

**Features**

- Advanced Shield Gate Trench technology
- Super Low Gate Charge
- High-Speed Switching
- 100% EAS Guaranteed
- Green Device Available

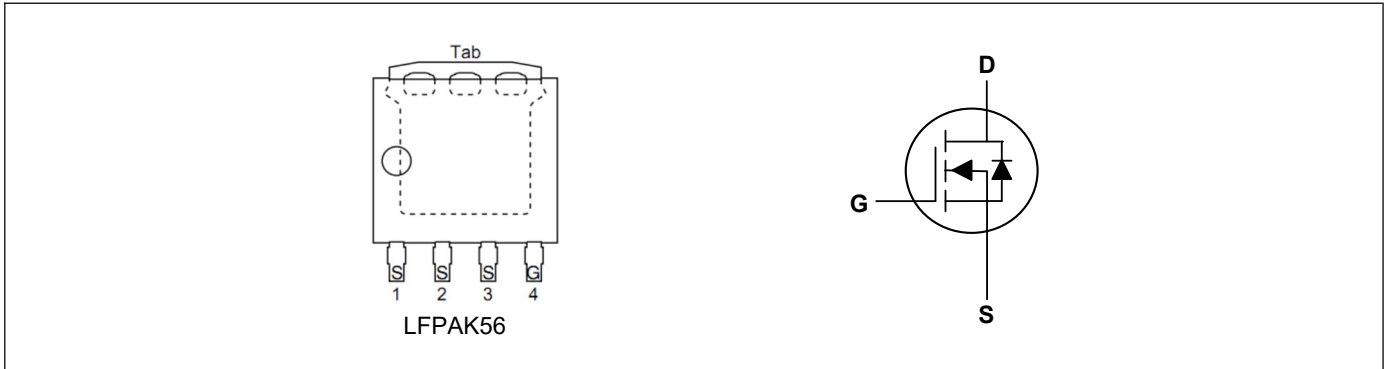
**Product Summary**



$V_{DS}$	40	V
$I_D$	358	A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	0.7	m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	1.4	m $\Omega$

**Applications**

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



**Absolute Maximum Ratings ( $T_C=25^\circ C$ , unless otherwise noted)**

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D@T_C=25^\circ C$	358	A
Continuous Drain Current <sup>1</sup>	$I_D@T_C=100^\circ C$	253	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	895	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	218	mJ
Total Power Dissipation <sup>4</sup>	$P_D$	167	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	---	45	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	---	0.9	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	---	---	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	0.5	0.7	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	1.0	1.4	mΩ
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0	---	2.0	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =36V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
Gate Resistance	R <sub>g</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	0.5	---	Ω
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	87	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	17	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	15	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, R <sub>G</sub> =1Ω, I <sub>D</sub> =1A	---	17	---	ns
Rise Time	T <sub>r</sub>		---	11	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	52	---	
Fall Time	T <sub>f</sub>		---	92	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz	---	6210	---	pF
Output Capacitance	C <sub>oss</sub>		---	2064	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	118	---	

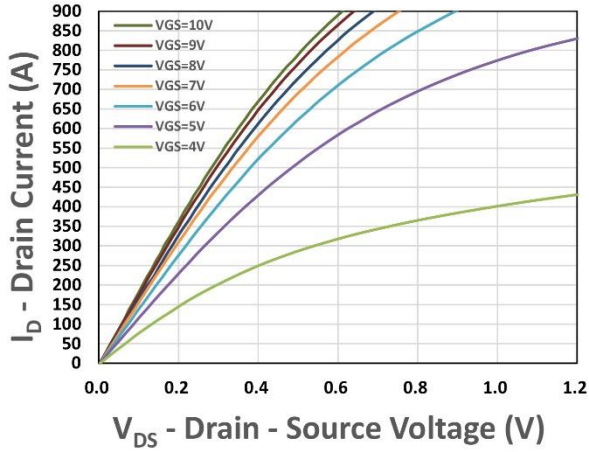
**Drain-Source Diode Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A, T <sub>J</sub> =25°C	---	0.8	1.1	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =10A, diF/dt=100A/μs	---	62	---	ns
Reverse recovery charge	Q <sub>rr</sub>		---	92	---	nC

