

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

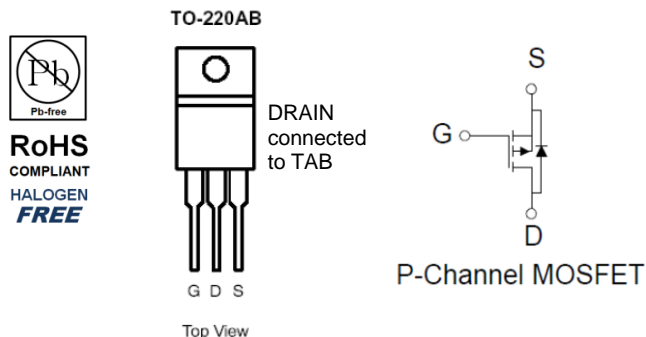
### Key Features:

- 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 $\Omega$ )	$I_D$ (A)
-40	5 @ $V_{GS} = -10V$	-90 <sup>a</sup>
	6.6 @ $V_{GS} = -4.5V$	



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		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_C = 25^\circ\text{C}$	$I_D$	-90	A
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	-360	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$T_C = 25^\circ\text{C}$	$I_S$	-90	A
Power Dissipation <sup>a</sup>	$T_C = 25^\circ\text{C}$	$P_D$	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 <sup>c</sup>	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	0.5	

### Notes

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

## Electrical Characteristics

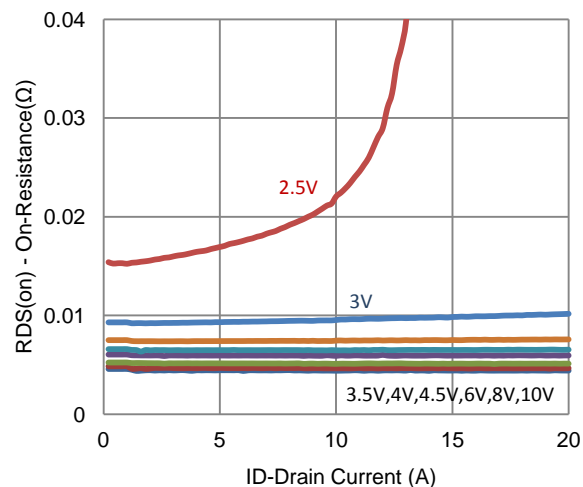
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250 \mu A$	-1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -32 V, V_{GS} = 0 V$			-1	$\mu A$
		$V_{DS} = -32 V, V_{GS} = 0 V, T_J = 55^\circ C$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5 V, V_{GS} = -10 V$	-135			A
Drain-Source On-Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10 V, I_D = -20 A$			5	m $\Omega$
		$V_{GS} = -4.5 V, I_D = -18 A$			6.6	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -20 V, I_D = -20 A$		68		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -45 A, V_{GS} = 0 V$		-0.89		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -20 V, V_{GS} = -4.5 V,$ $I_D = -2 A$		108		nC
Gate-Source Charge	$Q_{gs}$			27		
Gate-Drain Charge	$Q_{gd}$			34		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = -20 V, R_L = 10 \Omega,$ $I_D = -2 A,$ $V_{GEN} = -10 V, R_{GEN} = 6 \Omega$		30		ns
Rise Time	$t_r$			27		
Turn-Off Delay Time	$t_{d(off)}$			306		
Fall Time	$t_f$			104		
Input Capacitance	$C_{iss}$	$V_{DS} = -20 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		6488		pF
Output Capacitance	$C_{oss}$			556		
Reverse Transfer Capacitance	$C_{rss}$			503		

