design for Low  $R_{DS(ON)}$
- High Speed switching
- Epoxy Meets UL 94 V-0 Flammability Rating

### Application

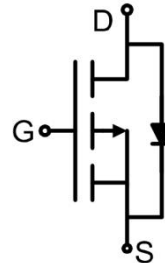
- Battery protection
- Load switch
- Power management

### Package

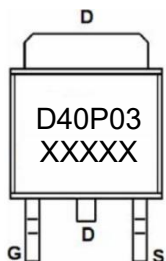


TO-252AB

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current( $T_C=25^\circ\text{C}$ )	$I_D$	-40	A
Continuous Drain Current( $T_C=100^\circ\text{C}$ )	$I_D(100^\circ\text{C})$	-25	A
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	-120	A
Avalanche energy <sup>2)</sup>	$E_{AS}$	49	mJ
Power Dissipation <sup>3)</sup>	$P_D$	2.5	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	$^\circ\text{C/W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu\text{A}$	-30			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V$			-1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1.0	-1.5	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -20A$		10.5	14	m $\Omega$
		$V_{GS} = -4.5V, I_D = -20A$		16	22	
<b>Dynamic characteristics<sup>4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V, f = 1\text{MHz}$		1220		pF
Output Capacitance	$C_{oss}$			170		
Reverse Transfer Capacitance	$C_{rss}$			160		
Total Gate Charge	$Q_g$	$V_{DS} = -15V, V_{GS} = -10V, I_D = -10A$		24		nC
Gate-Source Charge	$Q_{gs}$			2		
Gate-Drain Charge	$Q_{gd}$			6		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15V, V_{GS} = -10V, I_D = -10A, R_{GEN} = 2.5\Omega$		11		nS
Turn-on rise time	$t_r$			4		
Turn-off delay time	$t_{d(off)}$			70		
Turn-off fall time	$t_f$			50		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	$I_S$				-40	A
Diode Forward voltage	$V_{SD}$	$V_{GS} = 0V, I_S = -20A$			-1.3	V
Reverse Recovery Charge	$Q_{rr}$	$I_F = -10A, di/dt = 100A/\mu\text{s}$		11		nC
Reverse Recovery Time	$t_{rr}$				35	

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2)  $T_J=25^\circ\text{C}$ ,  $V_{DD}=-25V$ ,  $V_G=-10V$ ,  $R_G=25\Omega$ ,  $L=0.5\text{mH}$ ,  $I_{AS}=-14A$ .
- 3)  $P_D$  is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.
- 4) Guaranteed by design, not subject to production testing.

