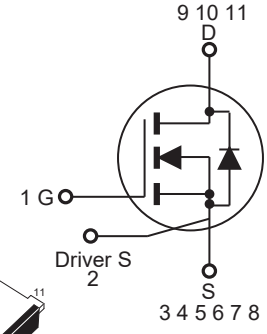
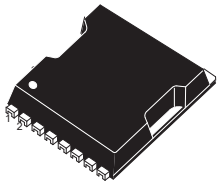
CEL52N65SF

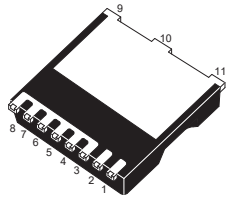
N-Channel Enhancement Mode Field Effect Transistor With Fast Body Diode

FEATURES

- 700V@$T_{J\,max}$, 52A, $R_{DS(ON)}$ = 58mΩ @V_{GS} = 10V
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- Pb-free lead plating ;RoHS compliant.
- Halogen Free.
- Fast reverse recovery time(Trr).
- TOLL package.







Applications

- EV Charging.
- Telecom.
- Server.
- Solar.
- SMPS.

ABSOLUTE MAXIMUM RATINGS T_C = 25°C unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous@ T_C = 25°C	I_D	52	A
@ T_C = 100°C		32	A
Drain Current-Pulsed [a]	I_{DM}	208	A
Maximum Power Dissipation @ T_C = 25°C	P_D	390	W
- Derate above 25°C		3.1	W/°C
Single Pulsed Avalanche Energy [f]	E_{AS}	380	mJ
Single Pulsed Avalanche Current [f]	I_{AS}	4.5	A
Operating and Store Temperature Range	T_J,T_{stg}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.32	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	60	°C/W

Electrical Characteristics T_C = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	650			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 650V, V_{GS} = 0V			5	μA
Gate Body Leakage Current, Forward	I_{GSSF}	V_{GS} = 30V, V_{DS} = 0V			100	nA
Gate Body Leakage Current, Reverse	I_{GSSR}	V_{GS} = -30V, V_{DS} = 0V			-100	nA
On Characteristics [b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 250μA	2.5		4.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		49	58	mΩ
Gate Input Resistance	R_g	f=1MHz,open Drain		3.4		Ω
Dynamic Characteristics [c]						
Input Capacitance	C_{iss}	V_{DS} = 100V,V_{GS}= 0V, f = 1MHz		2300		pF
Output Capacitance	C_{oss}			120		pF
Reverse Transfer Capacitance	C_{rss}			10		pF
Switching Characteristics [c]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 520V, I_D = 10A, V_{GS} = 10V, R_{GEN} = 10Ω		52		ns
Turn-On Rise Time	t_r			23		ns
Turn-Off Delay Time	$t_{d(off)}$			176		ns
Turn-Off Fall Time	t_f			9		ns
Total Gate Charge	Q_g	V_{DS} = 520V, I_D = 20A, V_{GS} = 10V		92		nC
Gate-Source Charge	Q_{gs}			21		nC
Gate-Drain Charge	Q_{gd}			37		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current	I_S				46	A
Drain-Source Diode Forward Voltage [b]	V_{SD}	V_{GS} = 0V, I_S = 20A			1.5	V
Reverse Recovery Time	T_{rr}	I_F = 20A,di/dt = 100A/us		183		ns
Reverse Recovery Charge	Q_{rr}			1.2		μC
Peak Reverse Recovery Current	I_{rr}			12		A
Reverse diode dv/dt ruggedness, V_{DS} = 0...480V , I_{SD} ≤ I_D	dv/dt	I_{DR} = 10A, V_{GS} = 0V, V_{DD} = 400V		100		V/ns
MOSFET dv/dt ruggedness, V_{DS} = 0...480V				100		V/ns

Notes :
a.Repetitive Rating : Pulse width limited by maximum junction temperature.
b.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
c.Guaranteed by design, not subject to production testing.
d.L = 37.5mH, I_{AS} =4.5A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C.

