



### Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

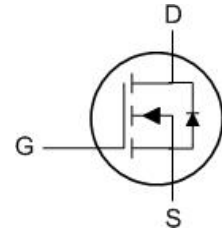
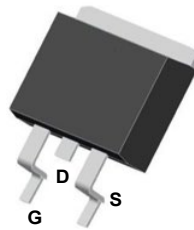
### Product Summary

BVDSS	RDSON	ID
100V	3.9mΩ	120A

### Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

### TO263 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	120	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	81	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	512	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	486	mJ
$I_{AS}$	Avalanche Current	120	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	178	W
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>4</sup>	71	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

### Thermal Data

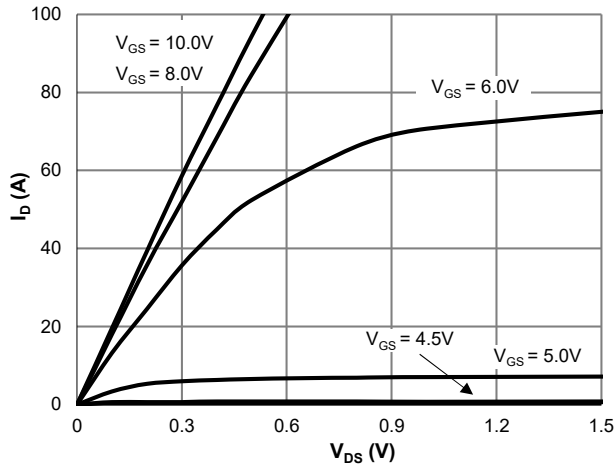
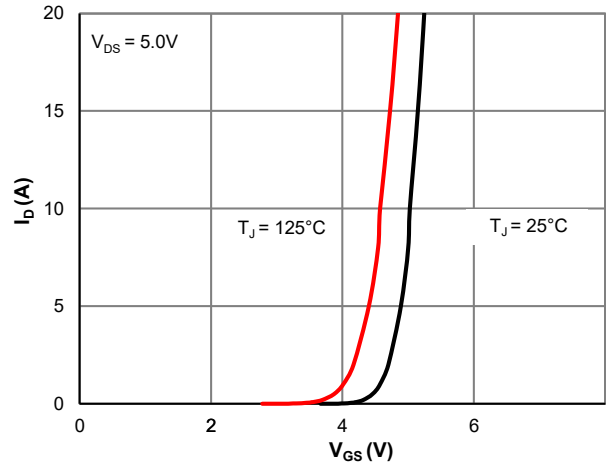
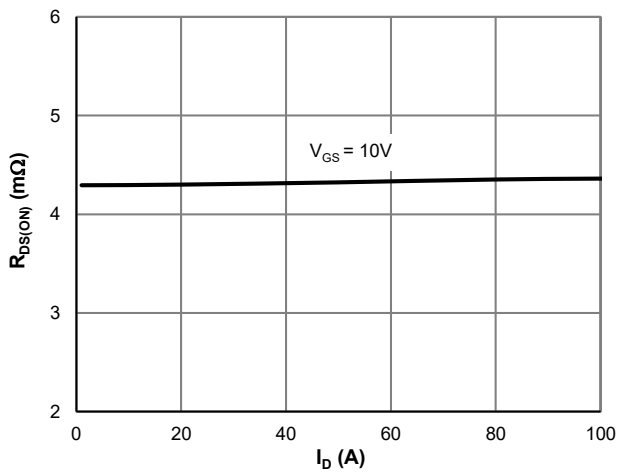
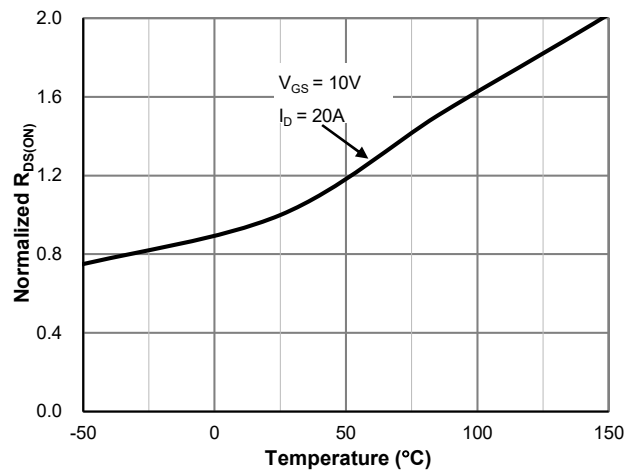
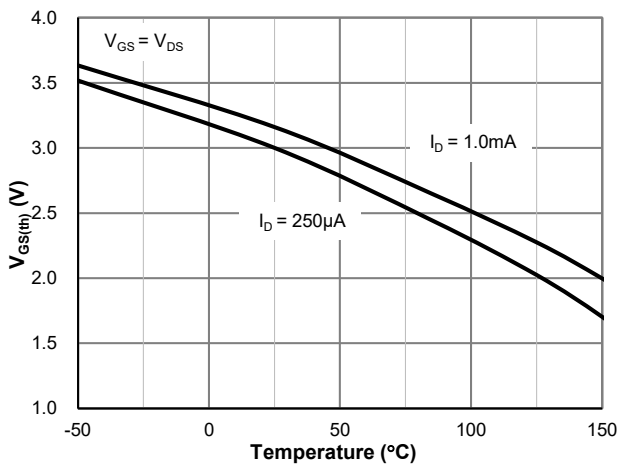
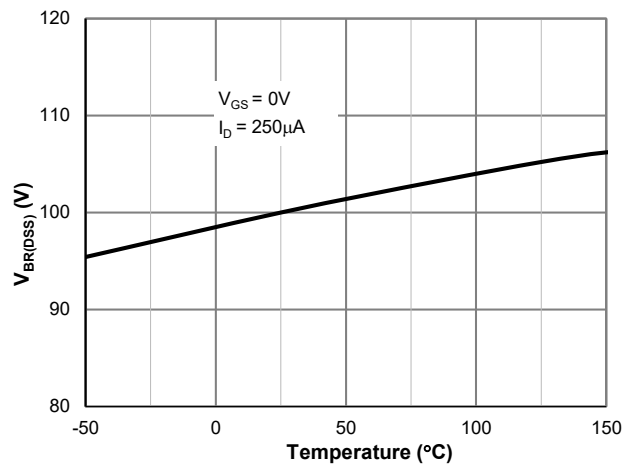
Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	56	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	0.8	$^\circ C/W$

