

N-Channel 500-V (D-S) MOSFET

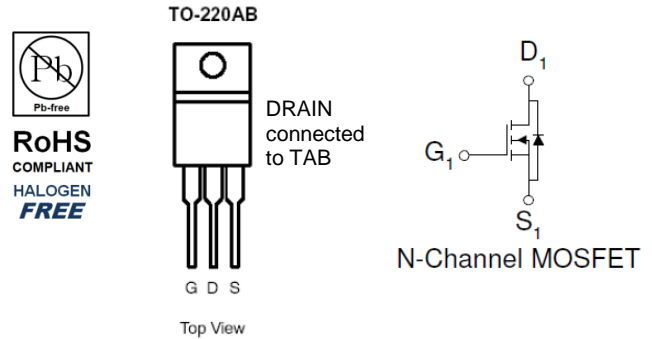
Key Features:

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:

- Off-line Power Supplies
- Electronic Ballasts
- High Power LED Lighting

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
500	520 @ $V_{GS} = 10V$	12 ^a



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^a	$T_C = 25^\circ\text{C}$	I_D	12	A
Pulsed Drain Current ^b		I_{DM}	50	
Continuous Source Current (Diode Conduction) ^a		I_S	12	A
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	150	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	1	

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

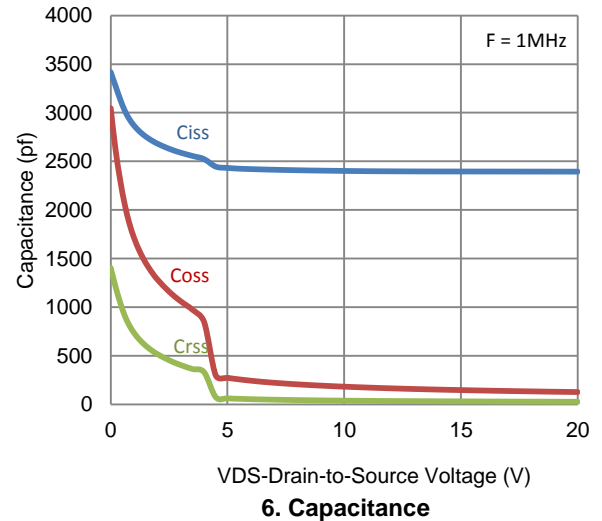
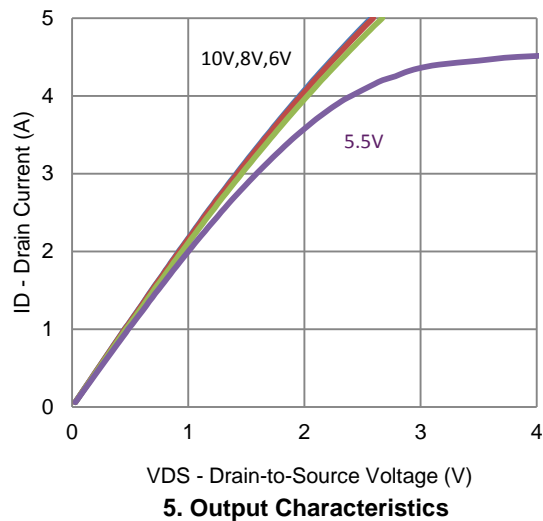
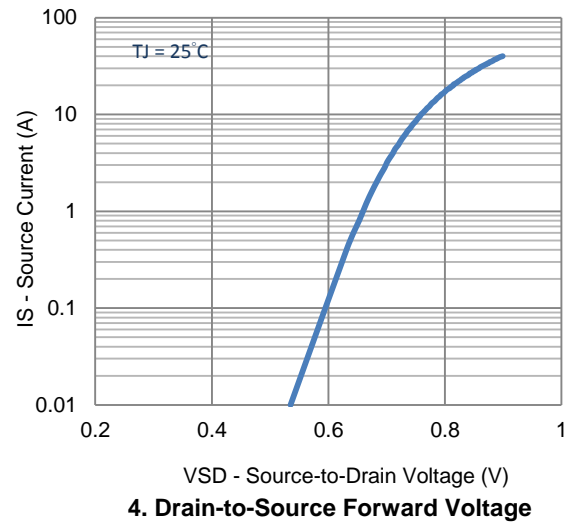
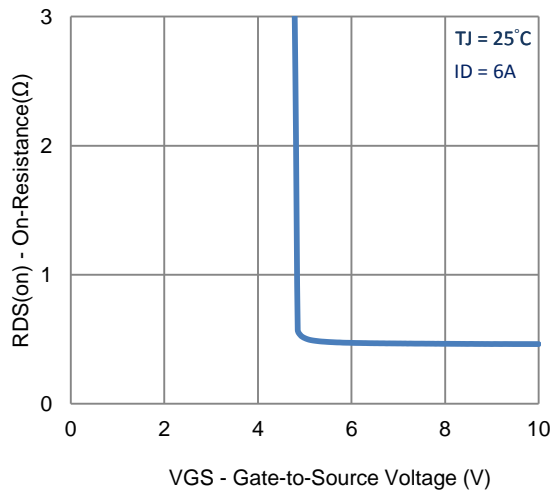
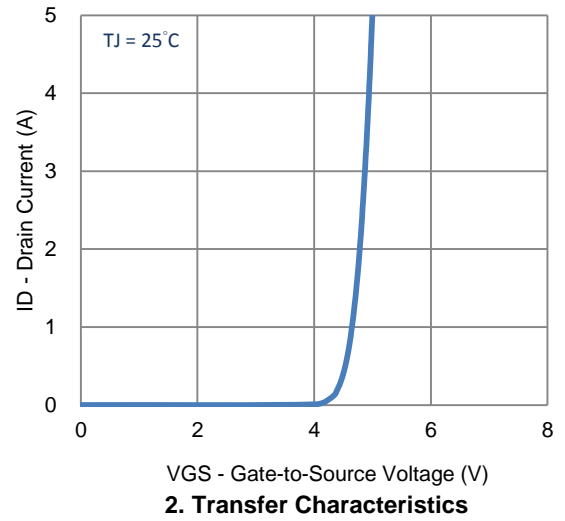
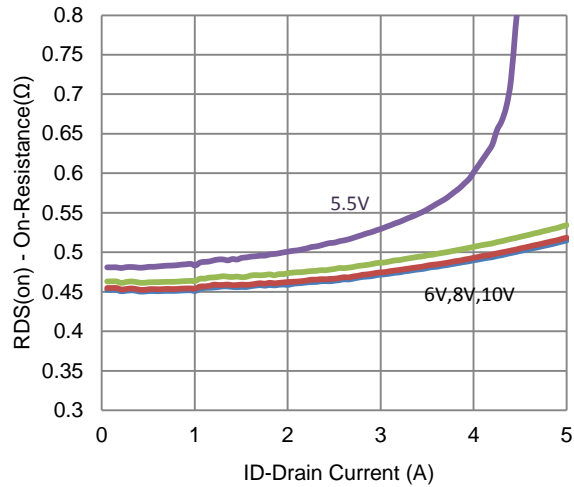
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 400 V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 400 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	20			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 6 A$			520	m Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 6 A$		38		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 6 A, V_{GS} = 0 V$		0.9		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 250 V, V_{GS} = 10 V,$ $I_D = 6 A$		44		nC
Gate-Source Charge	Q_{gs}			12		
Gate-Drain Charge	Q_{gd}			12		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 250 V, R_L = 50 \Omega,$ $I_D = 6 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		25		ns
Rise Time	t_r			11		
Turn-Off Delay Time	$t_{d(off)}$			71		
Fall Time	t_f			13		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		2396		pF
Output Capacitance	C_{oss}			147		
Reverse Transfer Capacitance	C_{rss}			31		