## Notes

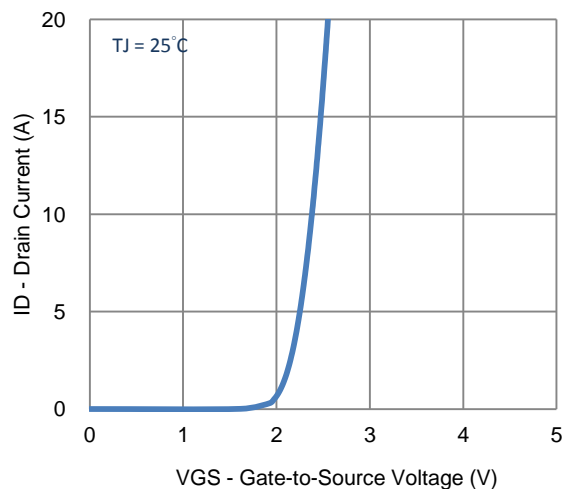
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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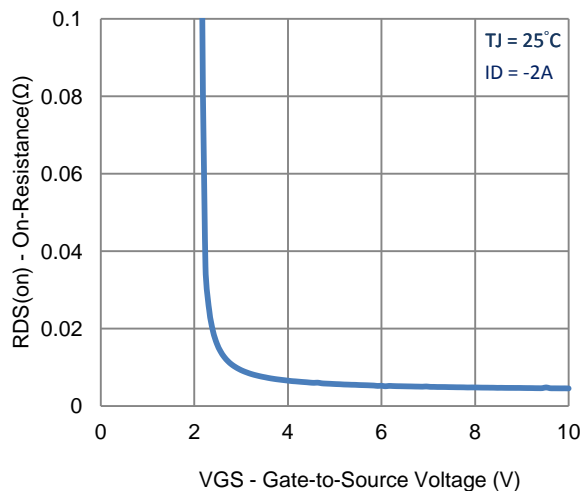
## Typical Electrical Characteristics



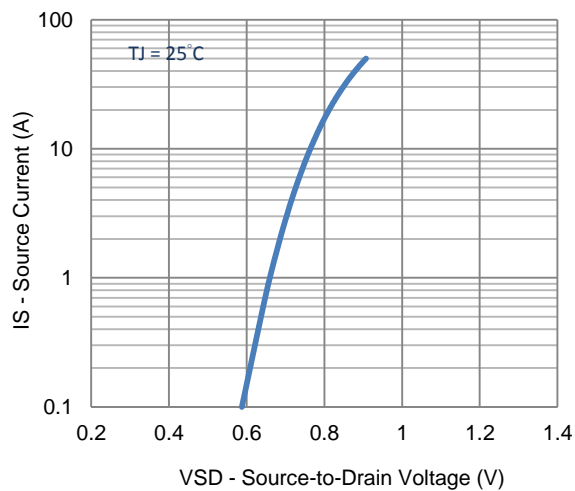
1. On-Resistance vs. Drain Current



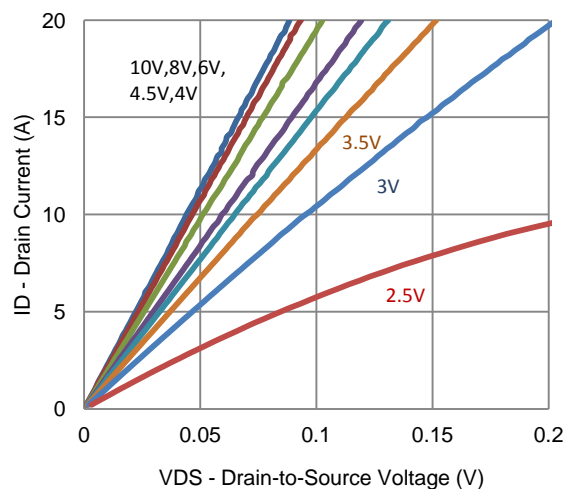
2. Transfer Characteristics



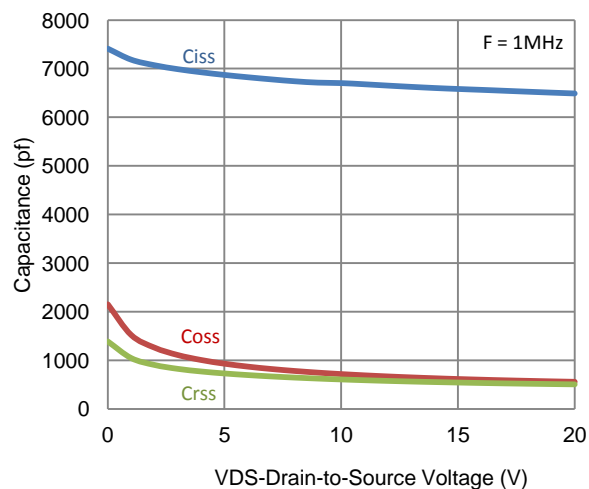
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