## Typical Characteristics

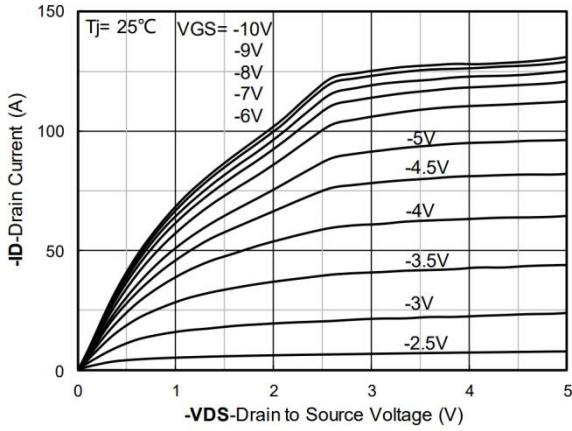


Figure 1. Output Characteristics

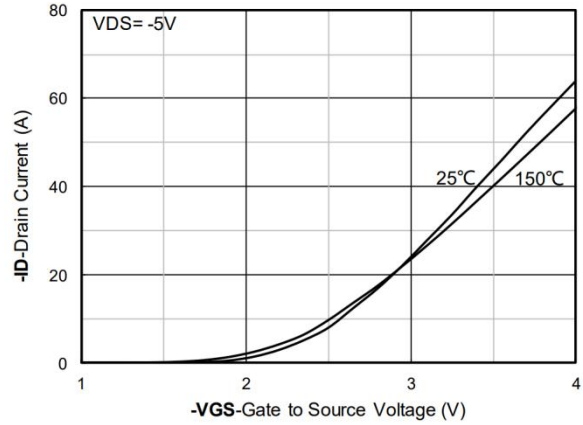


Figure 2. Transfer Characteristics

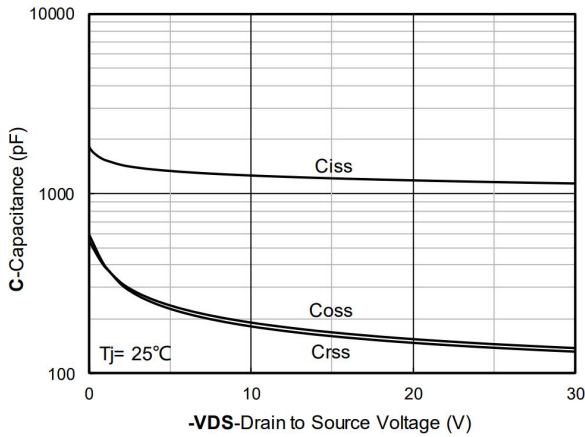


Figure 3. Capacitance Characteristics

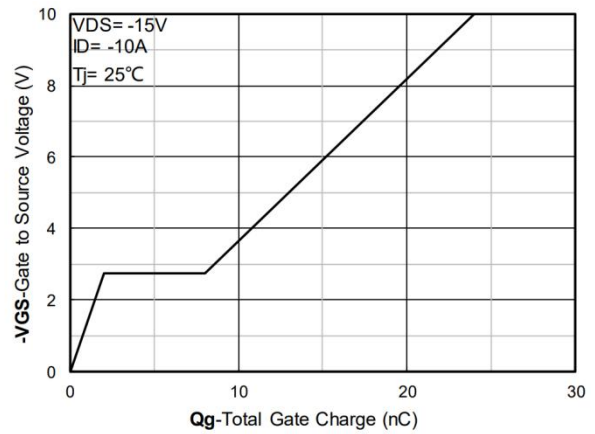


Figure 4. Gate Charge

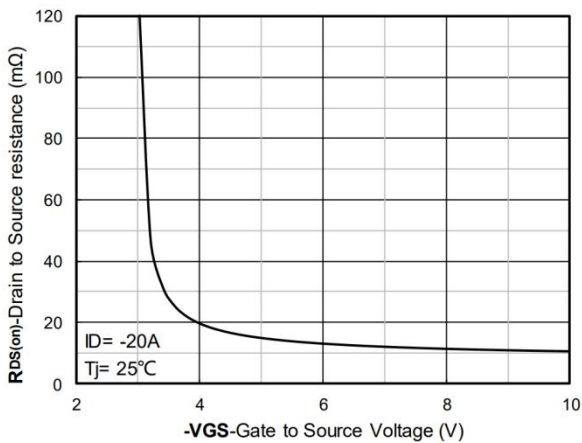


Figure 5. On-Resistance vs Gate to Source Voltage

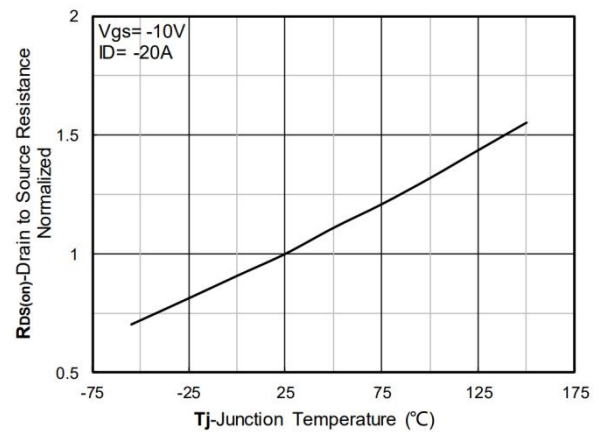


Figure 6. Normalized On-Resistance

## Typical Characteristics

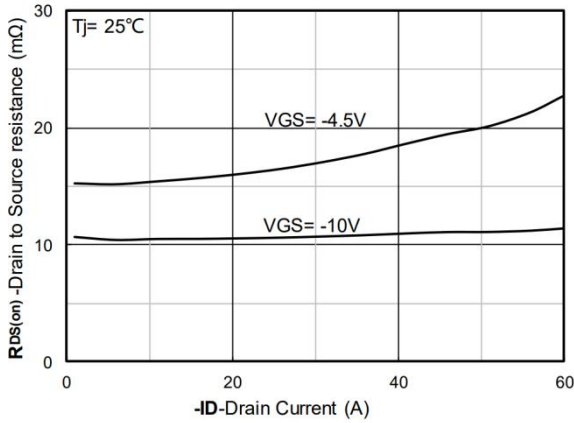


