

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
150V	12mΩ@10V	90A

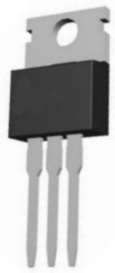
### Feature

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

### Application

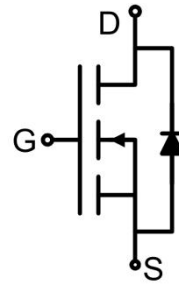
- Consumer electronic power supply
- Isolated DC-DC Converters
- Motor control

### Package

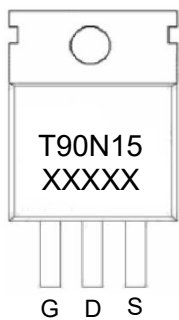


TO-220AB

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	150	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current( $T_C=25^\circ\text{C}$ )	$I_D$	90	A
Drain Current( $T_C=100^\circ\text{C}$ )	$I_D(100^\circ\text{C})$	56	A
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	250	A
Power Dissipation <sup>3)</sup>	$P_D$	3	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.7	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy <sup>2)</sup>	$E_{AS}$	400	mJ
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	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	150			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 150\text{V}, V_{GS} = 0\text{V}$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.0	3.0	4.0	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 45\text{A}$		9.6	12	m $\Omega$
		$V_{GS} = 10\text{V}, I_D = 20\text{A}$		9.5	12	
<b>Dynamic characteristics<sup>4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 75\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		3750		pF
Output Capacitance	$C_{oss}$			290		
Reverse Transfer Capacitance	$C_{rss}$			6		
Total Gate Charge	$Q_g$	$V_{DS} = 75\text{V}, V_{GS} = 10\text{V}, I_D = 45\text{A}$		48		nC
Gate-Source Charge	$Q_{gs}$			15		
Gate-Drain Charge	$Q_{gd}$			10		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 75\text{V}, V_{GS} = 10\text{V}, I_D = 45\text{A}, R_{GEN} = 2.2\Omega$		16		nS
Turn-on rise time	$t_r$			82		
Turn-off delay time	$t_{d(off)}$			30		
Turn-off fall time	$t_f$			6		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	$I_S$				90	A
Diode Forward voltage	$V_{SD}$	$V_{GS} = 0\text{V}, I_S = 45\text{A}$			1.2	V

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2)  $T_J=25^\circ\text{C}, V_{DD}=75\text{V}, V_G=10\text{V}, R_G=25\Omega, L=2\text{mH}, I_{AS}=20\text{A}$ .
- 3)  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
- 4) Guaranteed by design, not subject to production testing.

