

P-Channel 40-V (D-S) MOSFET

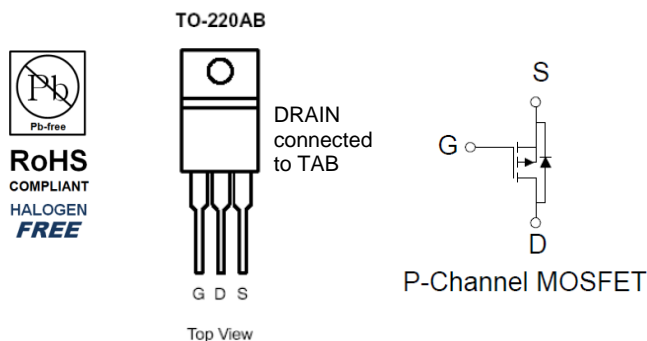
Key Features:

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

Typical Applications:

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
-40	7.6 @ $V_{GS} = -10V$	-90 ^a
	8 @ $V_{GS} = -4.5V$	



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^a	$T_C = 25^\circ\text{C}$	I_D	-90	A
Pulsed Drain Current ^b		I_{DM}	-390	
Continuous Source Current (Diode Conduction) ^a		I_S	-110	A
Power Dissipation ^a	$T_C = 25^\circ\text{C}$	P_D	300	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

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

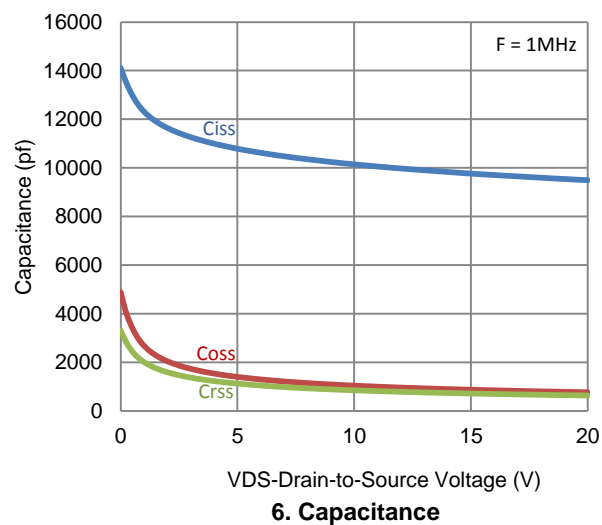
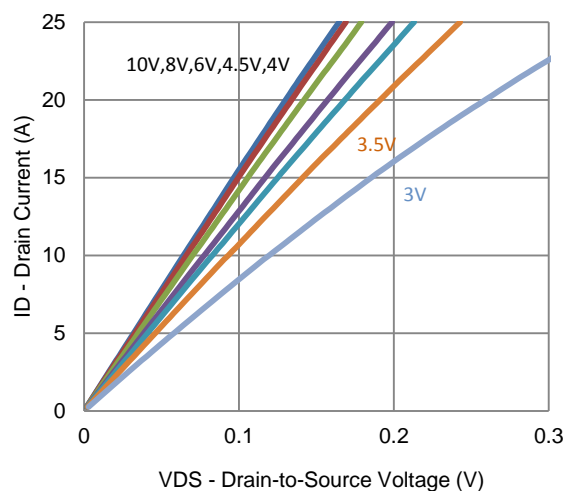
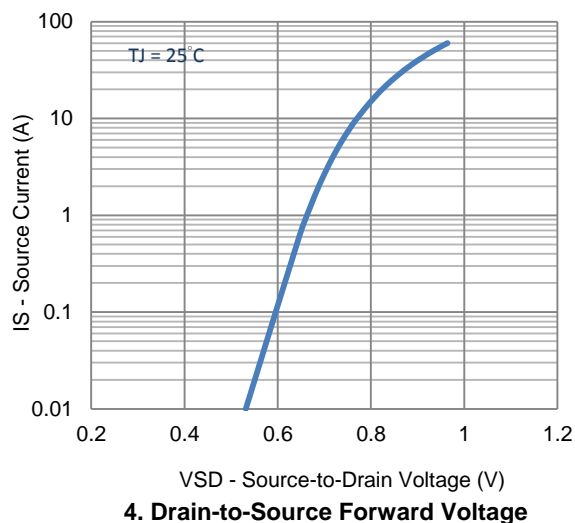
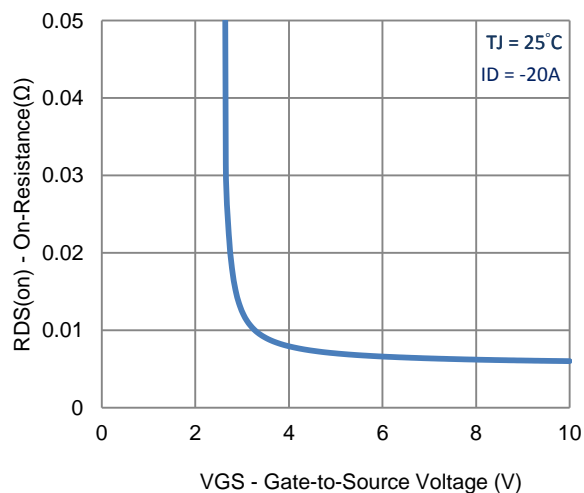
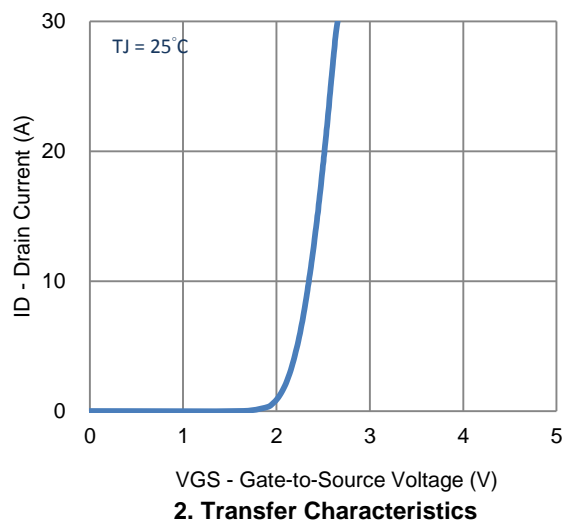
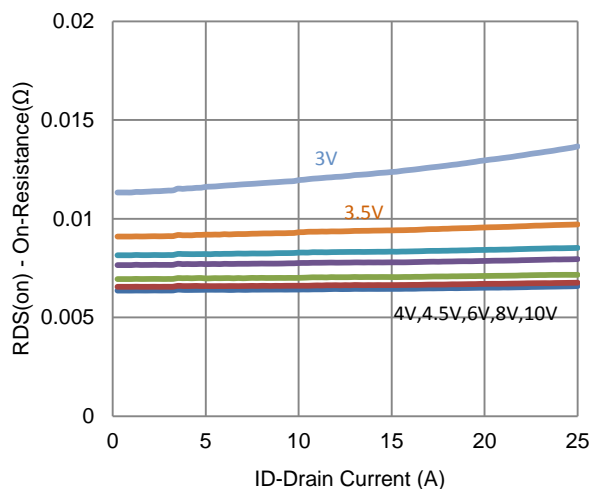
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250 \mu A$	-1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -32 V, V_{GS} = 0 V$			-1	μA
		$V_{DS} = -32 V, V_{GS} = 0 V, T_J = 55^\circ C$			-25	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5 V, V_{GS} = -10 V$	-110			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = -10 V, I_D = -50 A$			7.6	m Ω
		$V_{GS} = -4.5 V, I_D = -44 A$			8	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15 V, I_D = -20 A$		29		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -55 A, V_{GS} = 0 V$		-0.95		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = -20 V, V_{GS} = -4.5 V,$ $I_D = -20 A$		122		nC
Gate-Source Charge	Q_{gs}			32		
Gate-Drain Charge	Q_{gd}			50		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = -20 V, R_L = 1 \Omega,$ $I_D = -20 A,$ $V_{GEN} = -10 V, R_{GEN} = 6 \Omega$		17		ns
Rise Time	t_r			28		
Turn-Off Delay Time	$t_{d(off)}$			284		
Fall Time	t_f			115		
Input Capacitance	C_{iss}	$V_{DS} = -15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		9763		pF
Output Capacitance	C_{oss}			871		
Reverse Transfer Capacitance	C_{rss}			716		

