

N-Channel 650-V (D-S) MOSFET

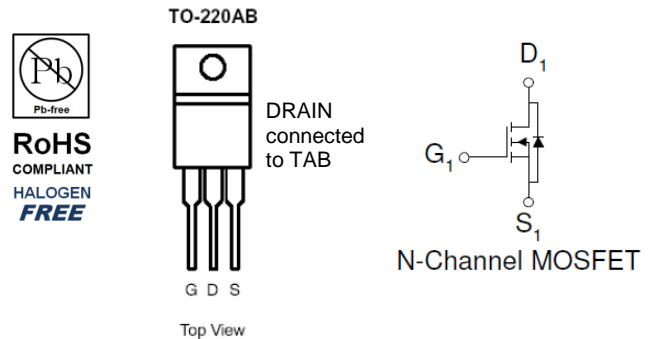
Key Features:

- 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)	$r_{DS(on)}$ (Ω)	I_D (A)
650	1.7 @ $V_{GS} = 10V$	9 ^a
	1.8 @ $V_{GS} = 6V$	



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	9	A
Pulsed Drain Current ^a	I_{DM}	50	
Continuous Source Current (Diode Conduction)	I_S	9	A
Power Dissipation	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	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Case	$R_{\theta JC}$	1	

Notes

- a. Pulse width limited by maximum junction temperature

Electrical Characteristics

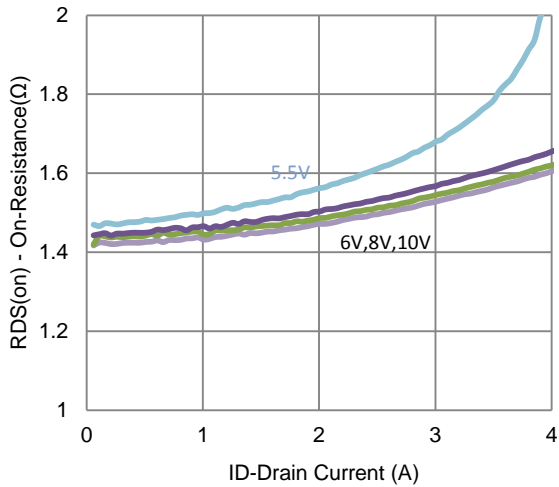
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 520 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 520 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	15			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 3 A$			1.7	Ω
		$V_{GS} = 5.5 V, I_D = 2.4 A$			1.8	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 3 A$		32		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 55 A, V_{GS} = 0 V$		0.9		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 120 V, V_{GS} = 6 V,$ $I_D = 3 A$		13.8		nC
Gate-Source Charge	Q_{gs}			7.9		
Gate-Drain Charge	Q_{gd}			5.9		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 120 V, R_L = 40 \Omega,$ $I_D = 3 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		16		ns
Rise Time	t_r			6		
Turn-Off Delay Time	$t_{d(off)}$			28		
Fall Time	t_f			7		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$		1590		pF
Output Capacitance	C_{oss}			123		
Reverse Transfer Capacitance	C_{rss}			33		

Notes

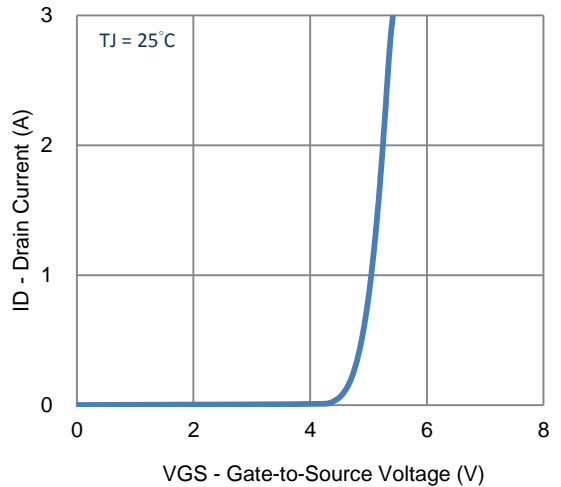
- Pulse test: PW \leq 300us duty cycle \leq 2%.
- Guaranteed by design, not subject to production testing.