Notes

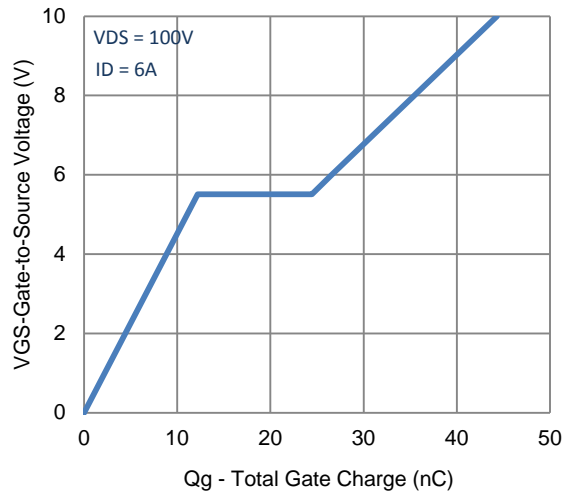
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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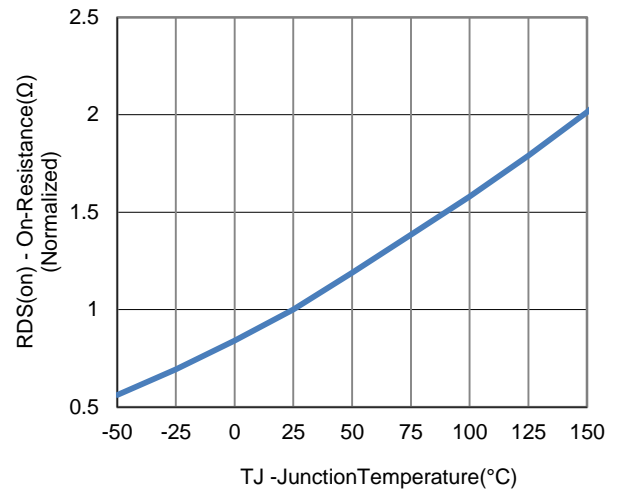
Typical Electrical Characteristics