## Typical Characteristics

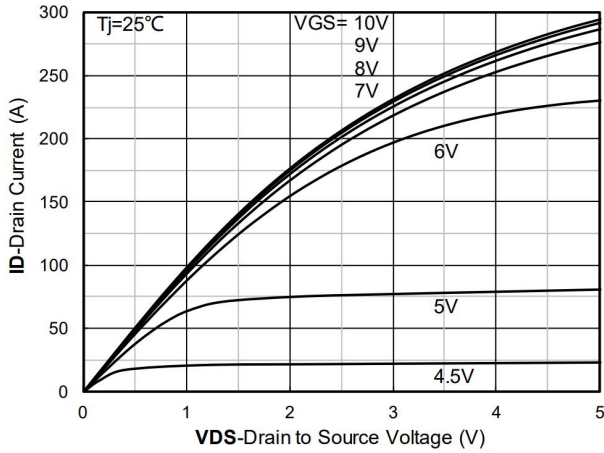


Figure 1. Output Characteristics

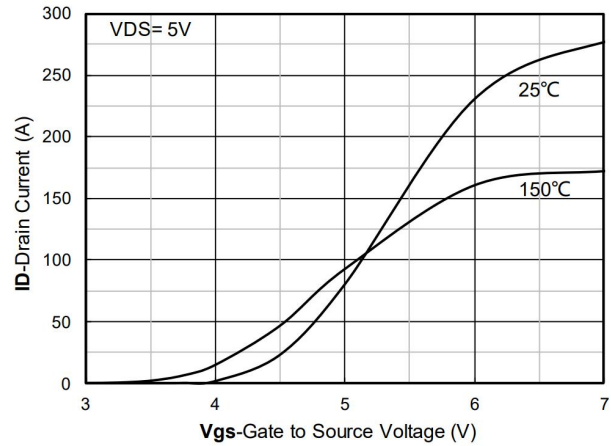


Figure 2. Transfer Characteristics

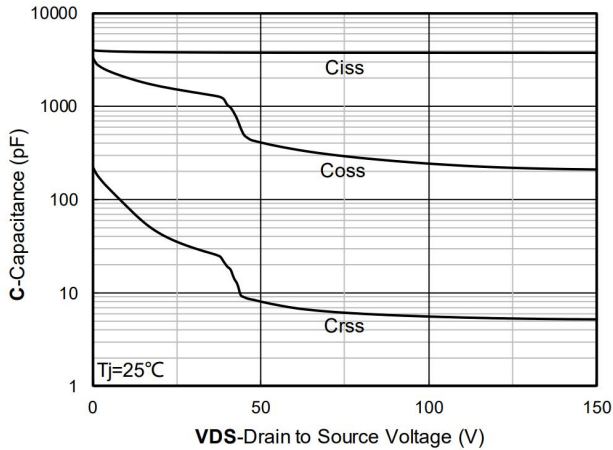


Figure 3. Capacitance Characteristics

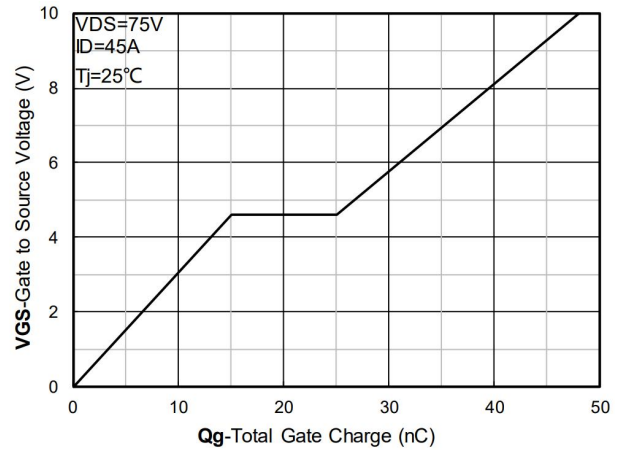


Figure 4. Gate Charge

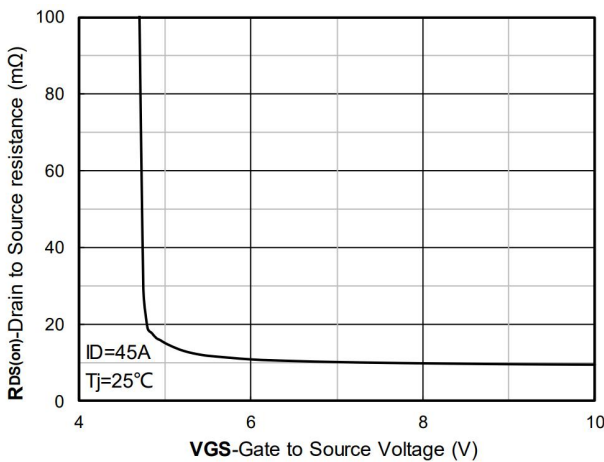


Figure 5. On-Resistance vs Gate to Source Voltage