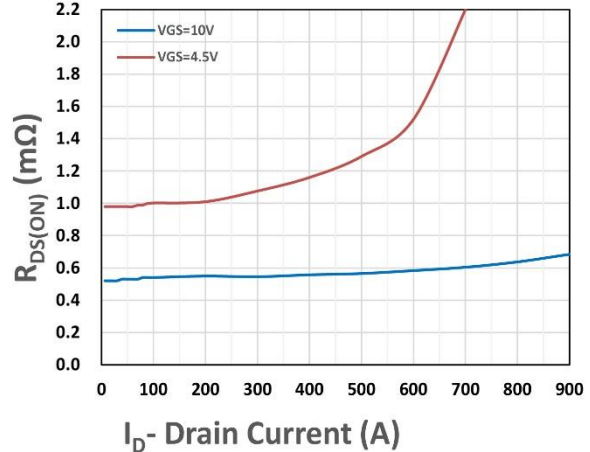
**Note:**

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=50V,L=0.1mH

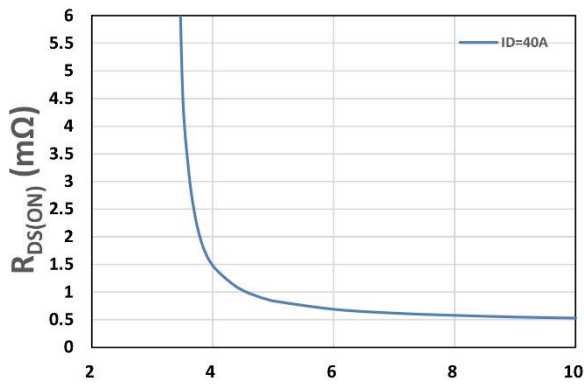
**Typical Characteristics**



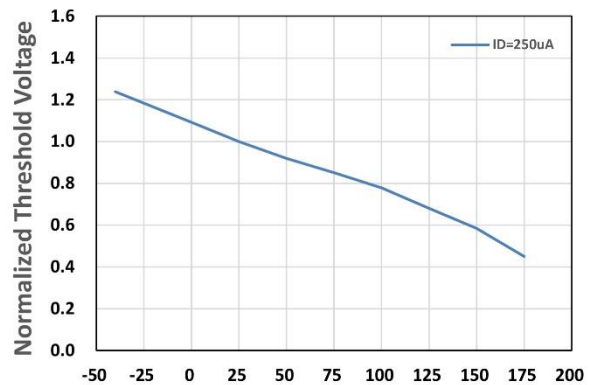
$V_{DS}$  - Drain - Source Voltage (V)  
Figure 1. Output Characteristics



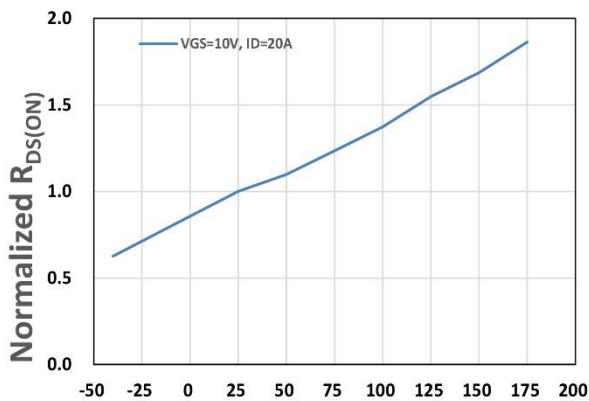
$I_D$  - Drain Current (A)  
Figure 2. On-Resistance vs.  $I_D$



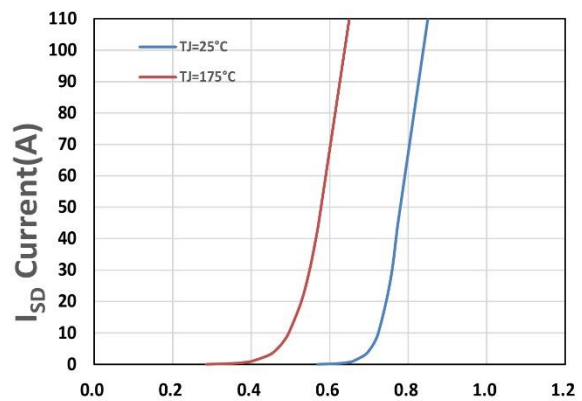
$V_{GS}$  - Gate - Source Voltage (V)  
Figure 3. On-Resistance vs.  $V_{GS}$



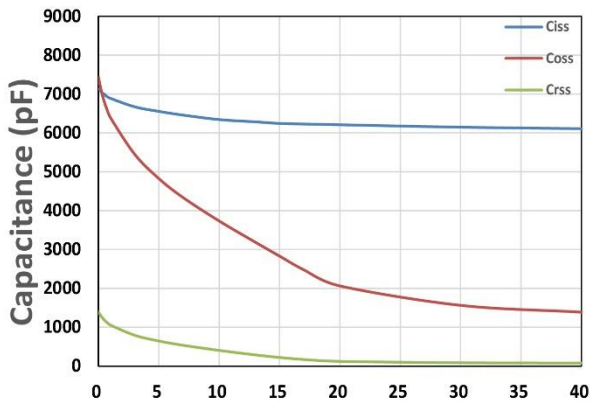
$T_j$ , Junction Temperature( $^{\circ}C$ )  
Figure 4. Gate Threshold Voltage