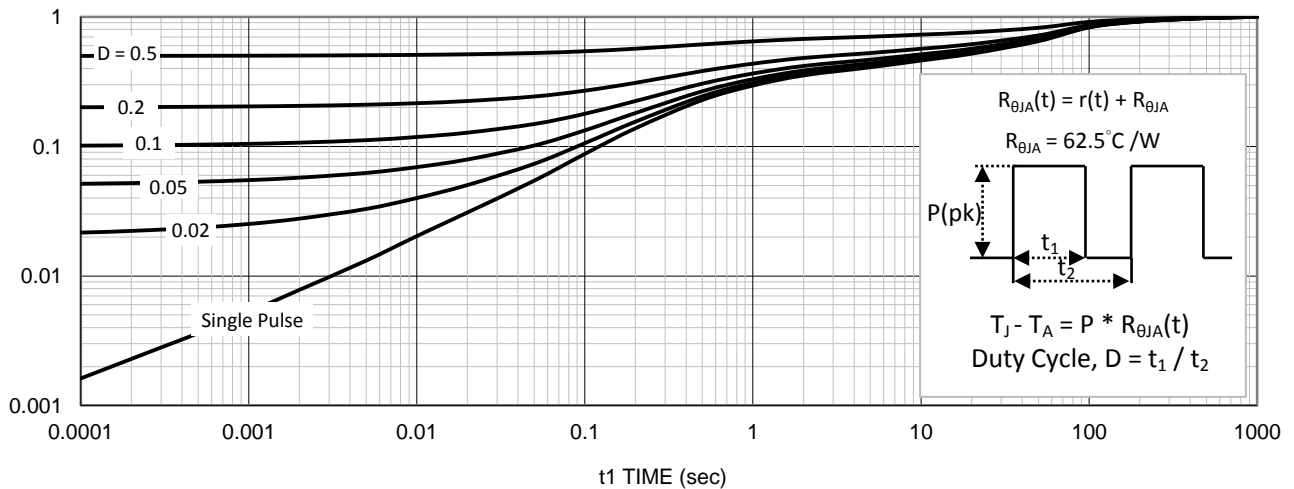
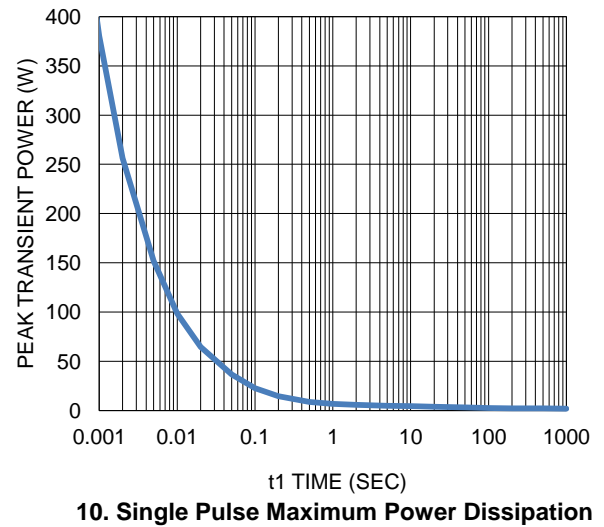
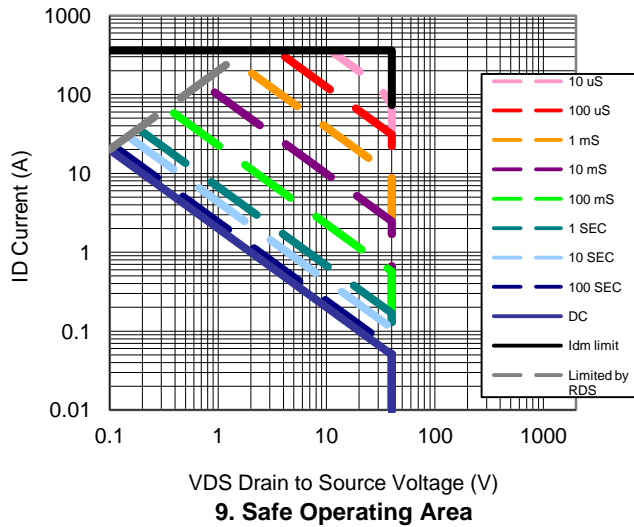
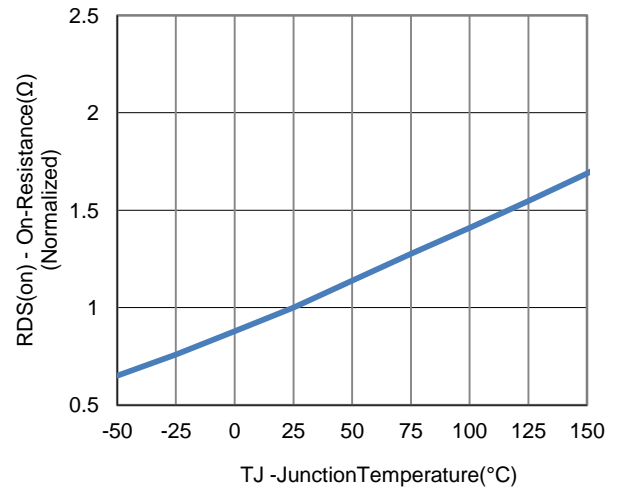
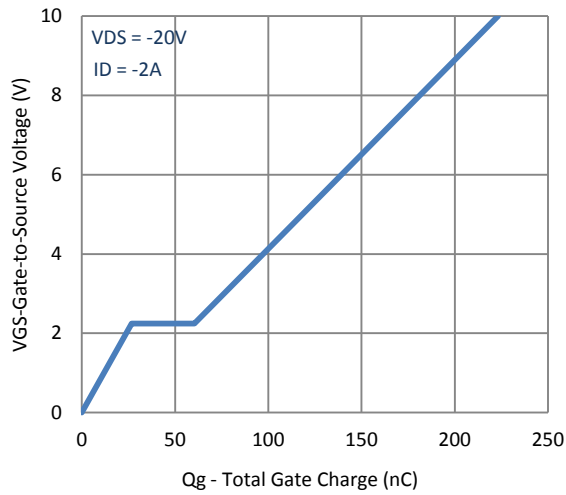


