

P-Channel 60V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^c
- 60	0.012 at $V_{GS} = - 10$ V	- 8.0
	0.015 at $V_{GS} = - 4.5$ V	- 5.0

FEATURES

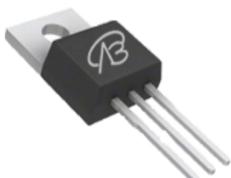
- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



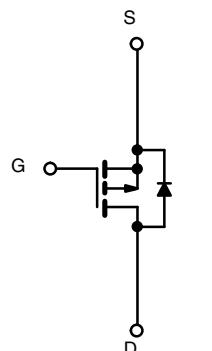
APPLICATIONS

- DC/DC Primary Switch

TO-220AB



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 60	V
Gate-Source Voltage	V_{GS}	± 30	
Continuous Drain Current ($T_J = 175$ °C) ^c	I_D	- 8.0	A
		- 5.0	
Pulsed Drain Current	I_{DM}	- 24.0	
Avalanche Current	I_{AS}	- 4.0	
Single Pulse Avalanche Energy ^a	E_{AS}	211	mJ
Power Dissipation	P_D	250 ^b	W
		2.4	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient Free Air	R_{thJA}	62	°C/W
Junction-to-Case	R_{thJC}	0.6	

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. Limited by package.