Notes

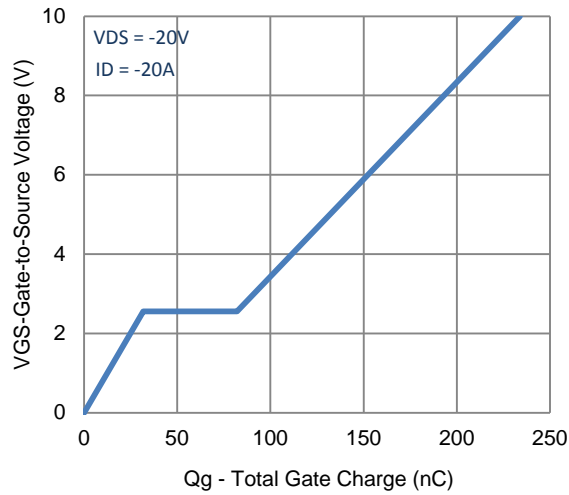
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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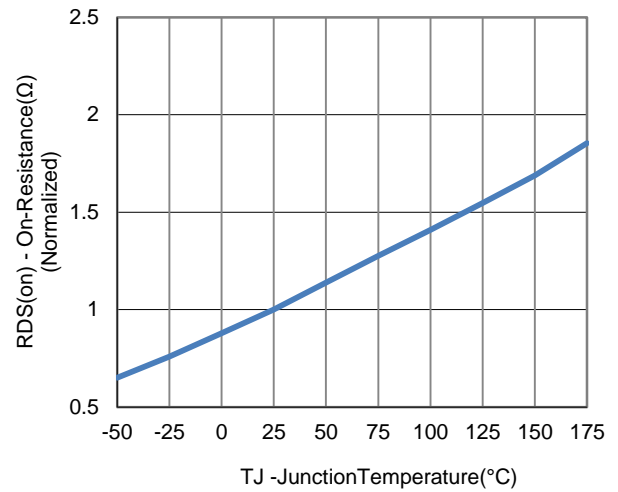
Typical Electrical Characteristics