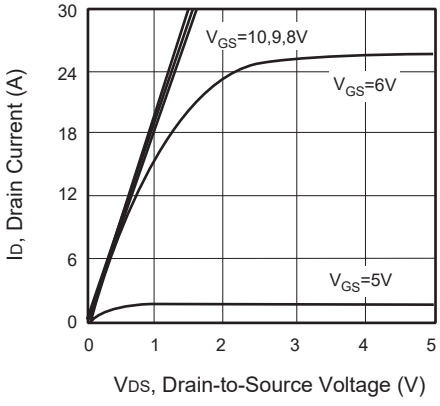


Figure 1. Output Characteristics

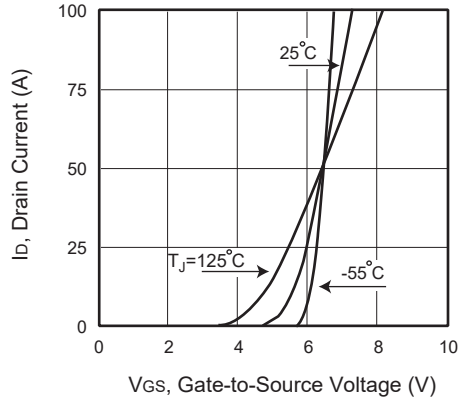


Figure 2. Transfer Characteristics

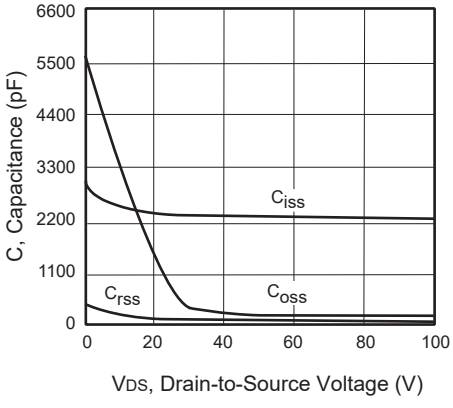


Figure 3. Capacitance

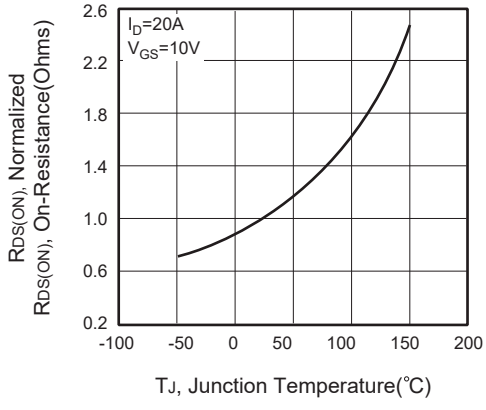


Figure 4. On-Resistance Variation with Temperature

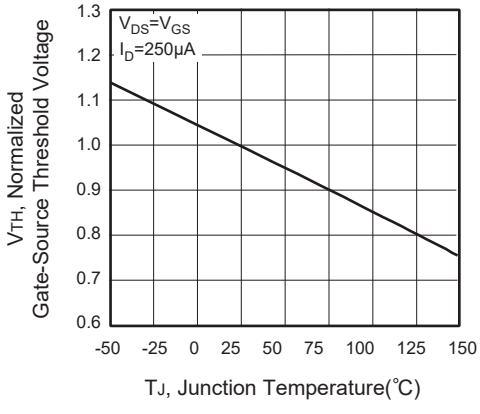


Figure 5. Gate Threshold Variation with Temperature

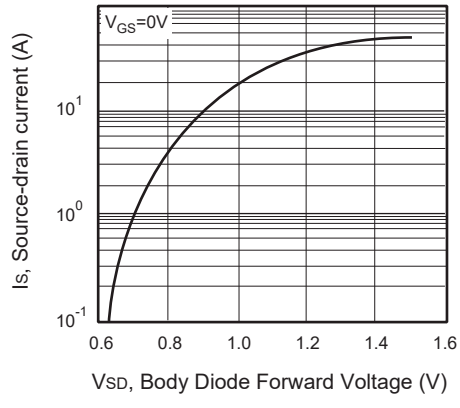


Figure 6. Body Diode Forward Voltage Variation with Source Current

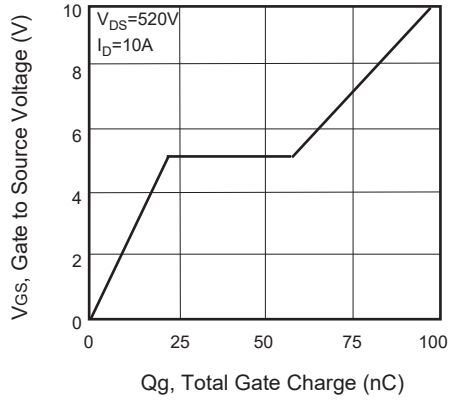


Figure 7. Gate Charge

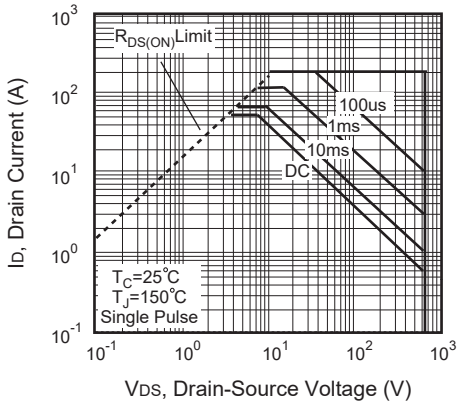


Figure 8. Maximum Safe Operating Area

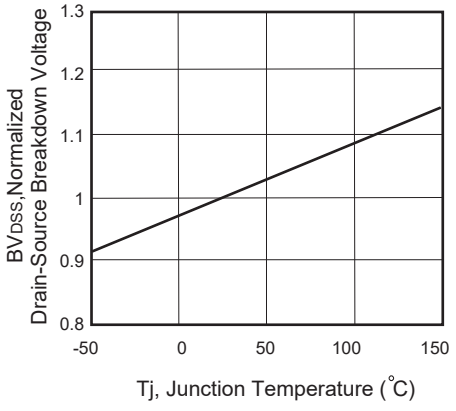


Figure 9. Breakdown Voltage Variation VS Temperature

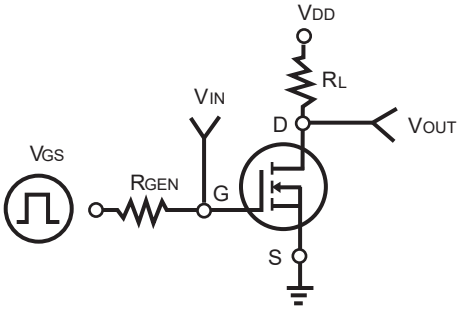