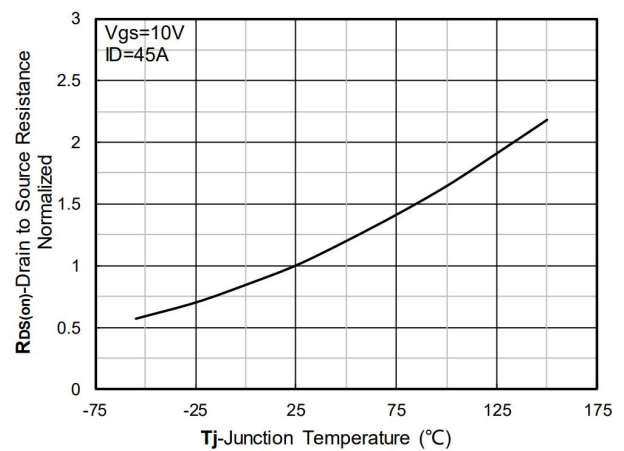


Figure 6. Normalized On-Resistance

## Typical Characteristics

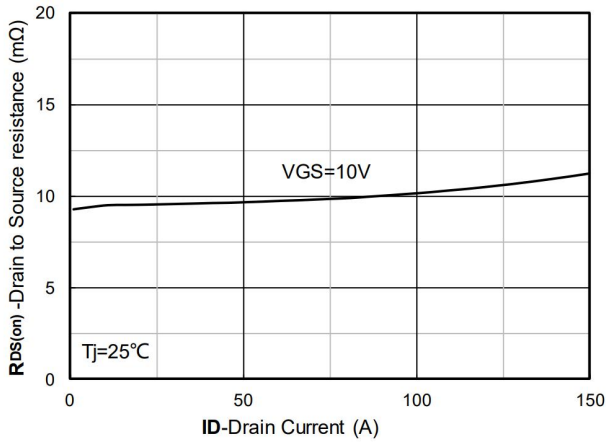


Figure 7. RDS(on) VS Drain Current

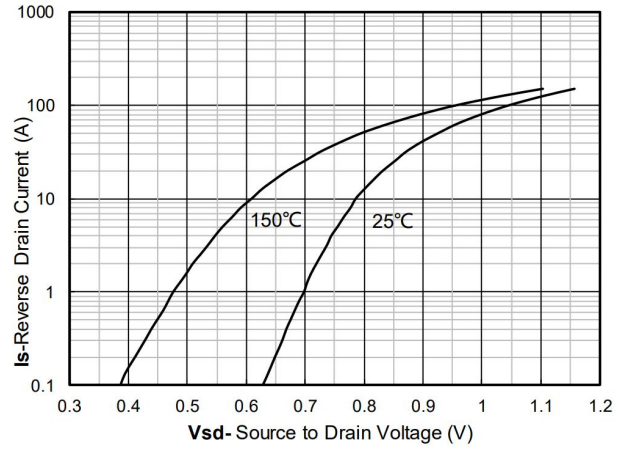


Figure 8. Forward characteristics of reverse diode

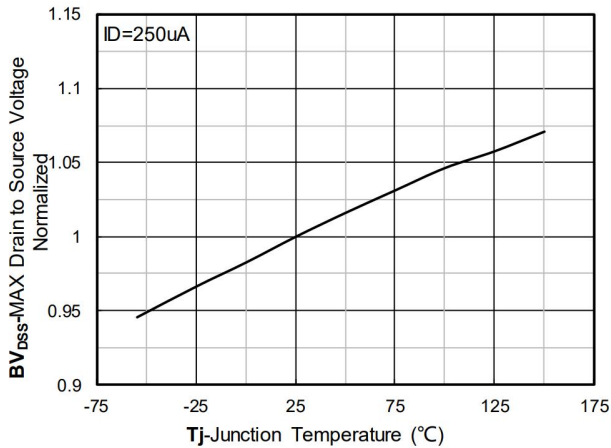


Figure 9. Normalized breakdown voltage

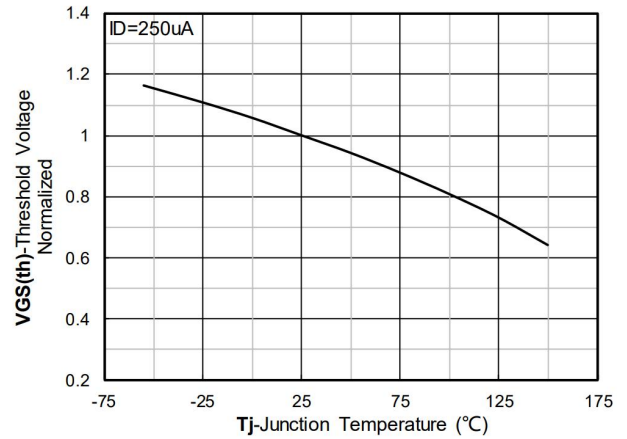


Figure 10. Normalized Threshold voltage