Figure 7. RDS(on) VS Drain Current

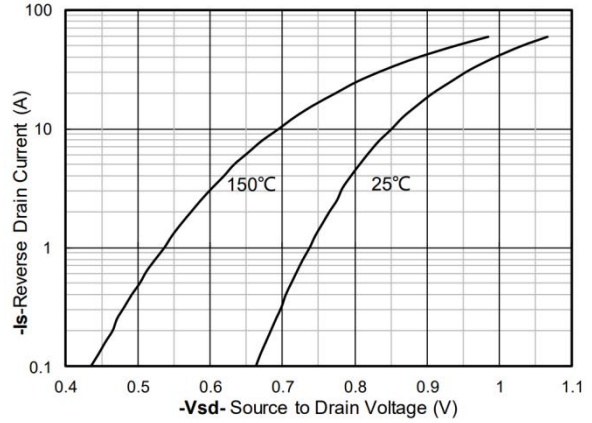


Figure 8. Forward characteristics of reverse diode

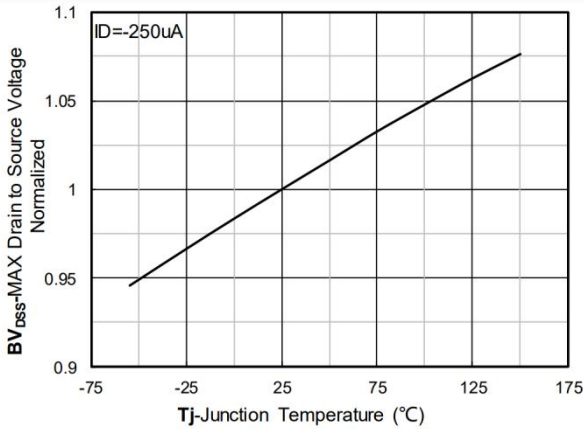


Figure 9. Normalized breakdown voltage

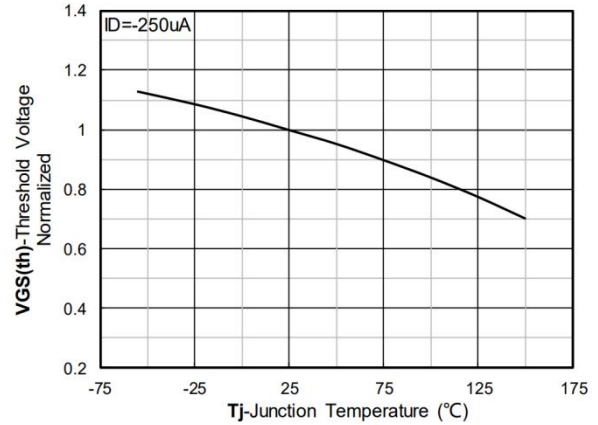


Figure 10. Normalized Threshold voltage

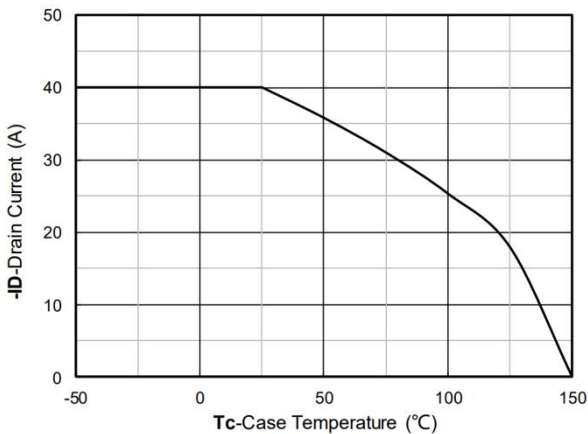


Figure 11. Current dissipation

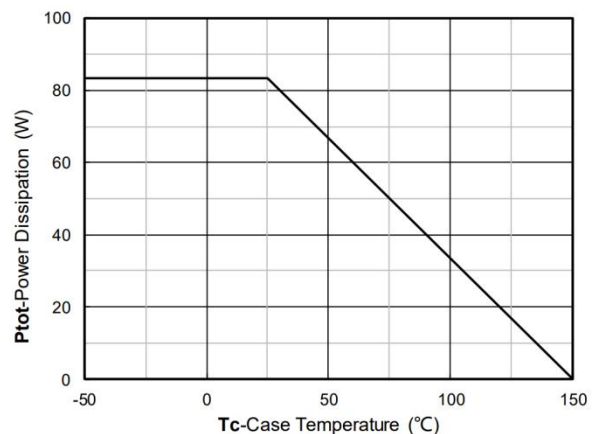


Figure 12. Power dissipation

## Typical Characteristic

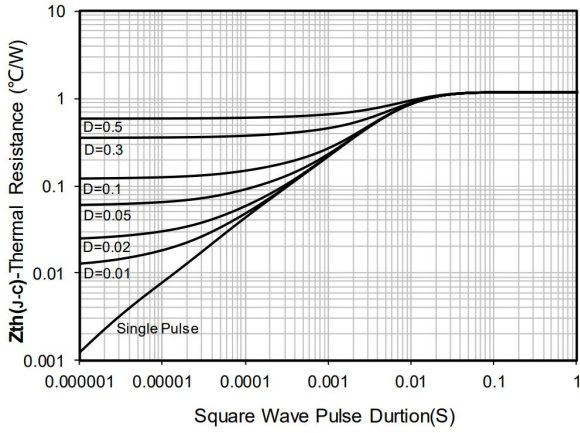


Figure 13. Maximum Transient Thermal Impedance

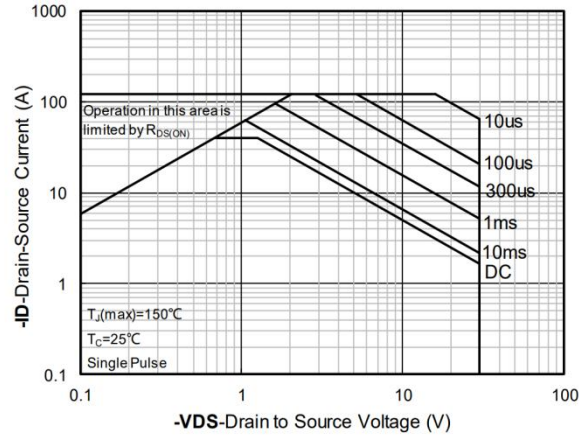