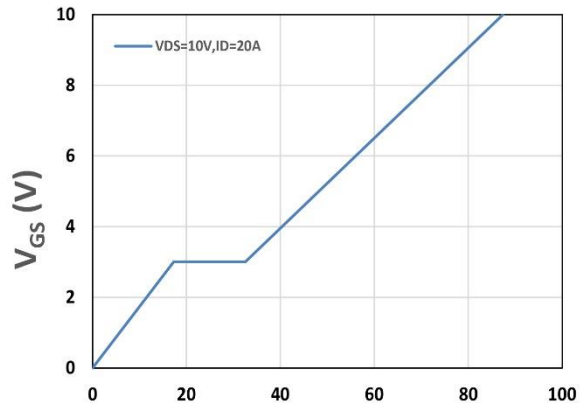
$T_j$ , Junction Temperature( $^{\circ}C$ )  
Figure 5. Drain-Source On Resistance



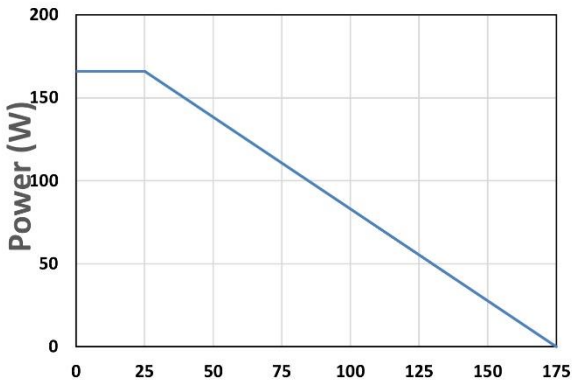
$V_{SD}$ , Source-Drain Voltage(V)  
Figure 6. Source-Drain Diode Forward



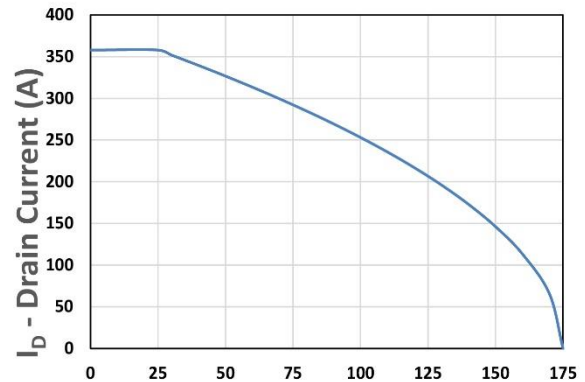
$V_{DS}$  - Drain - Source Voltage (V)  
Figure 7. Capacitance



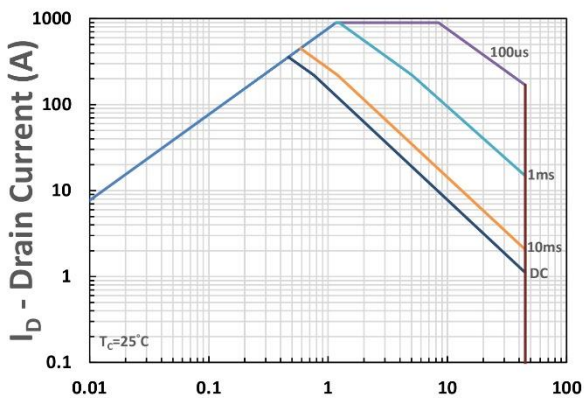
$Q_g$ , Total Gate Charge (nC)  
Figure 8. Gate Charge Characteristics



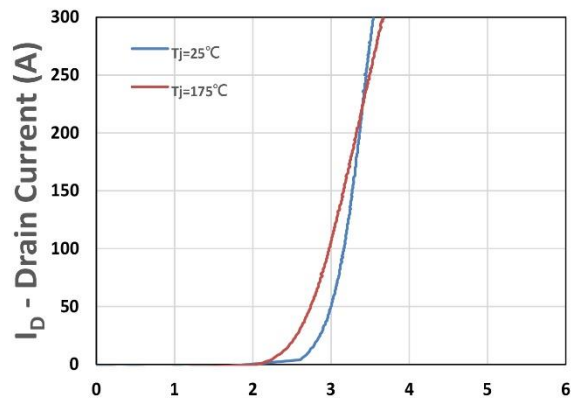
$T_c$ -Case Temperature (°C)  
Figure 9. Power Dissipation