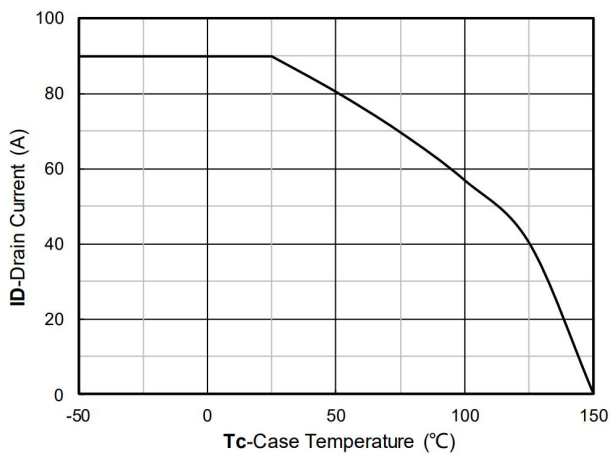


Figure 11. Current dissipation

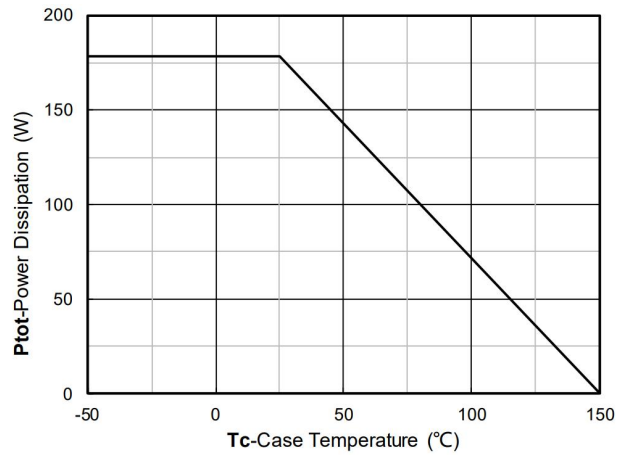


Figure 12. Power dissipation

## Typical Characteristics

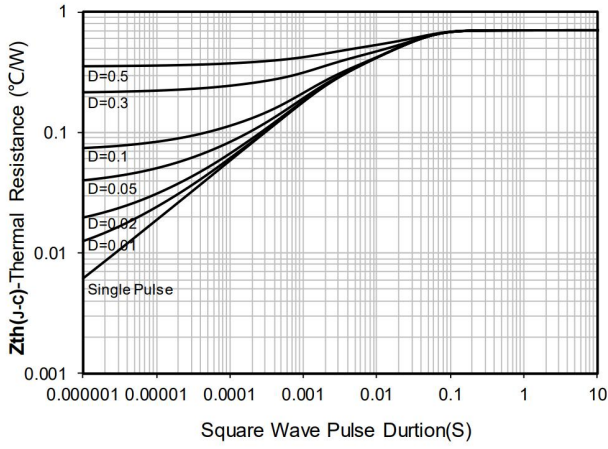


Figure 13. Maximum Transient Thermal Impedance

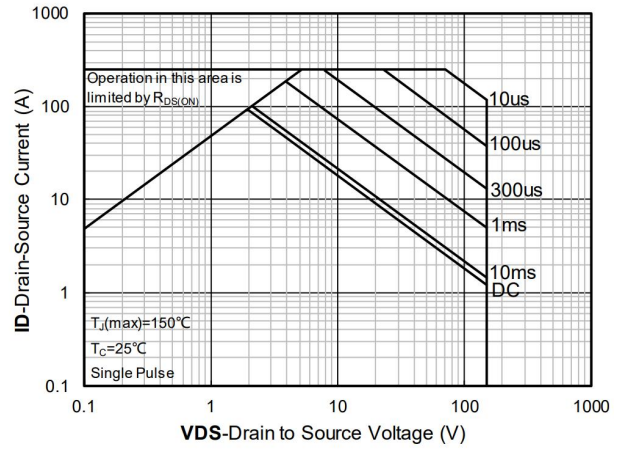
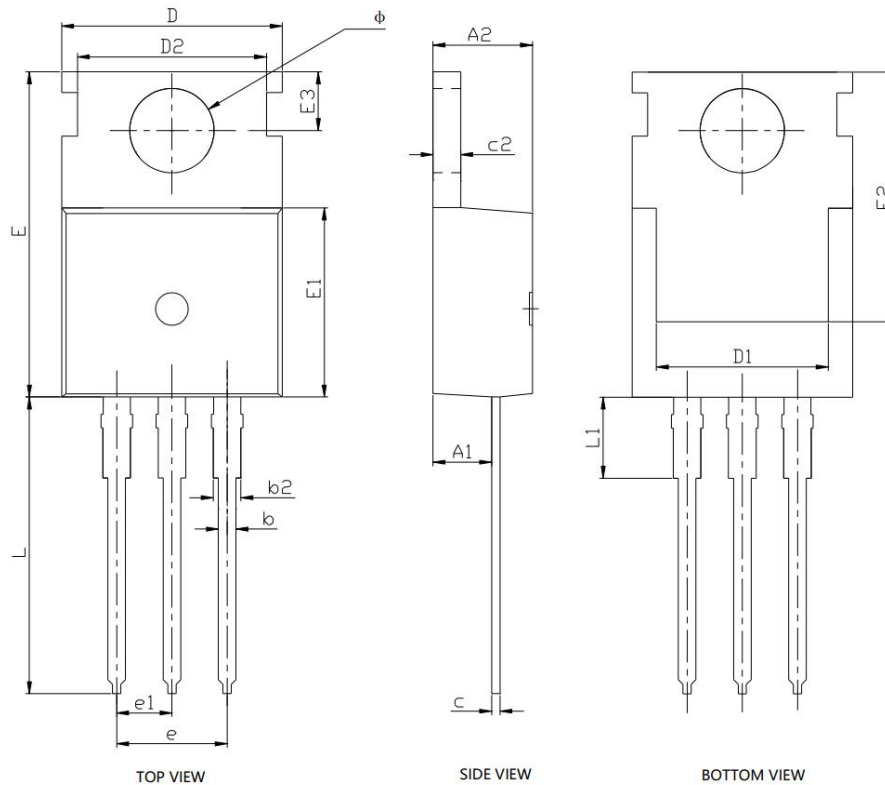


Figure 14. Safe Operation Area

### TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A1	2.300	2.500	0.091	0.098
A2	4.400	4.600	0.173	0.181
b	0.700	0.900	0.028	0.035
b2	1.250	1.420	0.049	0.056
c	0.450	0.550	0.018	0.022
c2	1.250	1.350	0.049	0.053
D	9.700	10.200	0.382	0.402
D1	7.500	8.400	0.295	0.331
D2	8.500	8.900	0.335	0.350
E	15.300	16.100	0.602	0.634
E1	9.100	9.300	0.358	0.366
E2	12.630	13.330	0.497	0.525
E3	2.750 BSC		0.108 BSC	
e	5.080 BSC		0.200 BSC	
e1	2.540 BSC		0.100 BSC	
L	13.000	13.500	0.512	0.531
L1	-	3.500	-	0.138
φ	3.550	3.750	0.140	0.148