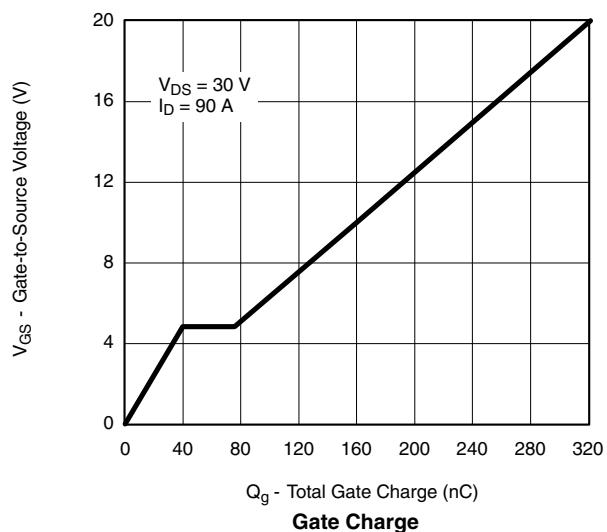
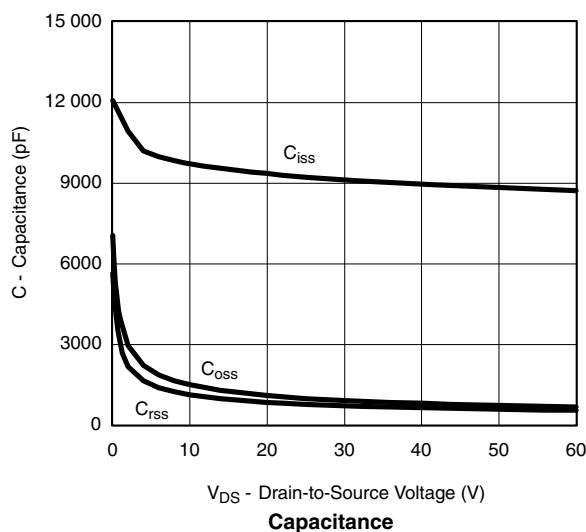
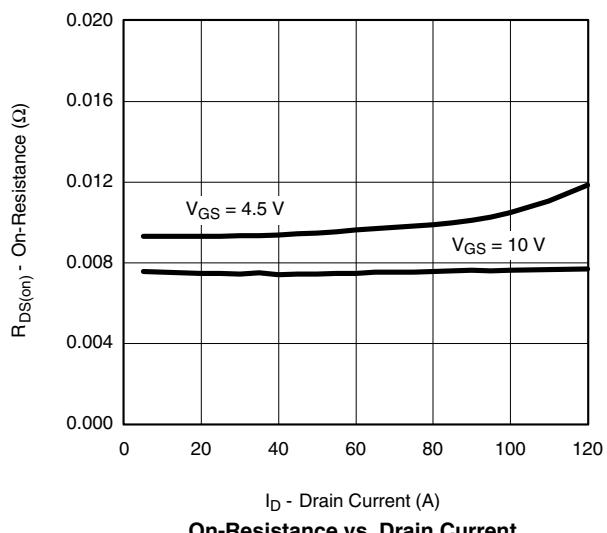
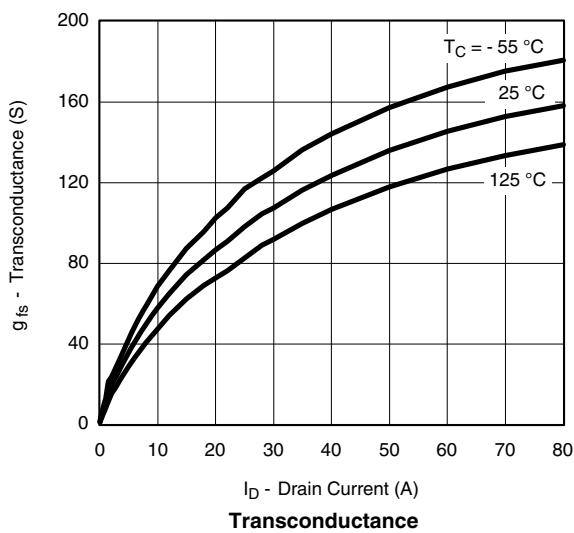
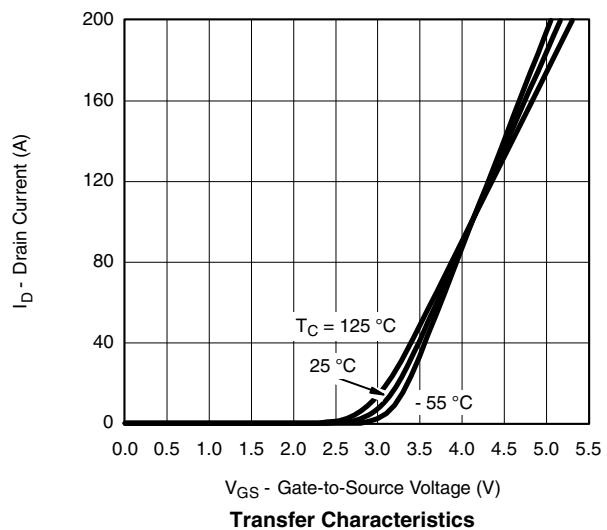
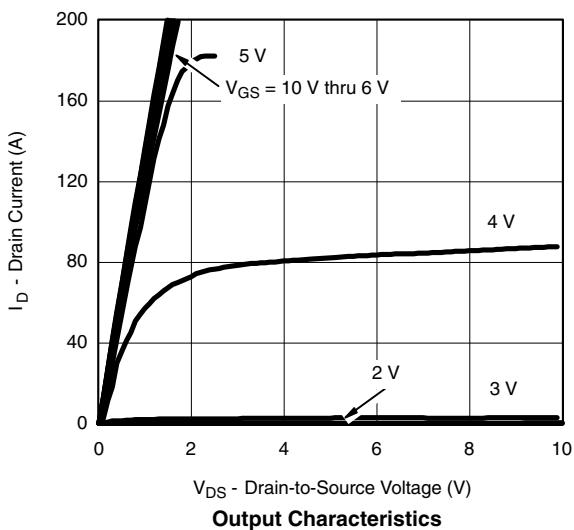
SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