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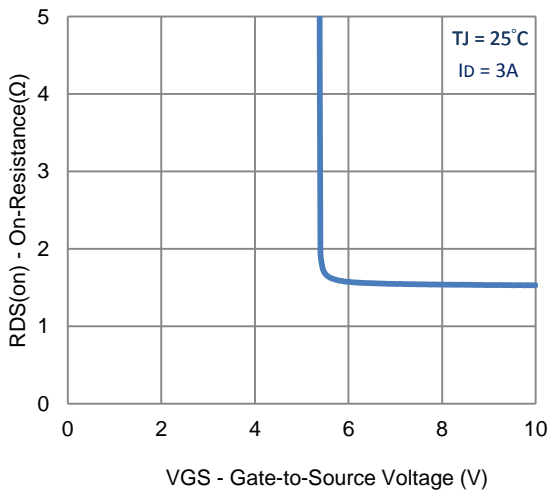
Typical Electrical Characteristics



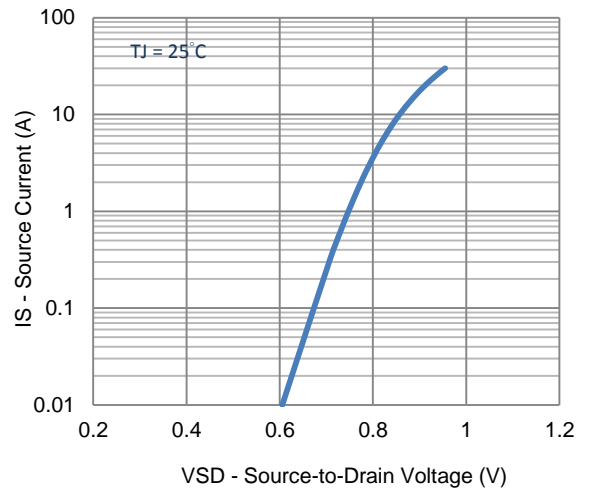
1. On-Resistance vs. Drain Current



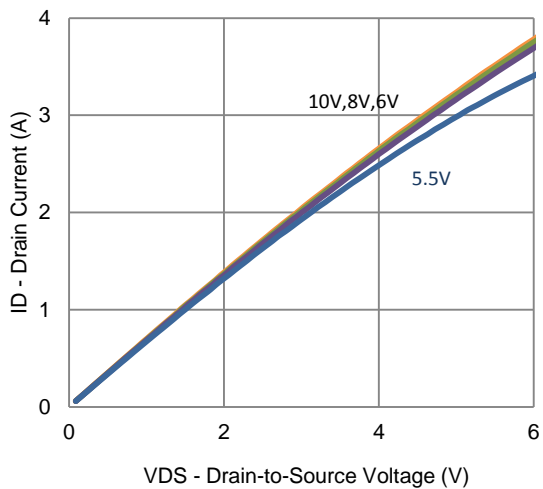
2. Transfer Characteristics



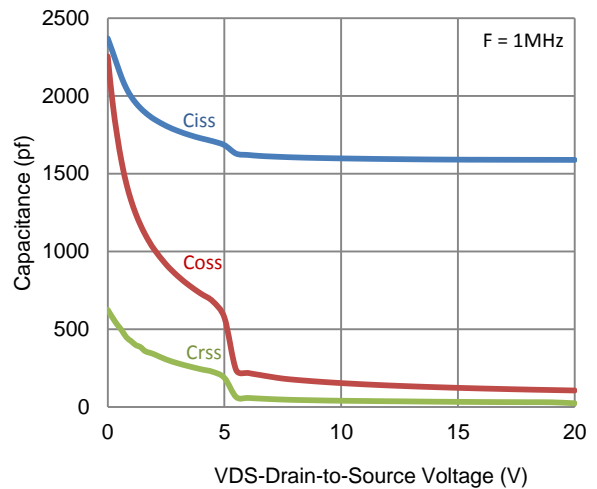
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