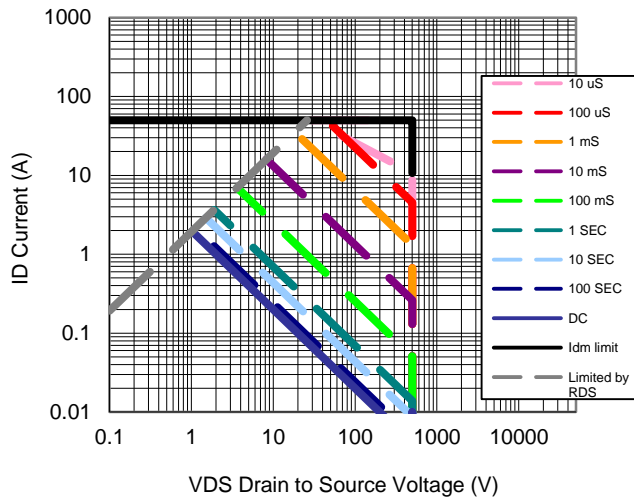
Typical Electrical Characteristics



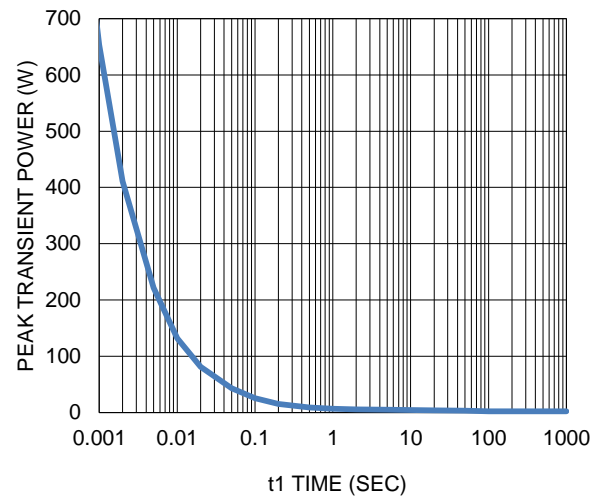
7. Gate Charge



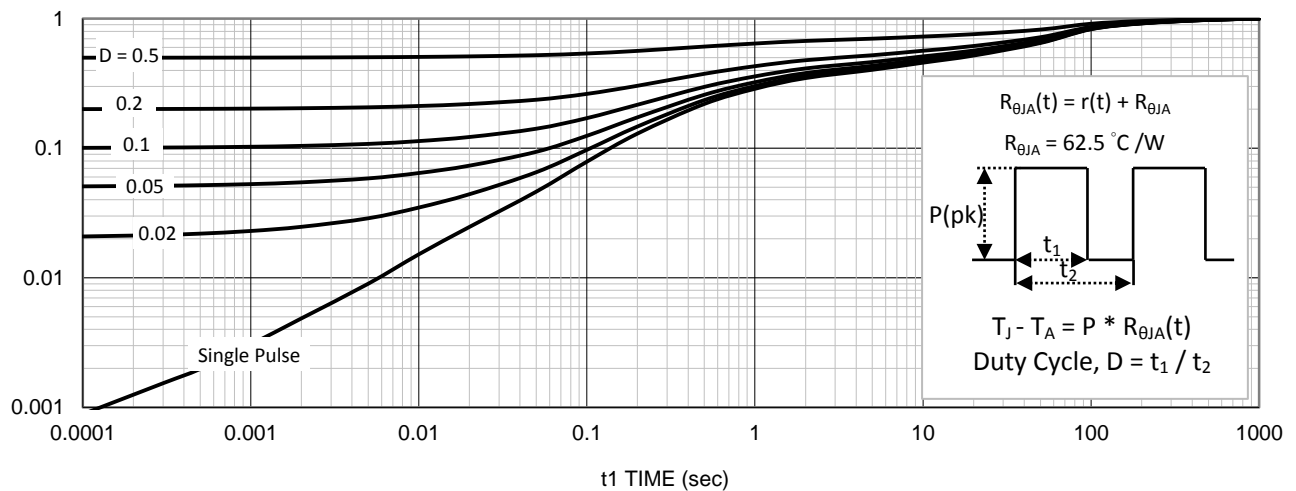
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Technical drawing of a mechanical part with dimensions in millimeters. The drawing includes a front view, a side view, and a detail view of a corner.

Front View Dimensions:

- Overall width: 11.5 MAX
- Width of top section: 10.16 ± 0.2
- Width of middle section: (9.5)
- Width of bottom section: (8.0)
- Overall height: 15.0 ± 0.3
- Height of top section: 2.78 ± 0.2
- Height of middle section: 6.4 ± 0.2
- Height of bottom section: 8.6 ± 0.2
- Radius of top corner: (1.27)
- Radius of bottom corner: (0.1)
- Radius of hole: φ 3.0 ± 0.05
- Radius of hole: (φ 1.0)
- Radius of hole: 1.20 ± 0.1
- Radius of hole: 1.27 ± 0.1
- Radius of hole: 1.5 MAX
- Radius of hole: 0.86 ± 0.1
- Radius of hole: 0.76 ± 0.1
- Radius of hole: 2.54 ± 0.5
- Radius of hole: 2.54 ± 0.5
- Radius of hole: (R0.3)

Side View Dimensions:

- Overall width: 4.44 ± 0.2
- Width of top section: 1.26 ± 0.15
- Width of middle section: 2.7 (MAX)
- Width of bottom section: 2.49 ± 0.6
- Width of bottom section: 0.5 ± 0.1

Detail View Dimensions:

- Angle: (25° typ)