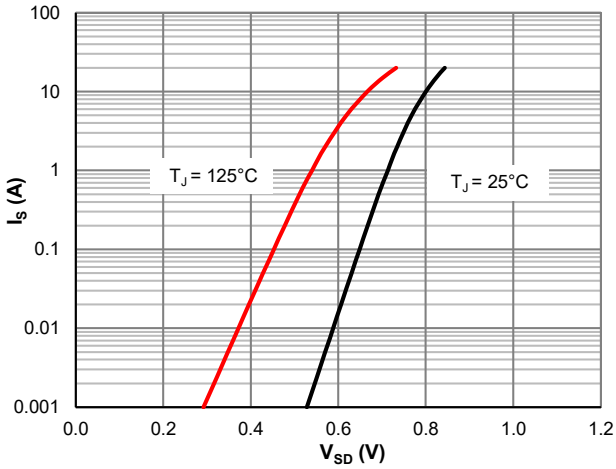
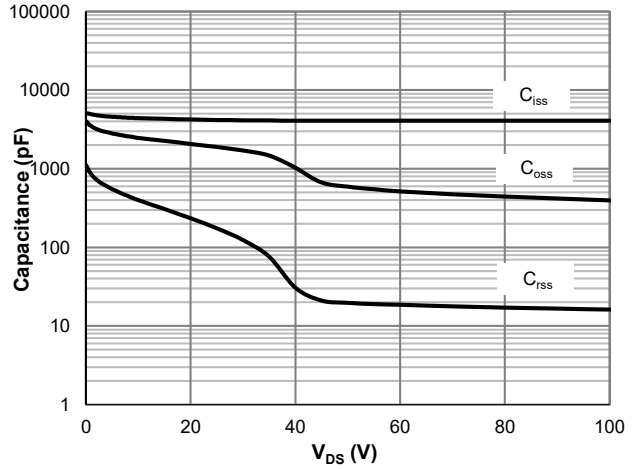
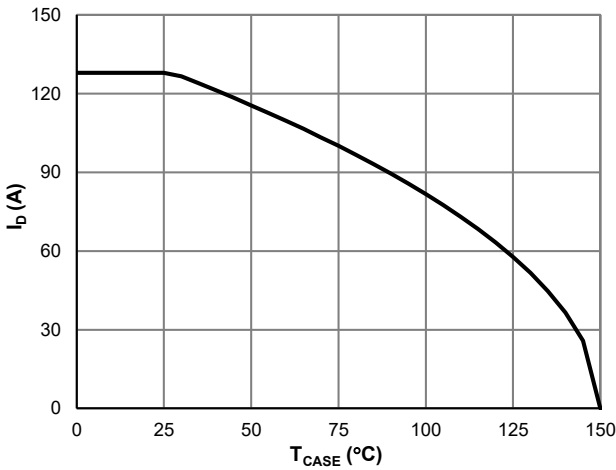
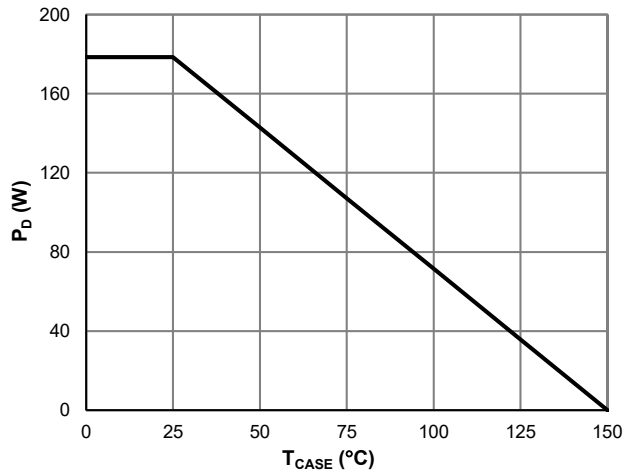
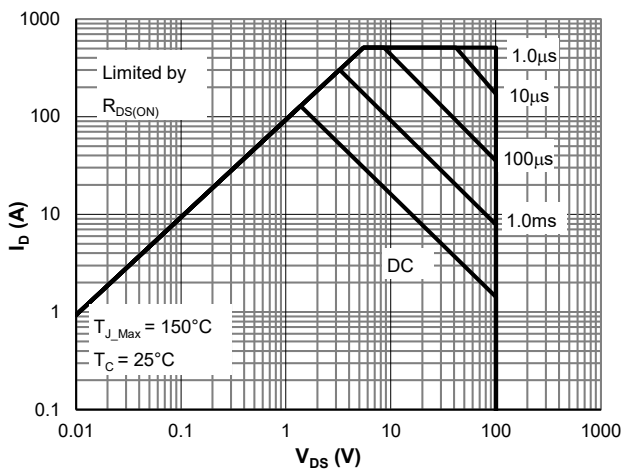
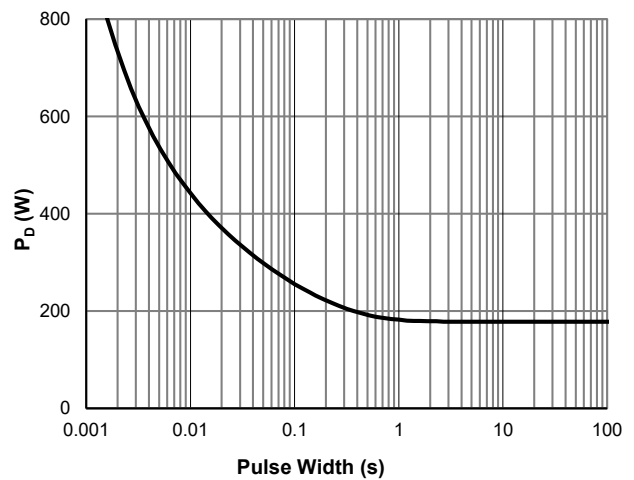
**Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	---	---	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=20A$	---	3.9	4.8	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	---	---	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.0	4.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$\text{mV}/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=80, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=15A$	---	35	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.6	---	$\Omega$
$Q_g$	Total Gate Charge (6V)	$V_{DS}=50V, V_{GS}=4.5V, I_D=20A$	---	44	---	nC
$Q_{gs}$	Gate-Source Charge		---	24	---	
$Q_{gd}$	Gate-Drain Charge		---	18.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega, I_D=10A$	---	18	---	ns
$T_r$	Rise Time		---	23	---	
$T_{d(off)}$	Turn-Off Delay Time		---	37	---	
$T_f$	Fall Time		---	15.7	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$	---	4102	---	pF
$C_{oss}$	Output Capacitance		---	592	---	
$C_{rss}$	Reverse Transfer Capacitance		---	19.8	---	