5. Output Characteristics

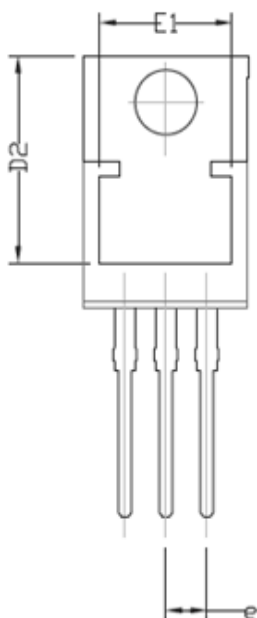
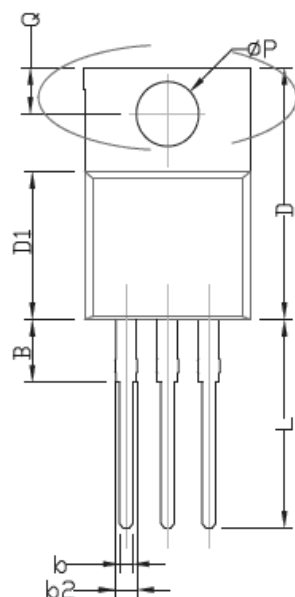


6. Capacitance

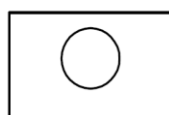
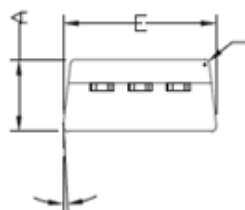
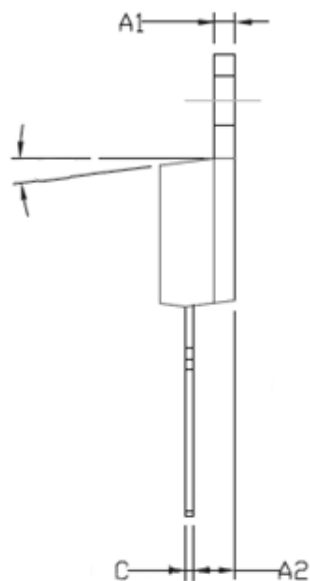
## Typical Electrical Characteristics



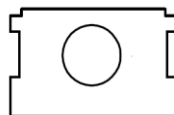
## Package Information



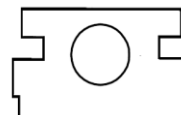
DIM.	MILLIMETERS	
	MIN	MAX
A	4.24	4.72
A1	1.11	1.41
A2	2.22	2.7
B	2.6	3.9
b	0.66	0.94
b2	1.17	1.45
c	0.4	0.6
D	14.5	15.74
D1	8.4	9.65
D2	12.08	12.48
E	9.7	10.54
E1	8	8.4
e	2.49	2.59
L	12.27	14.5
ØP	3.55	3.89
Q	2.58	2.98



Option 1



Option 2



Option 3

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