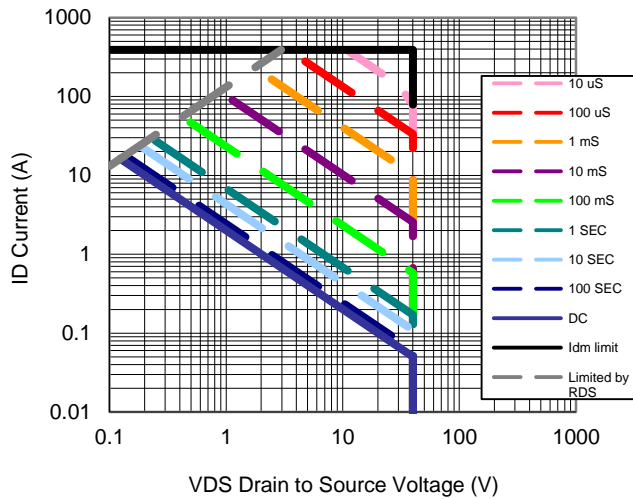
Typical Electrical Characteristics



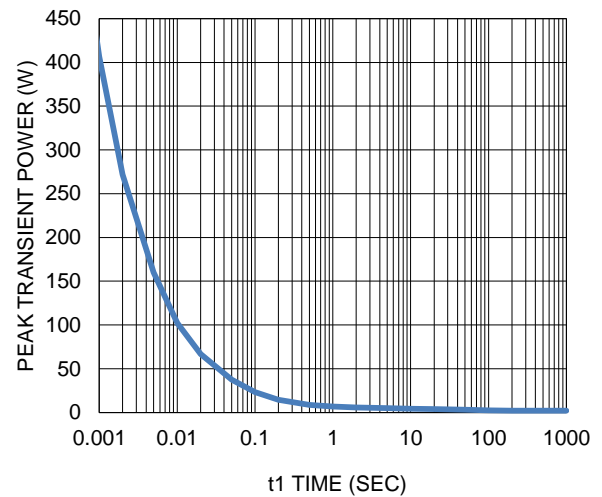
7. Gate Charge



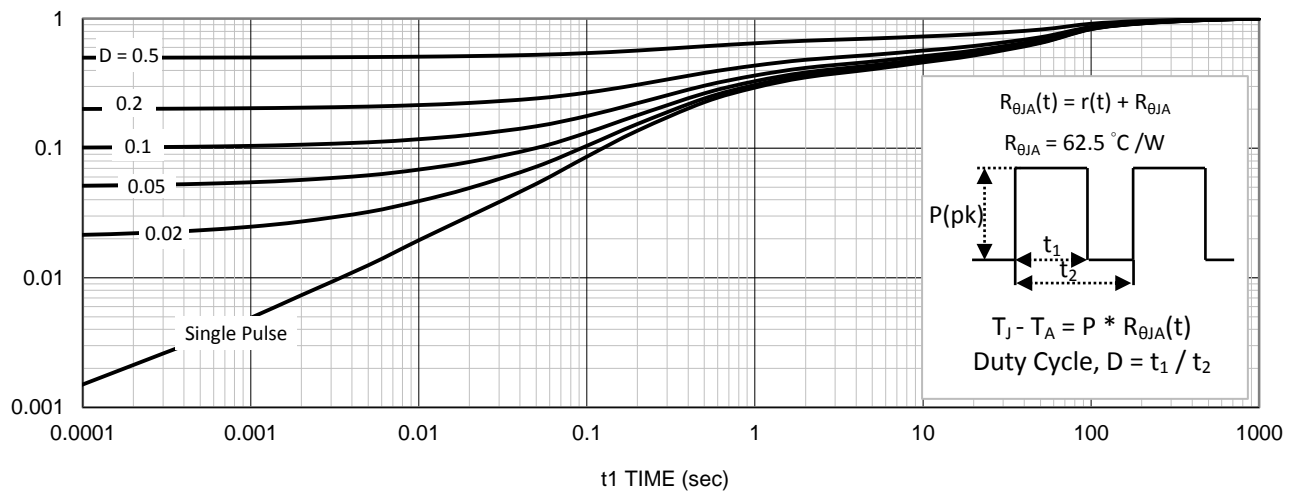
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information