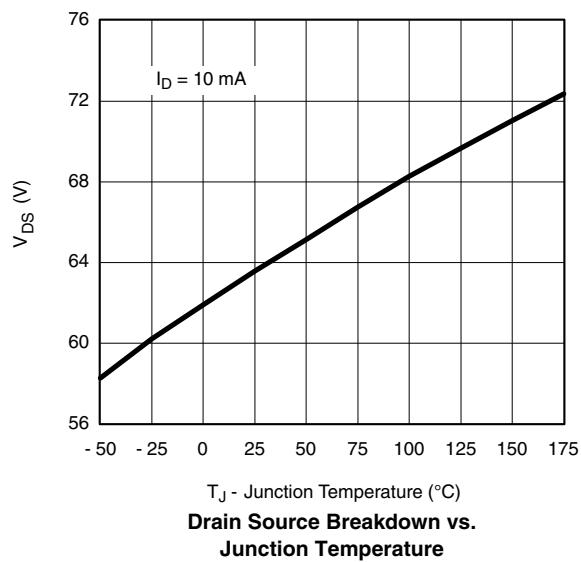
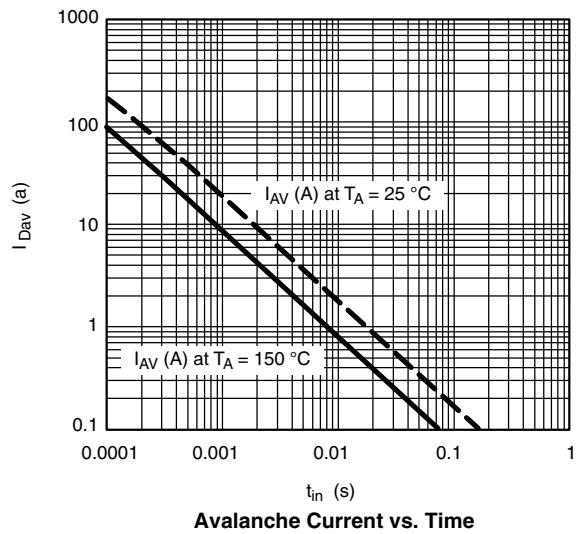
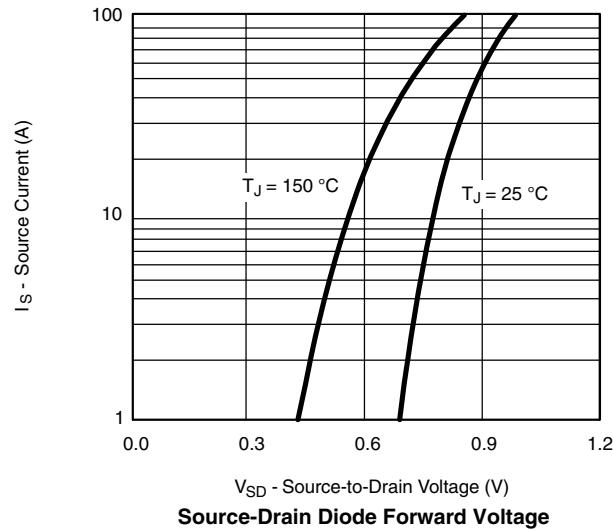
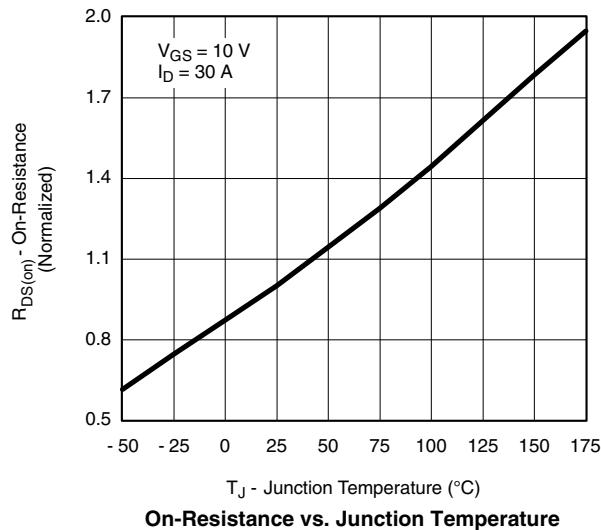
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = -250 \mu\text{A}$	- 60			V
Gate-Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	- 1		- 3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 30 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$			- 1	
		$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$			- 50	μA
		$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$			- 250	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}$, $V_{GS} = -10 \text{ V}$	- 8 0			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$		0.012		
		$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$, $T_J = 125^\circ\text{C}$		0.018		Ω
		$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$, $T_J = 175^\circ\text{C}$		0.022		
		$V_{GS} = -4.5 \text{ V}$, $I_D = -25 \text{ A}$		0.015		
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15 \text{ V}$, $I_D = -30 \text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = -25 \text{ V}$, $f = 1 \text{ MHz}$		8200		
Output Capacitance	C_{oss}			975		pF
Reverse Transfer Capacitance	C_{rss}			760		
Total Gate Charge ^c	Q_g	$V_{DS} = -30 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -90 \text{ A}$		160	240	
Gate-Source Charge ^c	Q_{gs}			40		nC
Gate-Drain Charge ^c	Q_{gd}			36		
Gate Resistance	R_g	$f = 1.0 \text{ MHz}$		3		Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = -30 \text{ V}$, $R_L = 0.33 \Omega$ $I_D \geq -90 \text{ A}$, $V_{GEN} = -10 \text{ V}$, $R_g = 2.5 \Omega$		20	30	
Rise Time ^c	t_r			190	285	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			140	210	ns
Fall Time ^c	t_f			300	450	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$) ^b						
Continuous Current	I_S	$I_F = -50 \text{ A}$, $V_{GS} = 0 \text{ V}$ $I_F = -50 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$			- 8 0	
Pulsed Current	I_{SM}				- 24 0	A
Forward Voltage ^a	V_{SD}			- 1.0	- 1.5	V
Reverse Recovery Time	t_{rr}			60	90	ns
Peak Reverse Recovery Current	$I_{RM(\text{REC})}$			- 3	- 4.5	A
Reverse Recovery Charge	Q_{rr}			0.09	0.2	μC