$T_c$ -Case Temperature (°C)  
Figure 10. Drain Current

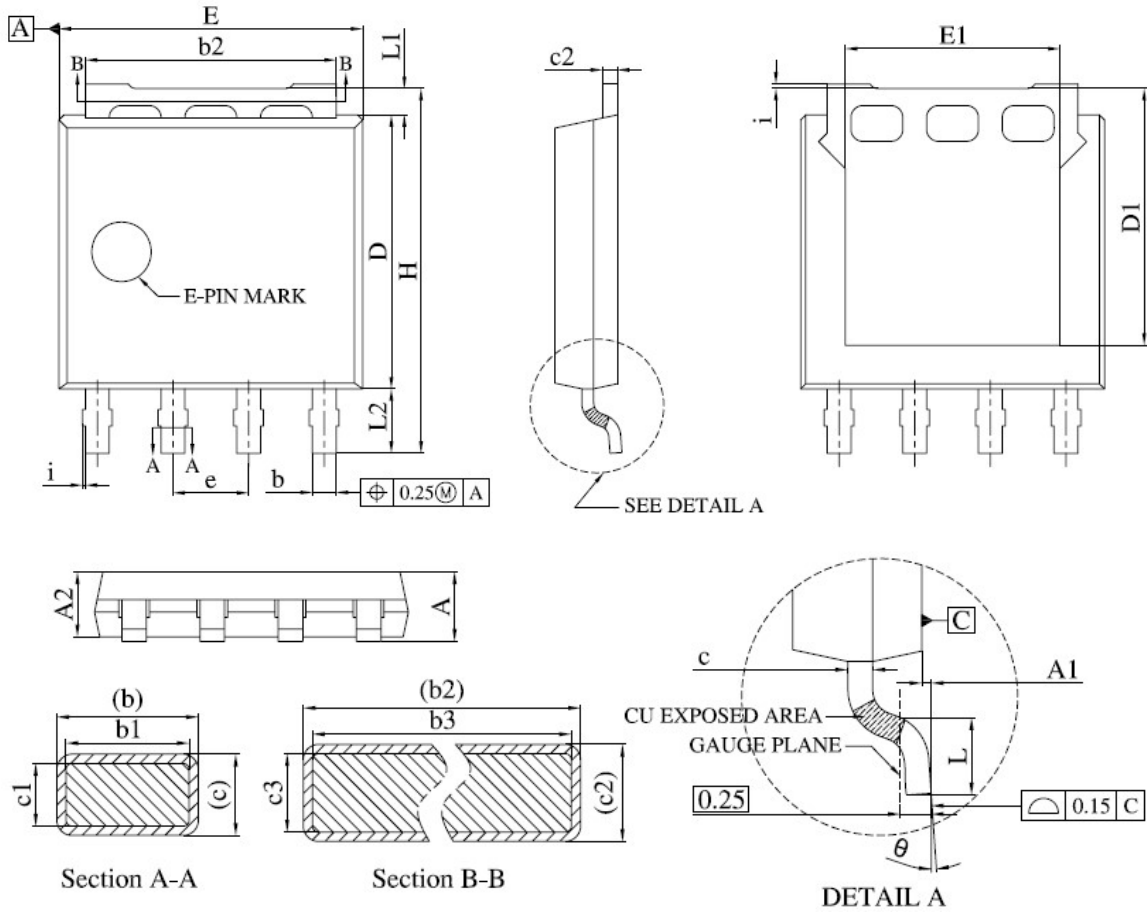


$V_{DS}$  - Drain-Source Voltage (V)  
Figure 11. Safe Operating Area



$V_{GS}$  - Gate - Source Voltage (V)  
Figure 12. Transfer Characteristics

**LFPAK56 Package Outline Dimensions**



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	1.00	1.30
A1	0.00	0.15
A2	0.98	1.12
b	0.35	0.50
b1	0.32	0.46
b2	4.02	4.41
b3	4.00	4.37
c	0.19	0.25
c1	0.17	0.23
c2	0.24	0.30
c3	0.22	0.28
D	4.45	4.70
D1	-	4.45
E	4.95	5.30
E1	3.50	3.70
e	1.27 BSC.	

Symbol	Dimensions In Millimeters	
	MIN.	MAX.
H	5.95	6.25
i	-	0.25
L	0.40	0.85
L1	0.27	0.57
L2	0.80	1.30
$\theta$	0°	8°

## Printing Information

ATC           =====Brand

XXXXXXX       =====Material Code

XXYY           =====XX Representative Year  
                  YY Representative Weeks