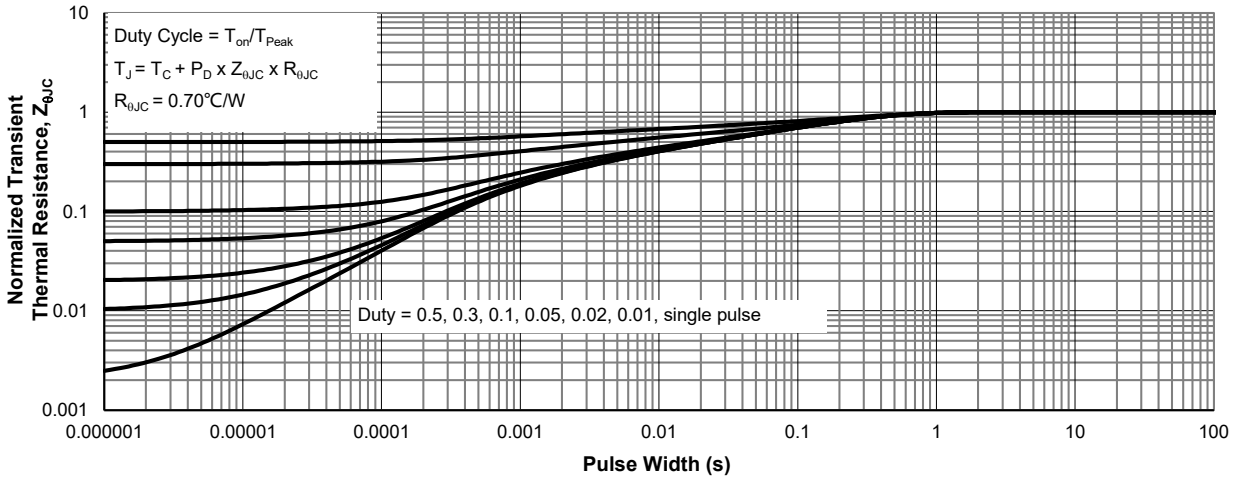
**Notes:**

1. Computed continuous current assumes the condition of  $T_{J\_Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under  $T_{J\_Max} = 150^\circ\text{C}$ .
3.  $E_{AS}$  of 486 mJ is based on starting  $T_J = 25^\circ\text{C}$ ,  $L = 3.0\text{mH}$ ,  $I_{AS} = 18A$ ,  $V_{GS} = 10V$ ,  $V_{DD} = 50V$ ; 100% test at  $L = 0.1\text{mH}$ ,  $I_{AS} = 67A$ .
4. The power dissipation  $P_D$  is based on  $T_{J\_Max} = 150^\circ\text{C}$ .
5. This value is guaranteed by design hence it is not included in the production test.

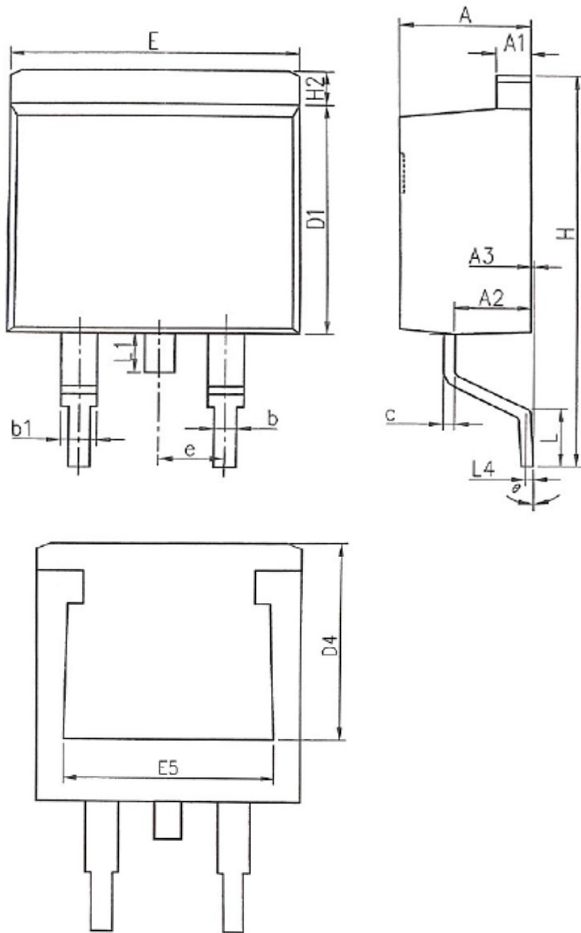
**Typical Electrical & Thermal Characteristics**

**Figure 1: Saturation Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3:  $R_{DS(ON)}$  vs. Drain Current**

**Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature**

**Figure 5:  $V_{GS(th)}$  vs. Junction Temperature**

**Figure 6:  $V_{BR(DSS)}$  vs. Junction Temperature**

**Typical Electrical & Thermal Characteristics**

**Figure 7: Body-Diode Characteristics**

**Figure 8: Capacitance Characteristics**

**Figure 9: Current De-rating**

**Figure 10: Power De-rating**

**Figure 11: Maximum Safe Operating Area**

**Figure 12: Single Pulse Power Rating, Junction-to-Case**

**Typical Electrical & Thermal Characteristics**



**Figure 13: Normalized Maximum Transient Thermal Impedance**

**Mechanical Dimensions for TO-263**

**COMMON DIMENSIONS**

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
θ	0°	9°