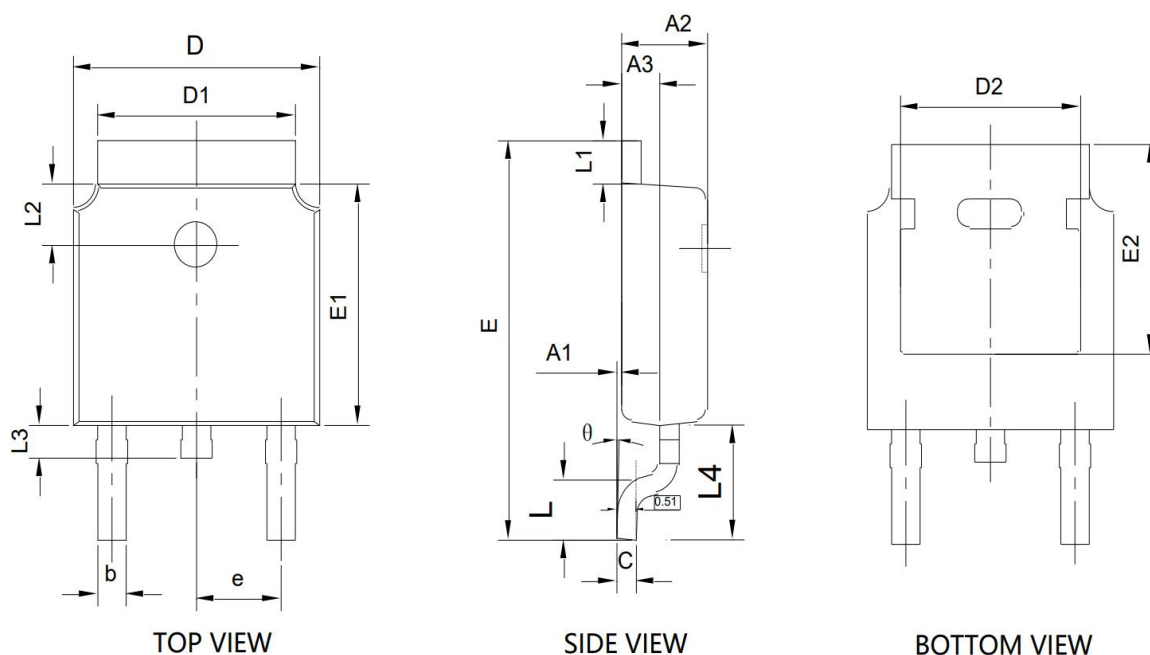


Figure 14. Safe Operation Area

### TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A1	0.000	0.200	0.000	0.008
A2	2.200	2.400	0.087	0.094
A3	0.900	1.100	0.035	0.043
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.150	5.450	0.203	0.215
D2	4.600	4.950	0.181	0.195
E	9.900	10.300	0.390	0.406
E1	6.000	6.200	0.236	0.244
E2	5.150	5.450	0.203	0.215
e	2.286 BSC		0.090 BSC	
L	1.250	1.750	0.049	0.069
L1	0.900	1.270	0.035	0.050
L2	1.400	1.900	0.055	0.075
L3	0.600	1.000	0.024	0.039
L4	2.900 REF		0.114 REF	
$\theta$	0°	10°	0°	10°