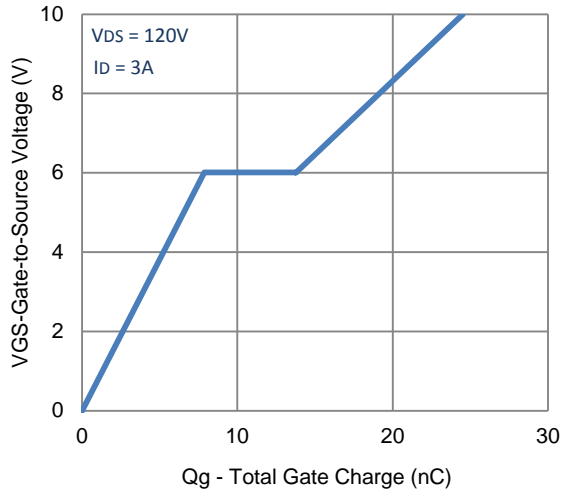


5. Output Characteristics

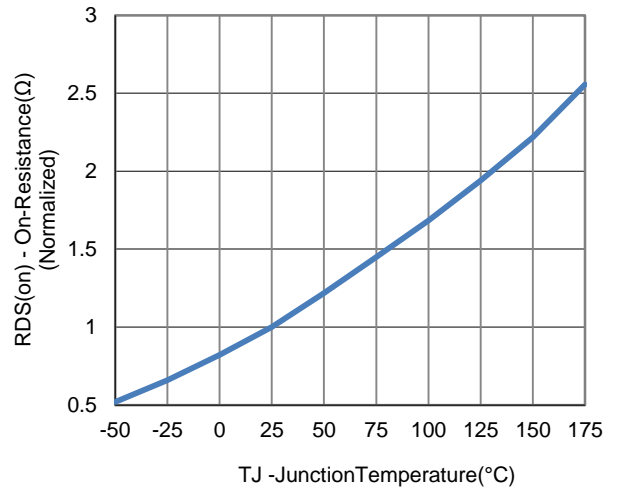


6. Capacitance

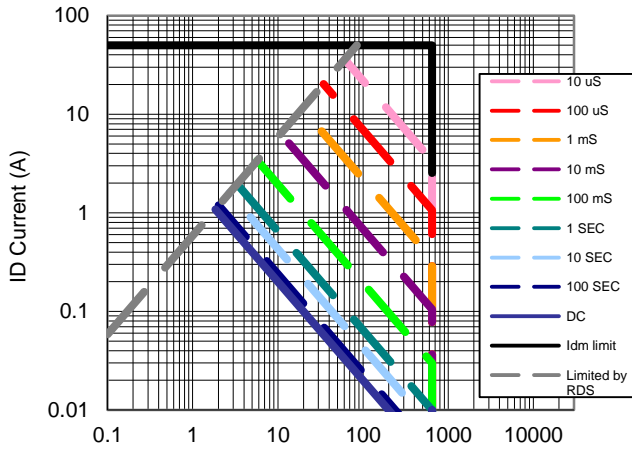
Typical Electrical Characteristics



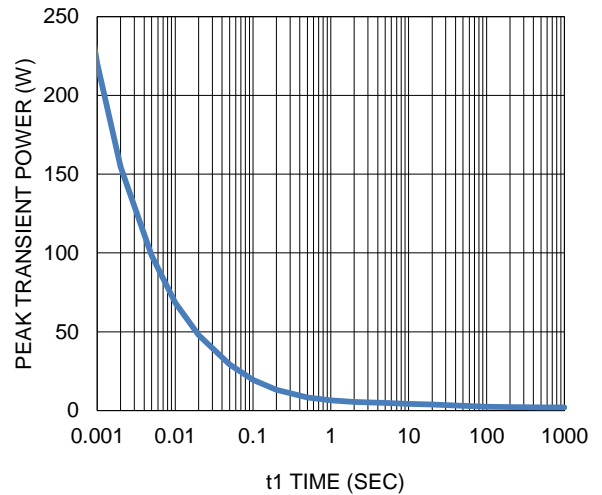
7. Gate Charge



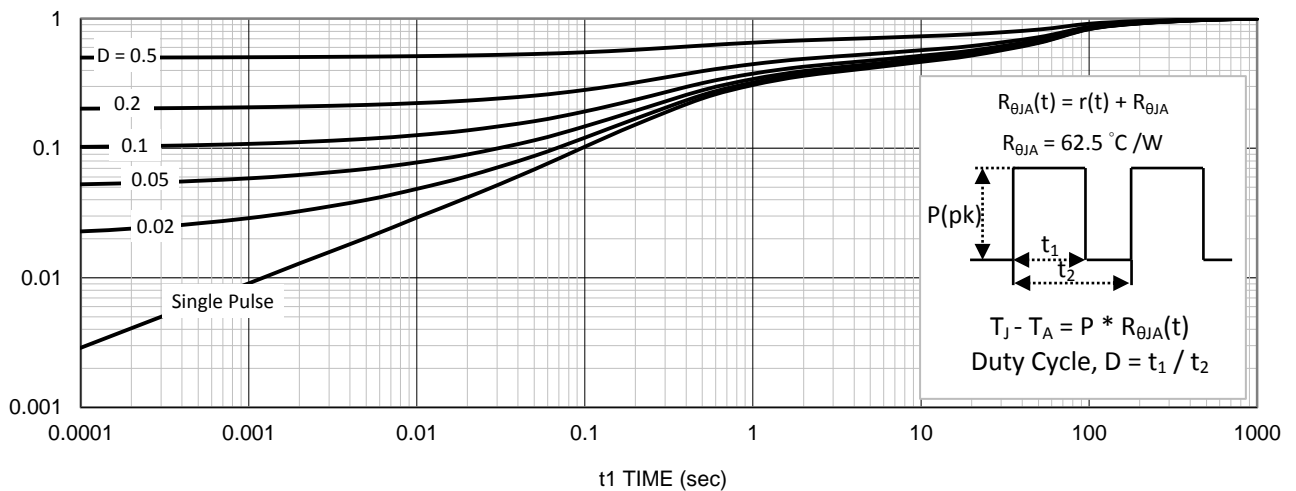
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information