Notes:

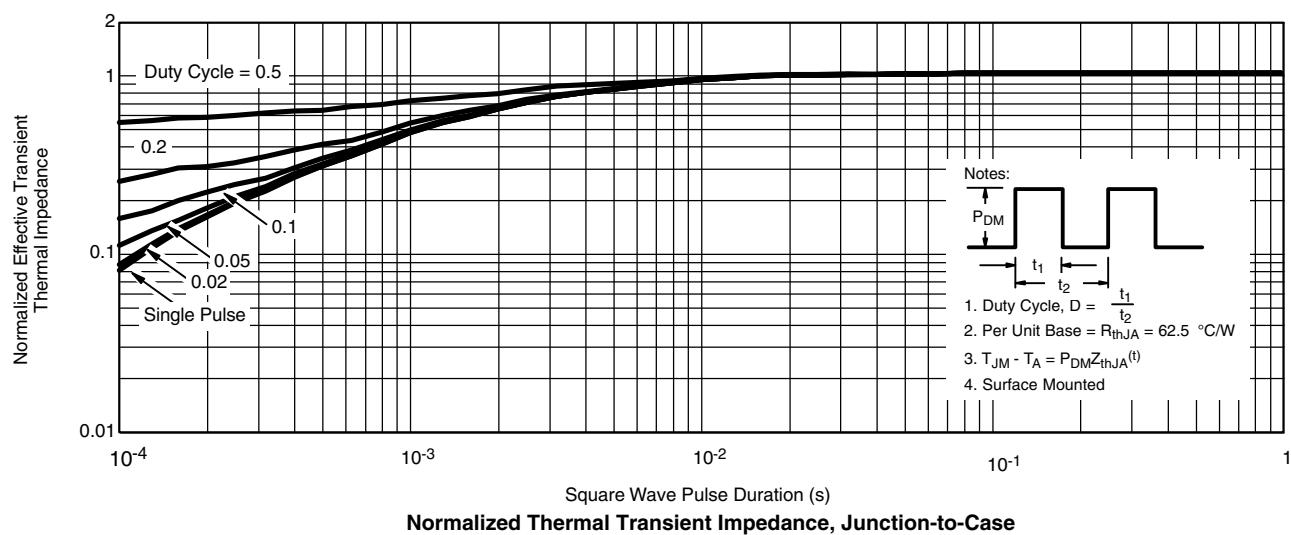
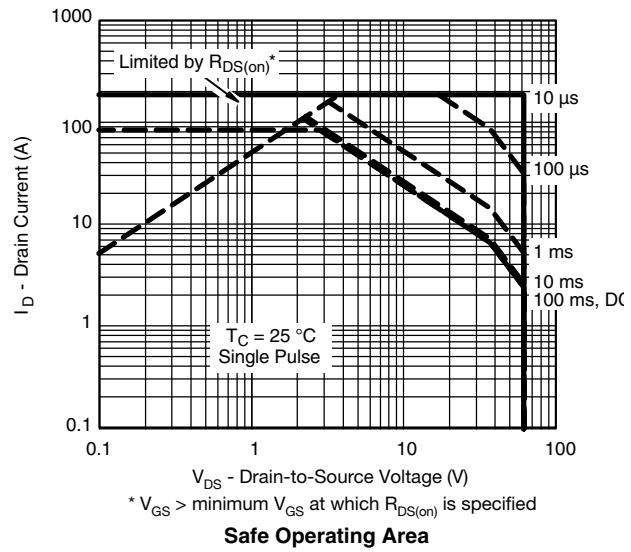
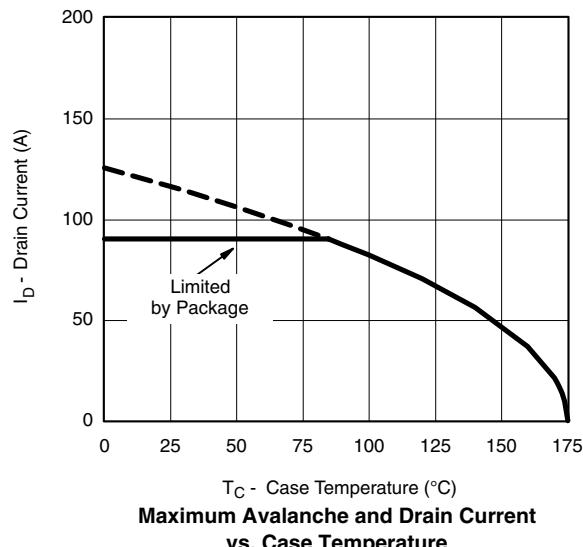
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2 \%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