Figure 10. Switching Test Circuit

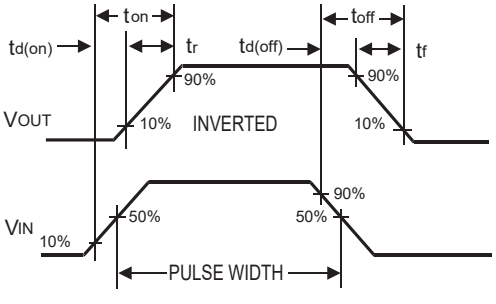


Figure 11. Switching Waveforms

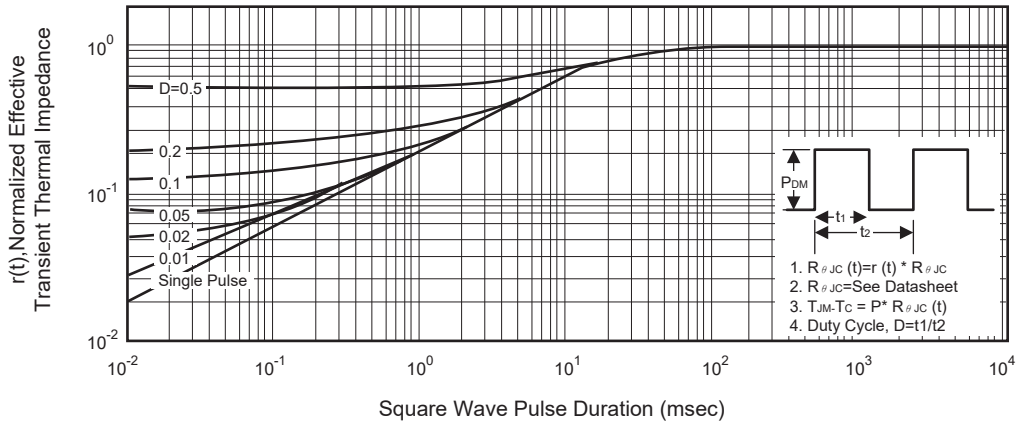
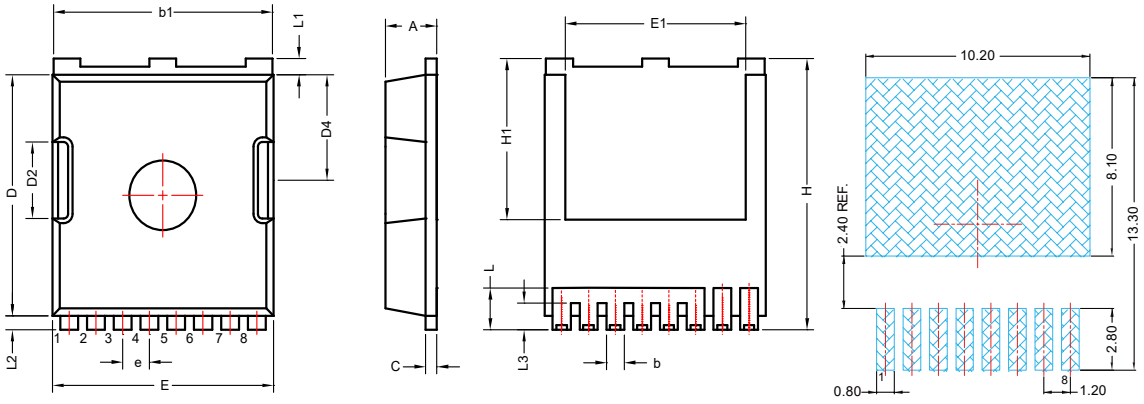


Figure 12. Normalized Thermal Transient Impedance Curve

TOLL 產品外觀尺寸圖 (Product Outline Dimension)



Land Pattern
(Only For Reference)

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.150	2.450	0.085	0.096
b	0.700	0.900	0.028	0.035
b1	9.650	9.950	0.380	0.392
c	0.400	0.600	0.016	0.024
D	10.180	10.580	0.401	0.417
D2	3.150	3.450	0.124	0.136
D4	4.400	4.700	0.173	0.185
E	9.700	10.100	0.382	0.398
E1	7.950	8.250	0.313	0.325
e	1.20BSC		0.047BSC	
H	11.480	11.880	0.452	0.468
H1	6.800	7.100	0.268	0.280
L	1.500	2.100	0.059	0.083
L1	0.500	0.900	0.020	0.035
L2	0.500	0.720	0.020	0.028
L3	1.000	1.300	0.039	0.051