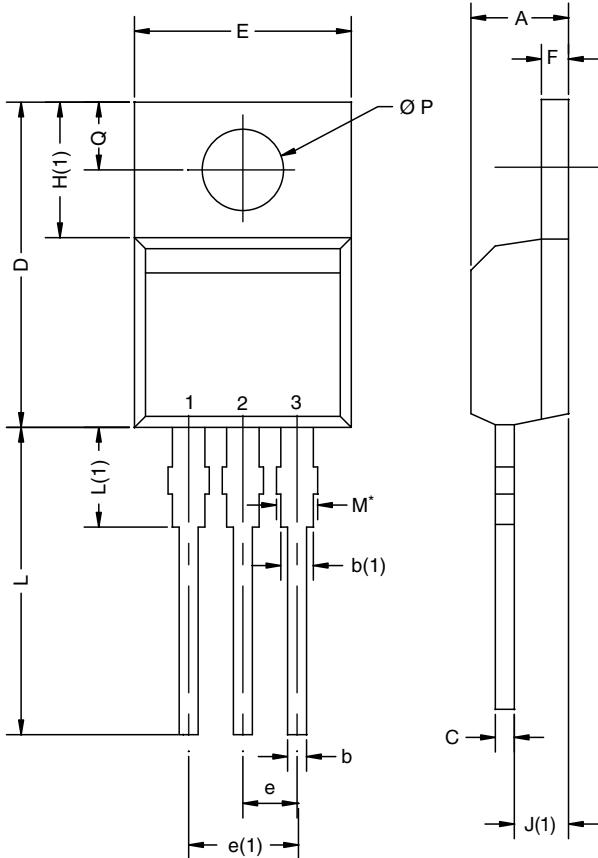
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


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THERMAL RATINGS



TO-220AB

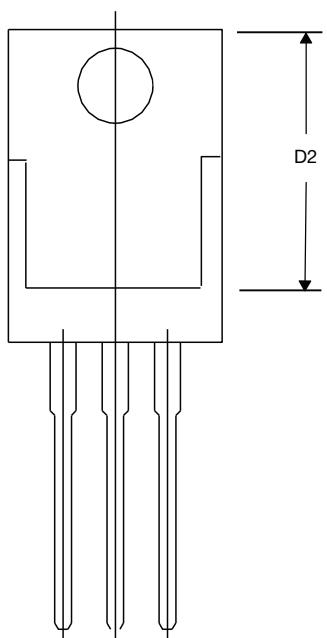


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: T14-0413-Rev. P, 16-Jun-14
 DWG: 5471

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
 Heatsink hole for HVM



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